

P-ISSN:2085-3475
E-ISSN: 2540-9972



JURNAL PROMKES

Jurnal Promosi dan Pendidikan Kesehatan Indonesia

Vol. 13 | No. 1
September, 2024

Published by:
Department of Health Promotion and Behavior Sciences
Faculty of Public Health
Universitas Airlangga

Qualitative Study: Health Empowerment Model of Suku Anak Dalam (SAD) Along the Central Crossing Sumatera Indonesia

M. Ridwan^{✉1}, Umami Kalsum¹, Rd. Halim¹

¹ Department of Public Health, Faculty of Medicine and Health Science, Universitas Jambi, Jambi, Indonesia 35361

✉Email: fkm.ridwan@unja.ac.id

ABSTRACT

Background: Health problems are still a major issue for the Suku Anak Dalam (SAD). Knowledge of health, personal hygiene, trust with migrants, desire to improve themselves and economic ability are still obstacles to healthy living. Efforts have been made but have not shown maximum results. **Objectives:** The research aims to find strategies for empowerment approaches to improve healthy behavior for SAD along the Central Cross of Sumatera. This research is expected to produce an empowerment strategy to improve health and enable people to behave healthily. **Methods:** The research design for this study is qualitative, with 43 informants consisting of the Public Health Department, Public Health Center, tumenggung, jenang, Pundi Sumatra NGOs, and SAD residents in four residential areas of the research location. Data collection was done using in-depth interviews and observations. The research locations are in Sarolangun District, Merangin, and Bungo Jambi District. **Results:** Health empowerment research conducted by the Health Service and Community Health Centers has been carried out with outreach activities, free treatment, and reproductive health, but has not shown success because no special SAD assistants are living in the settlement to provide examples of the healthy behavior they expect. Empowerment is carried out by non-governmental organizations (NGOs) with a strategy of providing special workers as companions in residential locations so that they can meet the needs of the community along with other stakeholders and can increase community trust so that it is easier for community mobilizers to accept change. **Conclusion:** The strategy of the health empowerment approach is to prepare a companion for each group who lives with them and understands sufficient health knowledge. Tumenggung's role as a mobilizer is becoming a key figure in the SAD community movement.

Keywords: Empowerment, SAD, Sumatera

INTRODUCTION

The population of SAD in Jambi Province in 2010 was 3,205 people and there was an increase in population to 12,909 people or 2951 families in 2019 (BPS Jambi Province, 2019). Data obtained from the NGO Pundi Sumatera SAD along the Sumatran Cross spread from Sarolangun to Damasraya consist of 10 rombongan (groups) totaling 491 people including Rombongan abas, rombongan Yudi, and Rombongan marni Rombongan sir, and Bujang rendah, rombongan tumenggung lintas, Rombongan tumenggung Jurai, Rombongan storm, Rombongan Nurani, and Rombongan Ngilo.

The government has made efforts to improve welfare in the economic sector in collaboration with non-governmental organizations including increasing health independence, but it is still not optimal,

one of which is the problem of low behavior. NGO and government collaboration is needed to carry out empowerment for the SAD (Eliza, 2018). There is an absence of local regulations on the recognition and protection of ethnic groups which has resulted in village officials not having a concept in granting decent rights to them so they have a SAD life in Merangin Regency (Bakhtiar et al., 2020). Socialization to the Kades and their officials is needed in order to find out the condition of the Selapik Hamlet community which has an inner tribe (Asra et al., 2018). Tumenggung leadership patterns affect social life, political awareness, environmental awareness and health awareness among the SAD (Samsu et al., 2022). Health problems are still a problem for the SAD community. Unsafe childbirth of inner children assisted by shamans and

carried out in nursing homes that have a SAD care can facilitate access to health services for the SAD (Ridwan & Lesmana, 2018). Health cadres who come from the SAD will be able to influence healthy behavior (Ridwan et al., 2020). The search for maternity assistance in the SAD community prioritizes shamans (Ridwan et al., 2021).

Health empowerment of the SAD along the Central Cross of Sumatra in Sarolangun, Bungo and Merangin districts in the promotive and preventive fields has not shown success. The efforts made by the public health center are still limited to treatment efforts due to the difficulty of building communication and mobilization to the community. This is evidenced by the low personal hygiene of the community, the cleanliness of the residential environment, and knowledge about maintaining the health of individuals and families. The study was conducted on communities that had settled or had settlements. SAD along the Sumatran Cross lives mostly from various activities that are greater than SAD who are still in the jungle. Some already have oil palm plantations, become police officers and have been able to continue their education at university. Community access to rural communities is getting closer. It is interesting how the inner tribe empowerment approach is applied to improve healthy behavior so that it has an impact on social life with people outside the community. The purpose of the study is to find how the empowerment approach strategy is carried out to improve the healthy behavior of SAD in the Central Cross of Sumatra Jambi.

METHODS

This research uses qualitative methods, with a case study approach, in four groups/rombongs. The head of the group in high risk of complications and can result in death (Guspianto et al., 2019).

RESULTS AND DISCUSSION

Table 1. Characteristics of informants.

| No | Informer Code | Age | Position | Location / rombongan / kab |
|----|---------------|--------|------------|--|
| 1 | KB.01 | 57 /LK | Tumenggung | Dwikarya Bhakti Village, Bungo Regency |
| 2 | KH.02 | 40 /LK | Tumenggung | Dwikarya Bhakti Village, Bungo Regency |
| 3 | KT.03 | 55/PR | Citizen | Dwikarya Bhakti Village, Bungo Regency |
| 4 | KS.04 | 70/PR | Citizen | Dwikarya Bhakti Village, Bungo Regency |
| 5 | KR.05 | 23/PR | Citizen | Dwikarya Bhakti Village, Bungo Regency |
| 6 | KM.06 | 65/LK | Citizen | Dwikarya Bhakti Village, Bungo |

Traditional healers have knowledge and skills from ancestral spirits. Traditional healers treat various diseases in the community by using herbal medicines (Sodi et al., 2011). SAD empowerment model with the SAD Community is called a tumenggung. Suka jadi Rombongan Village/Cross district group Sarolangun, Dwikarya Bhakti village consists of two groups, namely Tumenggung Hari and Tumenggung badai Bungo regency. Tumenggung group Jurai Pematang Kejumat limbur tembesi village Sarolangun Regency. Rombongan tumenggung Yudi pelakar jaya village, Merangin Regency. Data collection was conducted through in-depth interviews with all informants due to the difficulty of communicating with SAD residents. Observations are made to see health behaviors in daily life. The study was conducted for 3 months from September to December 2023. The study involves 43 informants, consisting of five tumenggungs, 27 from the SAD community, and one jenang and from the government (consisting of social health department and public health center) as many as six people, and four informants from non-governmental organizations (NGOs). Data analysis is using *content analysis*. The results of in-depth interviews with the SAD community and stakeholders were transcribed, followed by coding, namely interpreting the words from the in-depth interviews. The coding results are combined into sub-themes which are then are combined to produce research result themes. The themes of the research results are expressed in writing and connected to the results of previous research and existing theories about empowerment. This research has received ethical equality from the Health Research Ethics Committee of the Jambi Ministry of Health Poltekkes No. LB.02.06/2/624/2023, dated September 18, 2023.



| | | | | Regency |
|----|--------|--------|----------------------------------|--|
| 7 | KK.07 | 45/LK | Citizen | Dwikarya Bhakti Village, Bungo Regency |
| 8 | KP.08 | 50/LK | Citizen | Dwikarya Bhakti Village, Bungo Regency |
| 9 | KN.09 | 70/Pr | Citizen | Dwikarya Bhakti Village, Bungo Regency |
| 10 | PJ.01 | 40/LK | Tumenggung | Pelakar Jaya Village, Merangin Regency |
| 11 | PJ.02 | 35/Pr | Citizen | Pelakar Jaya Village, Merangin Regency |
| 12 | PJ.03 | 32/PR | Citizen | Pelakar Jaya Village, Merangin Regency |
| 13 | PJ.04 | 34/PR | Citizen | Pelakar Jaya Village, Merangin Regency |
| 14 | PJ.05 | 40/Pr | Citizen | Pelakar Jaya Village, Merangin Regency |
| 15 | PJ.06 | 49/LK | Citizen | Pelakar Jaya Village, Merangin Regency |
| 16 | PJ.07 | 58/PR | Citizen | Pelakar Jaya Village, Merangin Regency |
| 17 | PK.01 | 23/Lk | Citizen | Limbur Tembesi Village, Sarolangun Regency |
| 18 | PK.02 | 63/Lk | Tumenggung | Limbur Tembesi Village, Sarolangun Regency |
| 19 | PK.03 | 62 | Jenang | Limbur Tembesi Village, Sarolangun Regency |
| 20 | PK.04 | 50/lk | Citizen | Limbur Tembesi Village, Sarolangun Regency |
| 22 | PK.06 | 50/PR | Citizen | Limbur Tembesi Village, Sarolangun Regency |
| 23 | PK.07 | 40/PR | Citizen | Limbur Tembesi Village, Sarolangun Regency |
| 24 | RL.01 | 37 /LK | Tumenggung | Sukajadi Village, Sarolangun Regency |
| 25 | RL.02 | 40/LK | Citizen | Sukajadi Village, Sarolangun Regency |
| 26 | RL.03 | 53 /LK | Citizen | Sukajadi Village, Sarolangun Regency |
| 27 | RL.04 | 18/LK | Citizen | Sukajadi Village, Sarolangun Regency |
| 28 | RL.05 | 20/LK | Citizen | Sukajadi Village, Sarolangun Regency |
| 29 | RL.06 | 19/PR | Citizen | Sukajadi Village, Sarolangun Regency |
| 30 | RL.07 | 20/PR | Citizen | Sukajadi Village, Sarolangun Regency |
| 31 | RL.08 | 18/p | Citizen | Sukajadi Village, Sarolangun Regency |
| 32 | RL.09 | 40/p | Citizen | Sukajadi Village, Sarolangun Regency |
| 33 | RL.10 | 47/p | Citizen | Sukajadi Village, Sarolangun Regency |
| 34 | FS.01 | 28/LK | Facilitator of NGO Sumatra pundi | Dwikarya Bhakti Village, Bungo |
| 35 | FS.02 | 27/L | Facilitator of NGO Sumatra pundi | Sukajadi, Sarolangun Regency |
| 36 | FS.03 | 26/P | Facilitator of NGO Sumatra pundi | Bhakti Dwikarya Village, Bungo Regency |
| 37 | FS.04 | 40/PR | Sumatran Pundi | |
| 38 | PM.01 | 53/LK | Government | Health Department Bungo Regency |
| 39 | PM.02 | 57/PR | Government | Department social Bungo Regency |
| 40 | PM.03 | 53/LK | Government | Public Health Center Rantau Keloyang , Bungo Regency |
| 41 | PM.04 | 48/LK | Government | Health Department, Sarolangun Regency |
| 42 | PM.05 | 46/PR | Government | Public Health Center Pamenang , Merangin Regency |
| 43 | PM. 06 | 34/LK | Government | Health Department Merangin Regency |

Source: Primary Data

From the results of in-depth interviews with informants from the Health Department and Public Health Center, informants have made efforts to approach tumenggungs and tribal groups/rombongs to provide education and treatment activities. Activities in the community are carried out every month by the Health Department through the Public Health

Center, to conduct coaching, counseling, health checks, free medicine, mass circumcision, and health promotion activities, maternal and child health, and disease control and prevention. The following is an excerpt from the explanation above:

Community facilities are generally the same as the community, only what distinguishes it is public health centre

personnel who visit their place every month to carry out services, health coaching, health checks, and many others (PM.04)

...health departments and public health centers provide counseling, treatment, and circumcisions...the treatment that the community receives is the same as that done at SAD... (PM.03)

The inhibiting factor in running a health program is the lack of understanding from the inner tribe, both knowledge and routine application. The community has great difficulty remembering health knowledge. Most cannot read so media in the form of writing becomes an obstacle in their understanding. In addition, there are no health workers as companions in the community so the program that is carried out is not as expected, behavior is still far away from expectations, and personal hygiene from the community is still very low. This is in contrast to the activities of NGO Pundi Sumatra which places facilitators in the community so that this approach is more successful for approaching and mobilizing communities. Here are excerpts from interviews with informants:

... The obstacle in the SAD community is that sometimes they want to do counseling, and sometimes some want to listen, not (PM.04)

... Suku Anak Dalam health program has been carried out by the sub-district health center..., but no health workers are living there (PM.06)

We place facilitators in this community as a strategy of empowerment approach that we do, to connect needs with stakeholders and can accompany other community activities on site (FS.04)

Observations and interviews were carried out in four research locations; one location in Dwikarya Bhakti Bungo village has differences when viewed from the ability to behave healthily. The interview found that many programs that were intervened by various stakeholders made a difference in receiving information and the desire to carry out healthy behaviors. One

of them is the inclusion of the estungkara program from the Sumatran pundi program which provides a touch of health programs with training of health cadres, and programs to make additional food for toddlers. The task of the report facilitator is also to continue the health program to assist the community in the practice of daily healthy behavior. Another health program is a practice program for health students from universities with longer stays in the community. These students provides examples of healthy behavior in everyday life such as bathing, washing hands with shabu, combing hair, throwing out garbage, and cleanliness of the home environment.

... at the location of Dwikarya Bhakti there has been a good change, the family has been able to live a clean life, bathe, dress and clean the residential environment. This is also supported by their economic capabilities, because they already have an oil palm plantation along with other activities... (FS.01)

We are happy that many people come here because they can help our children to learn health and read, can dare to convey health messages in front of friends, learn to cook nutritious meals, and take many more baths that we get, for example, students ... (KT.03)

Another program is a special posyandu activity SAD where this posyandu is carried out to train cadres to provide education to fellow communities and give confidence to the community to be able to deliver health. This posyandu can provide independence for the community about health empowerment. The posyandu program in its implementation, the role of tumenggung and figures in the group are very influential in the context of community mobilization. With this special posyandu, government programs in the health sector can be felt by the community through posyandu. Previously, the posyandu activity community joined the village community; this was a conflict with the village community due to a lack of acceptance by the community.

...we are happy that there is a posyandu in our settlement because our children can be healthy... we also learn a lot about health.... (KR.05)

In the past, posyandu joined the community, but SAD residents did not want to go there because of the lack of acceptance by residents... some come but can't do the whole (KN.09)

To mobilize the people of SAD, tumenggung's role is very important because it is tumenggung who they consider as their leader (PK.03)

Children and young women are more receptive to new experiences and knowledge, while parents are more difficult because their past culture is ingrained in their lives. The community more quickly forgets what is conveyed by health workers and facilitators with the lecture method. This was conveyed by residents of the SAD Community:

...We are easier to understand with pictures easy to remember.... (KR.05)

... we see that residents can do what is conveyed with picture posters and practice what we say, for example: steps to wash hands with soap (FS.03)

From the results of interviews with informants, community knowledge can be increased by giving media posters with more pictures and practicing the message to be conveyed; this will enable greater understanding and they are given counseling with lectures. An easy target for intervention is girls and adolescents.

Table 2. The difference in empowerment is carried out by requesters and non-governmental organizations from the level of success.

| No | Government | Non-governmental organizations |
|----|--|---|
| 1 | There is no special companion in the settlement | Facilitators settle in settlements with the community |
| 2 | It is difficult to mobilize the community because of incidental activities | It is easier to mobilize because every day it interacts with the community |
| 3 | Community Trust is very low | More trust because at any time you can accompany the community to solve the problems faced |
| 4 | Non-continuous program | The program focuses more on accelerating health and economic improvement and is sustainable |
| 5 | Only set up the community to be able to interact with the Community | Preparing community acceptance of the community by involving the SAD program with the village government and preparing to interact with the community |

The role of the government through the Health Department and Public Health Center has made efforts to empower community health throughout Central Sumatra but has not been maximized due to the lack of assistance to the community in behaving healthily. This has an impact on the level of community trust so that it is difficult to mobilize the community to live healthy. The central figure in the SAD community is the tumenggung so that in order for the health empowerment program to run well, the involvement of the tumenggung is the key to its success. Unlike programs by non-governmental organizations, placing special facilitators in settlements will have an impact on the results of empowerment activities that are carried out more easily in mobilizing for healthy behavior change. Regular training and mentoring of health workers is also

needed to monitor the skills of public health workers, especially in providing health education to the community (Dewi et al., 2023). The empowerment of Remote Indigenous Communities by the Regional Government of Bengkalis Regency has not run as it should be where it is only limited to providing facilities and infrastructure assistance both in the field of human resource empowerment, social environment and social protection and advocacy, and the assistance provided has not been utilized by the people of Remote Indigenous Communities (Andriyus et al., 2021). The level of knowledge of the isolated and vulnerable Bonai ethnic community is included in the low category (Suparman et al., 2019). The program is carried out but is still routine, for example, mass treatment activities or visits several times a year, but does not

specialize programs and personnel to provide assistance in the community. The problems faced by KAT residents are very complex, so they require the right strategy in implementing KAT empowerment (Tranggano et al., 2020). The most effective model of community empowerment to free shackling is always to involve health cadres and health workers (Poltekkes et al., 2018). The results of empowerment research in coastal communities found that low health behavior is caused by; (1) low public education; (2) low willingness to learn; (3) limited health workers conducting health socialization and promotion activities; (4) access to information using leaflets (brochures) provided for those present (Yuliastina et al., 2020).

From the results of conversation and interviews with informants, health empowerment in communities cannot run alone, requiring collaborative work with many government sectors, NGOs, universities and the business world. Coordination between the programs of the parties is necessary so that the programs carried out will be useful and do not overlap between one program and another. Collaborative work will accelerate changes in the inner child tribe. In discussing the problem, it was stated that the difficulties faced by KAT are aspects of empowerment, namely power, cognitive, psychological, economic, and political (Hadiyanti, 2009). The Collaborative Cooperation Program in SAD of the children tribe in the village water pump in Batanghari district shows success in the development and empowerment program through government and CSR efforts with the division of authority and building commitment between the two (Efendi, 2020). The study concludes that there is a systematic and strategic exclusion of tribal representatives, who are ready and able to participate in local governance and successfully represent tribal interests (Rout & Patnaik, 2014). The causes of interethnic conflict are economic inequality, lack of religious understanding, and unfair treatment (Rashid et al., 2023). The involvement of the Batek community in empowering Indigenous tourism in Malaysia needs to be increased directly. The tourism sector which involves Indigenous peoples, if implemented with the right methods and strategies as discussed, allows the Batek community to

make this sector a new economic source while being able to maintain their culture and way of life (Ibrahim et al., 2023). Health programs have not focused on mentoring efforts in maintaining cleanliness and healthy behavior. This is because the energy and budgeting in the Public Health Center have not been fulfilled to run programs for the SAD community. Community empowerment activities in risk management are carried out to three subjects of community elements, namely adolescents, parents and adults and local organizations (Akbar et al., 2019). Women need to be empowered by creating safe spaces for them, supporting their mobility and independence inside and outside the home, promoting savings among them, generating skills through training, improving their decision-making skills, improving their reproductive health and providing them with better education (Patidar, 2018). Continuing to empower women from social, cultural, and institutional barriers is critical, as emerging correlations between women's leadership, health systems, and peacebuilding are critical for long-term stability, the right to health, and health system response (Meagher et al., 2023).

CONCLUSION

The strategy of the inner tribe health empowerment approach used is to provide assistance to personnel who live in settlements to increase trust that can generate empathy. This has an impact on facilitating the mobilization of the SAD community. The success of the health empowerment program will be quicker by collaborating with cross-sectors (government, businesses, NGOs, and universities).

REFERENCES

- Akbar, M., Social Rehabilitation of the Elderly, L., Jl Poros Bandara Haluoleo Kendari -Southeast Sulawesi, K., Susilowati, E., Social Welfare Jl Ir Djuanda, P. H., -West Java, B. (2019). Model of community empowerment in handling at-risk adolescents in Rw 09 Kebon Pisang Bandung City. *BIYAN: Scientific Journal of Social Work Policy and Services*, 1(2), 2019.

- Andriyus, A., Febrian, R. A., Handrisal, H., & Adni, D. F. (2021). Empowerment of Remote Indigenous Communities (KAT) by the Regional Government of Bengkalis Regency. *RUDDER : Journal of Government Science*, 6(01), 63-74. <https://doi.org/10.31629/kemudi.v6i01.3660>
- Asra, R., Naswir, M., Kalsum, U., & Lestari, A. P. (2018). Improving the Quality of Education for SADChildren in Selapik Hamlet, Muaro Jambi Regency. *Journal of Community Service Works*, 2(1), 1-8. <https://doi.org/10.22437/jkam.v2i1.5424>
- Bakhtiar, R., Anshar, S., Zumiarti, Z., Fitri, A., & Prayitno, R. (2020). Policy of Jambi Provincial Government of Merangin Regency regarding SADTribe. *UNES Law Review*, 2(4), 383-391. <https://doi.org/10.31933/unesrev.v2i4.128>
- BPS Jambi Province (Ed.). (2019). *Jambi Province in 2019 figures*. BPS Jambi Province/.
- Dewi, A., Supriyatiningsih, S., Sundari, S., Sugiyo, D., & Dewi, D. T. K. (2023). Community health worker empowerment through collaborative models with community midwifery. *International Journal of Public Health Science*, 12(2), 510-517. <https://doi.org/10.11591/ijphs.v12i2.22431>
- Efendi, G.N., & Purnomu, E.P. (2020). Collaboration Government and CSR A Case Study of SADin Pompa Air village, Jambi-Indonesia *International Journal of Academic Research in Business, Arts and Science (IJARBAS.COM)*, 2(1), 19-39. <https://doi.org/10.5281/zenodo.3632103>
- Eliza, F. R. (2018). The Role of Government toward KAT SAD Empowerment Program in Jambi Province in 2018. *Jambi Kesmas Journal*, 2(1), 40-49.
- Guspianto, G., Amir, A., & Mekarisce, A. A. (2019). Analysis of Maternity Behavior of Remote Indigenous Communities in Bukit Duabelas National Park Area, Sarolangun Regency, Jambi Province. *Indonesian Public Health Media*, 15(4), 391. <https://doi.org/10.30597/mkmi.v15i4.7991>
- Hadiyanti, P. (2009). Empowering remote indigenous peoples through out-of-school education models. *Jiv*, 4(2), 197-203. <https://doi.org/10.21009/jiv.0402.8>
- Ibrahim, A., Abdullah, R., Jazmina, W. N., Ismail, W. N. A. T., & Olaitan, A. (2023). Strategy Formulation To Empower Indigenous Community Involvement in Cultural Ecological Tourism of Kuala Tahan National Park. *Planning Malaysia*, 21(1), 36-47. <https://doi.org/10.21837/PM.V21I25.1222>
- Jena, A., Mishra, P. K. K., Ojha, S., & Joshi, P. (2018). Women Empowerment Through Agripreneurship. *International Journal of Science, Environment and Technology*, 7(4), 1329-1333. <http://www.ijset.net/journal/2179.pdf>
- Meagher, K., Khaity, M., Hafez, S., Rodo, M., Achi, N. El, & Patel, P. (2023). Strengthening health systems and peacebuilding through women's leadership: a qualitative study. *Globalization and Health*, 19(1), 1-18. <https://doi.org/10.1186/s12992-023-00920-1>
- Patidar, H. (2018). Women's empowerment and fertility behaviour among the Tribals of Rajasthan, India. *Space and Culture, India*, 5(3), 129-139. <https://doi.org/10.20896/saci.v5i3.285>
- Poltekkes, S., Malang, K., Blitar, K., Soetomo, J., & Blitar, N. (2018). COMMUNITY EMPOWERMENT MODEL IN PASUNG LIBERATION ACCORDING TO JAVANESE CULTURAL PERSPECTIVE Community Empowerment Model In Liberation Airborne Java Cultural Perspective. *Mar*, 4(1), 27-43.
- Rasyid, A., Lubis, R. F., Hutagalung, M. W. R., Lubis, M. A., Mohd Nor, M. R., & Vinandita, A. (2023). Local Wisdom Recognition in Inter-Ethnic Religious Conflict Resolution in Indonesia from Islah Perspective. *Juris: Sharia Scientific Journal*, 22(1), 13-26. <https://doi.org/10.31958/juris.v22i1.8432>

- Ridwan, M., & Lesmana, O. (2018). Model of Empowerment of Tribe Children in the Health Sector. *Jambi Kesmas Journal*, 2(2), 97-103.
- Ridwan, M., Reskiaddin, L. O., Ningsih, V. R., & Sari, P. (2020). Emotional demonstration approach in an effort to improve the practice of clean and healthy living behavior of SADin Pelakar Jaya Village. *Journal of Community Healthy Greetings (JSSM)*, 2(1), 42-48. <https://doi.org/10.22437/jssm.v2i1.11160>
- Ridwan, M., Sari, P., & Ningsih, V. R. (2021). Supporting Factors in Searching for Childbirth Assistance for the Anak Dalam Tribe (SAD) Community in Bungo Regency, Indonesia. *Aisyah Journal : Journal of Health Sciences*, 6(4), 631-638. <https://doi.org/10.30604/jika.v6i4.813>
- Rout, S., & Patnaik, P. (2014). Institutional Exclusion and Tribal Interest: Decentralized Government in the Context of Conflicts over Development in India. *Journal of Developing Societies*, 30(2), 115-143. <https://doi.org/10.1177/0169796X14525532>
- Samsu, S., Rusmini, R., Kustati, M., Ritonga, M., Novia Maulana, A., & Zulmuqim, Z. (2022). Tumenggung leadership and educational model in leading indigenous people: Suku Anak Dalam portrait. *Cogent Social Sciences*, 8(1). <https://doi.org/10.1080/23311886.2022.2123634>
- Sodi, T., Mudhovozi, P., Mashamba, T., Radzilani-Makatu, M., Takalani, J., & Mabunda, J. (2011). Indigenous healing practices in Limpopo Province of South Africa: A qualitative study. *International Journal of Health Promotion and Education*, 49(3), 101-110. <https://doi.org/10.1080/14635240.2011.10708216>
- Suparman, Saam, Z., Hidir, A., & Suwondo. (2019). The influence of bonai tribal remote indigenous community knowledge on the environment. *International Journal of Innovative Technology and Exploring Engineering*, 8(11), 1502-1509. <https://doi.org/10.35940/ijitee.K1878.0981119>
- Tranggano, M., Effendy, K., Lukman, S., & Tahir, I. (2020). Analysis of Policy Implementation of Empowerment of Remote Indigenous Communities in Buru District, Maluku Province. *Ejournal.Ipdn.Ac.Id*, XII, 97-112. <http://ejournal.ipdn.ac.id/JAPD/article/view/1362/771>
- Yuliastina, R., Tini, D. L. R., & Isyanto, I. (2020). The Role of Health Communication in Coastal Community Empowerment (Study on Madura Fishermen and Salt Farmer Groups). *Journal of Communication*, 14(2), 173-186. <https://journal.trunojoyo.ac.id/komunikasi/article/view/8826>

The Effects of Promotional Efforts Based on Gender Characteristics on Knowledge and Practice of Personal Genital Hygiene among Students of SD Negeri Ledug

Mahfuroh Sulistia✉¹⁾, Deisy Sri Hardini¹⁾

¹ Undergraduate Nursing Study Program, Faculty of Health Sciences, Muhammadiyah University Purwokerto, Purwokerto, Central Java, Indonesia 53182

✉Email: mahfurohsulistia123@gmail.com

ABSTRACT

Background: Hygiene behavior is very important to prevent children and adolescents from falling into various forms of sexual violence which are increasingly common in this millennial era. It is important to provide sexual education from an early age. **Objectives:** This research aims to identify the influence of promotive efforts based on gender characteristics on the knowledge and practice of personal genital hygiene in Ledug State Elementary School students. **Methods:** This was quantitative research with a quasi-experimental design with a Solomon four-group approach. The sample was 70 respondents using the simple random sampling method. Data analysis used the one-way ANOVA test. **Results:** The results of this research are the results of the one-way ANOVA statistical test which obtained a p-value of 0.000 which means $p < 0.05$; for knowledge, the average result of the female intervention group was greater, with a score of 29.3. Meanwhile, the skill that had the highest average value was the male intervention group, with a score of 19.4. **Conclusion:** There is an effect of promotional efforts based on gender characteristics on knowledge and practice of personal genital hygiene among students of SD Negeri Ledug. Ledug Elementary School students are expected to have a greater desire to know and a better way of thinking to gain knowledge, intellectual skills and problem-solving skills.

Keywords: Gender, Knowledge, Practice, Personal Genital Hygiene, Students

INTRODUCTION

Genital personal hygiene is one of the personal hygiene activities that must be carried out to prevent infection and is carried out to maintain family health (Djusad et al., 2021). Genital personal hygiene is the practice of maintaining the cleanliness and health of the genital organs carried out in everyday life to prevent reproductive system problems such as urinary tract infections, improve physical and mental well-being, and improve overall health status (Dwianggimawati, 2022). Indicators of good genital area hygiene are cleaning the genitals with clean water from the vaginal area to the anus, drying with a towel or tissue, wearing the right pants (underwear made of material that easily absorbs sweat, not tight), using sanitary napkins and changing them frequently, using cleansers for the feminine area, and keeping the bathroom clean (Arofah & Rohimah, 2019).

Biological factors influence disease exposure and health risks through

gender norms, roles, and relationships. Therefore, health policies must consider the differences in the needs of men and women. Promoting the realization of everyone's right to health, reducing health inequalities, and increasing positive impact are all possible by adapting health programs and policies to these differences and trends. Social (gender) and biological (sex) differences influence the health of women and men in Indonesia and elsewhere. Sexual and reproductive health is not the only area where men's and women's health differs. Apart from gender, health status is influenced by education, income and place of residence (urban or rural) (World Health Organization (WHO), 2020).

Learning at school can be different for boys and girls in different ways (Connell, 2023). This can have an impact on several things, including the level of class participation and the learning outcomes achieved. The Indonesian government faces significant obstacles over the next 10 years to ensure that men

and women have equal access to educational opportunities and outcomes (Nugraha et al., 2021). Gender equality can be incorporated into teaching and learning activities for many good reasons (Rosa & Clavero, 2022). This includes breaking old stereotypes such as respecting the abilities of both male and female students, giving equal attention to both boys and girls, and encouraging female students to actively participate in extracurricular activities that most male students attend (Sardjunani, 2013).

Hygiene behavior is very important because if it is not implemented well it will hurt reproductive health. Based on WHO data in 2010, the prevalence rates of candidates (25-50%), bacterial vaginosis (20-40%), and trichomoniasis (5-15%) (Mulyani et al., 2018). In Turkey, the prevalence of urinary tract infections in school-aged girls is 7.8%, while it affects 1.6% of boys. Only 1% of older children, 3% of school-age children, and less than 1% of term infants have asymptomatic bacteriuria (Zincir et al., 2012). Asymptomatic conditions may involve significant bacteriuria and leukocyturia; the majority of these problems occur in countries where circumcision is less common.

Health services for school-aged children aim to identify children at risk of disease so that it can be controlled early, encourage optimal growth and development, contribute to learning and ultimately produce healthy, high-achieving school-aged children (Nugraha, 2021). Based on the phenomenon above, the author is interested in exploring "the effect of promotional efforts based on gender characteristics on knowledge and practice of personal genital hygiene among students of SD Negeri Ledug.

METHODS

Based on data collection, the number of samples in this study was 70 respondents divided into four groups. The male control and experimental groups consisted of 40 students, while the female control and experimental groups consisted of 30 female students. This research was carried out from October 2022 to July 2023 at Ledug Elementary School which is located in Kec. Kembaran, Kab. Banyumas, Central Java. This research has received ethical equality from the Health Research

Ethics Committee of the Universitas Muhammadiyah Purwokerto No. KEPK/UMP/08/II/2023, dated February 1, 2023.

Inclusion Criteria

- Class V students of Ledug State Elementary School
- 10-12 years old
- Willing to be a respondent
- Willing to fill out the questionnaire.

Exclusion Criteria

- Students who cannot read and write.

Furthermore, the male control group and the female experimental group were given a pretest of knowledge with a children's knowledge questionnaire regarding vulva and penile hygiene on March 7-10, 2023. Providing health education using booklets and personal genital hygiene practices in the experimental group on 13-17 March 2023, all groups were given a knowledge posttest using a vulva and penis hygiene questionnaire on March 20, 2023. The control group was given personal genital hygiene health education using the lecture method after the posttest on March 21, 2023.

This study is quantitative research. The research was a quasi-experimental design, with a randomised Solomon four-group approach (Winarno, 2013). Two previous experimental designs were combined in this design to create the 4-group method. The Solomon four-group design research is presented in Table 1.

Table 1. Research Design.

| | | | | |
|-----|----------------------------|----------------|---|----------------|
| (R) | Intervention 1 (female) | Y ₁ | X | Y ₂ |
| (R) | | Y ₁ | - | Y ₂ |
| (R) | Control 1 (man) | - | X | Y ₂ |
| (R) | Intervention 2 (man) | - | - | Y ₂ |

Control 2 (female)

Information:

R: Randomization

Y₁: Pretest in groups 1 and 2 before being given treatment

Y₂: Posttest on the four groups after treatment

X: Treatment in the intervention group

-: Control group without treatment

RESULTS AND DISCUSSION

1. Univariate Analysis

a. Respondent Characteristics

The distribution of respondent characteristics in this study included children's age, gender, and menstrual status at Ledug Elementary School.

Table 2. Distribution of Respondent Characteristics.

| Characteristic | Intervention | | Control | |
|-------------------------|--------------|------|---------|------|
| | N | % | N | % |
| Child Age | | | | |
| 10 years old | 8 | 22.9 | 9 | 25.7 |
| 11 years old | 23 | 65.7 | 20 | 57.1 |
| 12 years old | 4 | 11.4 | 6 | 17.1 |
| Total | 35 | 100 | 35 | 100 |
| Gender | | | | |
| Man | 20 | 57.1 | 20 | 57.1 |
| Woman | 15 | 42.9 | 15 | 42.9 |
| Total | 35 | 100 | 35 | 100 |
| Menstrual Status | | | | |
| Already menstruating | 12 | 80 | 10 | 66.7 |
| Not menstruating yet | 3 | 20 | 5 | 33.3 |
| Total | 15 | 100 | 15 | 100 |

Based on Table 2, the sample used in this study consisted of 70 students divided into four groups, the male intervention and control groups were 40 students (57.1%) while the female intervention and control groups were 30 female students (42.9%). Age characteristics show that most of the respondents were aged 11 years, for the intervention group there were 23 students (65.7%) and the control group 20 students (57.1%). Based on menstrual status, there were 12 female students in the intervention group who had menstruated (80%) and 10 female students in the control group (66.7%). Meanwhile, there were three female students in the intervention group (20%) who had not menstruated and five female students in the control group (33.3%).

b. Respondents' Knowledge Before Being Given Health Education About Personal Genital Hygiene

Table 3. Percentage Distribution of Pretest Knowledge.

| | F | (%) | F | (%) |
|------------|----|-------|----|-------|
| Good | 9 | 60.0 | 12 | 60.0 |
| Enough | 3 | 20.0 | 5 | 25.0 |
| Not enough | 3 | 20.0 | 3 | 15.0 |
| Total | 15 | 100.0 | 20 | 100.0 |

Based on Table 3, the results of knowledge research before being given health education about personal genital hygiene in the female intervention group were in the good category, nine respondents (60%), in the sufficient category, three respondents (20%) and in the poor category, there were three respondents (20%). Meanwhile, in the male control group, there were 12 respondents (60%) in the good category, five respondents in the fair category, and three respondents in the poor category (15%).

c. Respondents' Knowledge After Being Given Health Education About Personal Genital Hygiene Based on Female Gender Characteristics.

Table 4. Posttest Percentage Distribution of Women's Knowledge.

| | F | (%) | F | (%) |
|------------|----|-------|----|-------|
| Good | 11 | 73.3 | 6 | 40.0 |
| Enough | 3 | 20.0 | 5 | 33.3 |
| Not enough | 1 | 6.7 | 4 | 26.7 |
| Total | 15 | 100.0 | 15 | 100.0 |

Table 4 shows the results of knowledge research after being given health education about personal genital hygiene based on female gender in the intervention group, 11 respondents (73.3%) in the good category, three respondents (20%) in the adequate category and one respondent in the poor category (6.7%). Meanwhile, in the control group, there were six respondents (40%) in the good category, five respondents in the fair category (33.3%), and four respondents in the poor category (26.7%).

d. Respondents' Knowledge After Being Given Health Education About Personal Genital Hygiene Based on Male Gender Characteristics

Table 5. Posttest Percentage Distribution of Male Knowledge.

| | F | (%) | F | (%) |
|--------|----|------|----|------|
| Good | 19 | 95.0 | 13 | 65.0 |
| Enough | 1 | 5.0 | 7 | 35.0 |

Table 5 shows the results of knowledge research after being given health education about personal genital hygiene based on male gender in the intervention group, 19 respondents (95%) in the good category and one respondent in the fair category (5%). Meanwhile, in the control group, there were 13 respondents (65%) in the good category and seven respondents (35%) in the fair category.

- e. Respondents' Skills Before Being Given Health Education on Personal Genital Hygiene

Table 6. Percentage Distribution of Pretest Skills.

| | F | (%) | F | (%) |
|---------------|----|-------|----|-------|
| Skilled | 7 | 46.7 | 12 | 60.0 |
| Quite skilled | 5 | 33.3 | 7 | 35.0 |
| Unskilled | 3 | 20.0 | 1 | 5.0 |
| Total | 15 | 100.0 | 20 | 100.0 |

Based on Table 6, the results of research on skills before being given health education about personal genital hygiene in the female intervention group were seven respondents (46.7%) in the skilled category, five respondents in the quite skilled category (33.3%) and three respondents in the unskilled category (20%). Meanwhile, in the male control group, there were 12 respondents (60%) in the skilled category, seven respondents in the moderately skilled category, and one respondent in the unskilled category (5%).

- f. Respondents' Skills After Being Given Health Education on Personal Genital Hygiene Based on Female Gender Characteristics

Table 7. Posttest Percentage Distribution of Women's Skills.

| | F | (%) | F | (%) |
|---------------|----|-------|----|-------|
| Skilled | 13 | 86.7 | 1 | 6.7 |
| Quite skilled | 2 | 13.3 | 12 | 80.0 |
| Unskilled | - | - | 2 | 13.3 |
| Total | 15 | 100.0 | 20 | 100.0 |

Table 7 shows the results of skills research after being given health education about personal genital hygiene

based on female gender in the intervention group, 13 respondents (86.7%) in the skilled category and two respondents in the moderately skilled category (13.3%). Meanwhile, in the control group, there was one respondent in the skilled category (6.7%), in the moderately skilled category there were 12 respondents (80%), and in the unskilled category there were two respondents (13.3%).

- g. Respondents' Skills After Being Given Health Education on Personal Genital Hygiene Based on Male Gender Characteristics

Table 8. Posttest Percentage Distribution of Male Skills.

| | F | (%) | F | (%) |
|---------------|----|-------|----|-------|
| Skilled | 18 | 90.0 | 15 | 75.0 |
| Quite skilled | 2 | 10.0 | 5 | 25.0 |
| Total | 20 | 100.0 | 20 | 100.0 |

Table 8 shows the results of skills research after being given health education about personal genital hygiene based on male gender in the intervention group, 18 respondents (90%) in the skilled category, and two respondents in the moderately skilled category (10%). Meanwhile, in the control group, there were 15 respondents (75%) in the skilled category and five respondents (25%) in the quite skilled category.

2. Bivariate Analysis

a. Normality test

Data analysis using parametric statistical methods has several conditions that must be met. These conditions include, among other things, that the data must be normally distributed and the data for the variables being analyzed be homogeneous. The normality test is a way to determine whether the distribution of data in a sample can be rationally expected to come from a certain population with a normal distribution (Budiwanto, 2017). The normality test that researchers used in this research was the Kolmogorov-Smirnov (KS) test. The normality test results are shown in Table 9.

Table 9. Kolmogorov-Smirnov Normality Test Results.

| Group | Kolmogorov-Smirnov | Sig |
|-----------|-----------------------------------|-------|
| Knowledge | <u>Pretest</u> | 0.168 |
| | Women's Intervention | |
| | <u>Pretest</u> Male Control | 0.328 |
| | <u>Posttest</u> | 0.132 |
| | Women's Intervention | |
| | <u>Posttest</u> Female Control | 0.206 |
| | <u>Posttest</u> Male Intervention | 0.436 |
| | <u>Posttest</u> Male Control | 0.586 |
| Skills | <u>Pretest</u> | 0.913 |
| | Women's Intervention | |
| | <u>Pretest</u> Male Control | 0.654 |
| | <u>Posttest</u> | 0.696 |
| | Women's Intervention | |
| | <u>Posttest</u> Female Control | 0.634 |
| | <u>Posttest</u> Male Intervention | 0.444 |
| | <u>Posttest</u> Male Control | 0.313 |

Based on the results above, it can be concluded that all research data are normally distributed because the significance of the variables is > 0.05 , so the normality assumption test can be carried out using the one-way ANOVA statistical test.

b. Homogeneity Test

The homogeneity test is a test used to determine whether the variances of two or more distributions are the same. The homogeneity test ensures that the data set examined in the analysis process comes from populations that do not differ much in diversity. Parametric statistical analysis is based on the assumption that population variances are equal.

Table 10. Homogeneity Test Results.

| Group | Test of Homogeneity of Variance | Statistics | Sig |
|---------------------------|---------------------------------|------------|-------|
| <u>Posttest</u> Knowledge | Based on mean | 19.864 | 0.715 |

| | | | |
|------------------------|--------------------------------------|--------|-------|
| | Based on median | 4.796 | 0.750 |
| | Based on median and with adjusted df | 4.796 | 0.764 |
| | Based on trimmed mean | 17.249 | 0.715 |
| <u>Posttest</u> Skills | Based on mean | 0.610 | 0.611 |
| | Based on mean | 0.554 | 0.647 |
| | Based on median and with adjusted df | 0.544 | 0.648 |
| | Based on trimmed mean | 0.555 | 0.647 |

The results of the homogeneity test calculation show that the significance value of knowledge and skills is > 0.05 . The data have the same variable value (homogeneity) because the significance level of the test is greater than or equal to 0.05, so data analysis can be carried out using the one-way ANOVA test.

c. One-Way ANOVA Statistical Test

The results of the analysis of the influence of promotional efforts based on gender characteristics on knowledge and practice of personal genital hygiene after being given include the average value or mean p-value. The results of the one-way ANOVA test are presented as follows:

Table 11. One Way ANOVA Statistical Test Results.

| Group | One Way ANOVA | Mean Squares | Sig |
|---------------------------|----------------|--------------|-------|
| <u>Posttest</u> Knowledge | Between Groups | 270.542 | 0.000 |
| | Within Groups | 10.118 | 0.000 |
| | Total | | |
| <u>Posttest</u> Skills | Between Groups | 64.840 | 0.000 |
| | Within Groups | 2.281 | 0.000 |
| | Total | | |

Based on Table 11, it is found that the p-value is $0.000 < 0.05$ and it can be concluded that H_a is accepted. In other words, there are differences between

groups (intervention and control). Therefore, it can also be concluded that there is an effect of promotional efforts based on gender characteristics on knowledge and practice of personal genital hygiene among students of SD Negeri Ledug.

- d. Differences in Knowledge and Skills After Being Given Health Education on Personal Genital Hygiene Based on Gender Characteristics

Table 12. One-Way ANOVA Advanced Test Results.

| Dependent Variable | (I)Group Type | (J)Group Type | Sig |
|---------------------------|---------------------|---------------------|-------|
| Posttest Knowledge | Male Intervention | Female Intervention | 0.000 |
| | | Male Control | 1.000 |
| | | Female Control | 0.033 |
| | | Female Intervention | 0.000 |
| | Female Intervention | Male Intervention | 0.000 |
| | | Male Control | 0.000 |
| | | Female Control | 0.001 |
| | | Female Intervention | 0.000 |
| | Male Control | Male Intervention | 1.000 |
| | | Female Intervention | 0.000 |
| | | Female Control | 0.001 |
| | | Female Intervention | 0.000 |
| Posttest Skills | Male Intervention | Female Intervention | 0.027 |
| | | Male Control | 0.384 |
| | | Female Control | 0.000 |
| | | Female Intervention | 0.000 |
| | Female Intervention | Male Intervention | 0.027 |
| | | Male Control | 1.000 |
| | | Female Control | 0.000 |
| | | Female Intervention | 0.000 |

| | | |
|----------------|---------------------|-------|
| Male Control | Male Intervention | 0.384 |
| | Female Intervention | 1.000 |
| | Female Control | 0.000 |
| | Female Intervention | 0.000 |
| Female Control | Male Intervention | 0.000 |
| | Female Intervention | 0.000 |
| | Male Control | 0.000 |
| | Female Control | 0.000 |

Based on Table 12, the research results show that the differences in knowledge and skills after being given health education about personal genital hygiene are as follows:

- 1) *Posttest* The male intervention group's knowledge of female intervention and female control has a significant level of difference because the p-value is < 0.05 , namely 0.000 and 0.033, while the male control group has no significant difference because the p-value is > 0.05 namely 1.000.
- 2) *Posttest* The female intervention group's knowledge of male intervention, male control and female control has a significant level of difference because the p-value is < 0.05 , namely 0.000 and 0.001.
- 3) *Posttest* There is no significant difference in the male control group's knowledge of male intervention because the p-value is > 0.05 , namely 1.000, while the female intervention and female control have a significant level of difference because the p-value is < 0.05 , namely 0.000 and 0.001.
- 4) *Posttest* The female control group's knowledge of male intervention, female intervention and male control have a significant level of difference because the p-value is < 0.05 , namely 0.033 and 0.001.

- 5) *Posttest* The skills of the male intervention group toward female intervention and female control have a significant level of difference because the p-value is < 0.05 , namely 0.027 and 0.000, while the male control group has no significant difference because the p-value is > 0.05 namely 0.384.
- 6) *Posttest* The skills of the female intervention group toward male intervention and female control have a significant level of difference because the p-value is < 0.05 , namely 0.027 and 0.000, while the male control group has no significant difference because the p-value is > 0.05 namely 1.000.
- 7) *Posttest* The skills of the male control group to the female control group have a significant level of difference because the p-value is > 0.05 , namely 0.000, while the male intervention and female intervention have no significant difference because the p-value is < 0.05 , namely 0.384 and 1.000.
- 8) *Posttest* The skills of the female control group toward male intervention, female intervention and male control have a significant level of difference because the p-value is < 0.05 , namely 0.000.

In this study, health education was provided to the intervention group using booklet and phantom media, and for the control group using lecture and phantom media. The research results showed that students' knowledge and skills increased after being exposed to health education through booklets as well as phantom vulva and penis hygiene, which was marked by an increase in the respondents' knowledge and skills scores.

These results are also in line with research conducted by Fitriyah (2023) which states that good and high personal hygiene knowledge among teenagers can influence these teenagers to carry out good and correct hygiene practices because they are supported by adequate knowledge about reproductive health, especially personal external genital hygiene. This is supported by Orem's

theory, according to which effective self-care is developed to help shape the integrity of human structure and function and is closely related to human development (Ahenkorah, 2024).

According to Dorothea Orem's theory, self-care is an activity that arises from individual care to fulfill individual needs to maintain life, health and well-being both in health and illness (Queirós et al., 2014). Personal hygiene is important because if implemented well it can minimize access for microorganisms (port of entry) and ultimately prevent people from getting sick (Finlay et al., 2021). Forms of personal hygiene include skin cleanliness, hair cleanliness, oral cleanliness, eye cleanliness, ear cleanliness, genital cleanliness, hand cleanliness, and foot and nail cleanliness (Kipps et al., 2023). Factors that influence personal hygiene include age, gender, developmental status, health status, social culture, health system, and family system (Lin et al., 2021). Self-care according to the Orem principle, means everyone has the need and the right to take care of themselves, unless they are unable to take care of themselves (Martínez et al., 2021). Orem's model can be expanded beyond the parameters of the original model, namely from personal self-care to family care (Fadhilah et al., 2022). The implications of the research results after the intervention is carried out is that students can apply genital hygiene in their daily lives by using available tools such as using a clean towel or washcloth, and clean water and can practice how to care for their genitals properly and correctly to maintain their health status and maintain reproductive health (Altundağ, 2024).

CONCLUSION

Based on the results of the studies and analyses that have been carried out, it can be concluded that the age characteristics of most of the respondents were 11 years old, for the intervention group there were 23 students (65.7%), and for the control group there were 20 students (57.1%). Based on menstrual status, 12 female students in the intervention group had menstruated (80%) and 10 female students in the control group (66.7%). Meanwhile, three female students in the intervention group had not menstruated (20%) and five female

students in the control group (33.3%) and the average knowledge of intervention and control group respondents was 10.118 and the average skill of intervention and control group respondents was 2.281, so the difference between the two groups is 7.837. The results of the one way ANOVA statistical test obtained a p-value of 0.000, which means $p < 0.05$, so it can be concluded that there is an influence of promotional efforts based on gender characteristics on the knowledge and practice of personal genital hygiene in Ledug State Elementary School students.

REFERENCES

- Ahenkorah, F. (2024). *Effects of Socio-Demographic Factors on the Self-Care Ability of Registered Nurses Employed in a Publicly Funded Hospital*. Azusa Pacific University.
- Altundağ, S. (2024). Imparting genital hygiene skills to adolescents with intellectual disabilities attending a special education Centre: a quasi-experimental study on effect of short education. *International Journal of Developmental Disabilities*, 70(1), 127-136.
- Arofah, I., & Rohimah, S. (2019). Analisis jalur untuk pengaruh angka harapan hidup, harapan lama sekolah, rata-rata lama sekolah terhadap indeks pembangunan manusia melalui pengeluaran Riil Per Kapita di Provinsi Nusa Tenggara Timur. *Jurnal Saintika Unpam: Jurnal Sains Dan Matematika Unpam*, 2(1), 76.
- Connell, R. W. (2023). Teaching the boys: New research on masculinity and gender strategies for schools. In *The Critical Pedagogy Reader* (pp. 332-354). Routledge.
- Djusad, S., Meutia, A. P., Tunggadewi, S. A., Sari, Y. M., Hakim, S., Priyatini, T., Moegni, F., & Santoso, B. I. (2021). Genital self-image as predictor of sexual dysfunction in women with pelvic organ prolapse in Indonesia. *Women's Health*, 17, 17455065211066020.
- Dwianggimawati, M. S. (2022). Analisis Determinan Faktor Tanda dan Gejala Infeksi Saluran Kemih pada Remaja Putri di SMA Negeri 2 Karang Kabupaten Trenggalek. *Journal of Global Research in Public Health*, 7(1), 53-58.
- Fadhilah, N., Pangestuti, L., & Ardina, R. (2022). Dukungan Keluarga dan Personal Hygiene pada Pasien Stroke di Rumah Sakit Mitra Husada Pringsewu. *Healthcare Nursing Journal*, 4(1), 179-193.
- Finlay, B. B., Amato, K. R., Azad, M., Blaser, M. J., Bosch, T. C. G., Chu, H., Dominguez-Bello, M. G., Ehrlich, S. D., Elinav, E., & Geva-Zatorsky, N. (2021). The hygiene hypothesis, the COVID pandemic, and consequences for the human microbiome. *Proceedings of the National Academy of Sciences*, 118(6), e2010217118.
- Kipps, S., Allaway, R., & Carmichael, S. (2023). Personal hygiene and pressure ulcer prevention. *The Great Ormond Street Hospital Manual of Children and Young People's Nursing Practices*.
- Lin, T., Harris, E. A., Heemskerk, A., Van Bavel, J. J., & Ebner, N. C. (2021). A multi-national test on self-reported compliance with COVID-19 public health measures: The role of individual age and gender demographics and countries' developmental status. *Social Science & Medicine*, 286, 114335.
- Martínez, N., Connelly, C. D., Pérez, A., & Calero, P. (2021). Self-care: A concept analysis. *International Journal of Nursing Sciences*, 8(4), 418-425.
- Mulyani, S., Wijayanti, A., & Masitoh, E. (2018). Pengaruh corporate governance terhadap tax avoidance (perusahaan pertambangan yang terdaftar di BEI). *Jurnal Riset Akuntansi Dan Bisnis Airlangga*, 3(1), 322-340.
- Nugraha, J. P., Alfiah, D., Sinulingga, G., Rojiati, U., Saloom, G., Johannes, R., Batin, M. H., Lestari, W. J., Khatimah, H., & Beribe, M. F. B. (2021). *Teori perilaku konsumen*. Penerbit NEM.
- Queirós, P. J. P., Vidinha, T. d S., & Almeida Filho, A. J. (2014). Self-care: Orem's theoretical contribution to the nursing discipline and profession. *Revista de Enfermagem [Internet]*, 4(3), 157-163.
- Rosa, R., & Clavero, S. (2022). Gender equality in higher education and research. In *Journal of Gender Studies* (Vol. 31, Issue 1, pp. 1-7). Taylor & Francis.
- Sardjunani, N. (2013). *Studi strategi*

- pengembangan anak usia dini di Indonesia*. Kementerian Perencanaan Pembangunan Nasional.
- Sibua, N. F., & Mutthalib, N. U. (2023). Faktor yang Berhubungan dengan Tindakan Personal Hygiene Organ Reproduksi Eksterna Remaja Putri di SMP Negeri 30 Makassar. *Window of Public Health Journal*, 4(1), 36-47.
- Winarno, M. E. (2013). *Metodologi penelitian dalam pendidikan jasmani*. Um press.
- World Health Organization (WHO). (2020). Global leprosy (Hansen disease) update, 2020: impact of COVID-19 on global leprosy control. *Weekly Epidemiological Record*, 96(36), 421-444.
- Zincir, H., Kaya Erten, Z., Özkan, F., Seviğ, Ü., Başer, M., & Elmalı, F. (2012). Prevalence of urinary tract infections and its risk factors in elementary school students. *Urologia Internationalis*, 88(2), 194-197.

Prevention of Early Jaundice in Babies Through Empowerment: Quasi-Experiments with Pregnant Women

Lenny Nainggolan^{✉1)}, Tengku Sri Wahyuni¹⁾, Teta Puji Rahayu²⁾, Ayesha Hendriana Ngestiningrum²⁾

¹ Department of Midwifery, Politeknik Kesehatan Kementerian Kesehatan Medan, Pematang Siantar, North Sumatra, Indonesia 405002

² Department of Midwifery, Poltekkes Kemenkes Surabaya, Magetan, East Java, Indonesia 63318

✉Email: lennybidann@gmail.com

ABSTRACT

Background: Jaundice is a health problem for newborns that occurs in around 60% of term pregnancies and around 80% of premature pregnancies. Babies who experience severe jaundice need to receive proper examination and treatment to prevent morbidity and death. Mothers' role in overcoming the lack of breast milk in newborn babies is important. Hence, they need to be educated and empowered to avoid health problems that can be prevented if mothers and babies receive timely care. **Objectives:** This research aims to analyze the effect of maternal empowerment on preventing early jaundice in babies in Pematangsiantar City. **Method:** The method used was the quasi-experimental design with a non-equivalent control group design model, carried out on 62 pregnant women and jaundice assessment on 62 newborns (31 pregnant women who were given education and monitored for empowerment and 31 mothers who were given education but not monitored). Sampling was taken using consecutive sampling. Data collection used a validated questionnaire and statistical tests with chi-square. **Results:** Statistical tests showed that, after empowering mothers, 90.3% implemented IMD in the intervention group and 83.9% in the control group ($p=0.707$). The results showed that after empowering mothers there were 93.5% of babies did not experience jaundice, and in the control group 71.0% did not experience jaundice. Statistically, there was a difference between the two groups ($p=0.46$). **Conclusion:** Maternal empowerment can influence the prevention of jaundice in babies. Implementation of empowerment through providing education about IMD, breastfeeding, and jaundice needs to be carried out by health workers.

Keywords: Baby, Empowerment, Jaundice, Mother, Newborn

INTRODUCTION

In principle, health development is to improve health status, which is carried out in promotive, preventive, curative, and rehabilitative efforts. The community's ability to realize the importance of health is one form of achieving promotive and preventive measures that have an impact on improving family health as an investment in human resource development (Mujiarto et al., 2019).

Achieving the health status of family members, especially mothers and children, is a priority in assessing the success of the 2005-2025 National Long-Term Development Plan. The health of mothers and children also needs to be considered because they are a vulnerable group with high mortality and morbidity rates (PPN,

2010). The Infant Mortality Rate (IMR) 2017 was 24 per 1,000 live births. Through the SDGs program, the government is targeting a reduction in IMR by 2030 to 12 per 1000 live births (Dopongnuha, 2019; Mariane, 2019). Jaundice is seen as a sign of danger for babies, especially neonates; this can be seen from the results of Basic Health Research (Kemenkes, 2018), where the causes of neonatal death occurring in the first week 0-6 days are respiratory disorders 37%, prematurity 34%, sepsis 12%, hypothermia 7%, jaundice 6%, and congenital abnormalities 1% (Kemenkes, 2014). Jaundice is a health problem among newborns and occurs in around 60% of term pregnancies and around 80% in premature ones. Jaundice is classified into physiological and pathological (Ansong-Assoku et al., 2018; Obeagu & Katya, 2022; Parwata et al., 2019). Babies who

experience severe jaundice need to receive proper examination and treatment to prevent morbidity and death (Mayunita, 2020; Myle & Al-Khattabi, 2021). Jaundice can occur alone or can be caused by several factors, namely excessive production, for example, excessive breakdown of blood (hemolysis), disturbances in the uptake and conjugation process due to liver function disorders, transport disturbances due to lack of albumin, which binds bilirubin, and disorders excretion that occurs due to blockage in the liver (due to infection) (Nugraheni et al., 2020; Sulistyani et al., 2020; Yuliarty, 2020). Babies who experience jaundice will experience a change in the color of their skin/eye sclera (normally white) to yellow due to increased levels of bilirubin in the blood. Jaundice in newborn babies can be a physiological thing, found in 25% -50% of babies born at term (Fetriyah et al., 2019; Klemming et al., 2021; Revenis & Wong, 2021; Safitri & Hafilah, 2022; Sreedha et al., 2023). The World Health Organization (WHO, 2013) provides information that normal newborn babies experience yellowish changes in skin color, mucosa, and face, ranging from 50% to 80% of preterm babies.

Physiological jaundice generally occurs on the second day to around two weeks due to low breast milk production so that the baby experiences a lack of breast milk which results in indirect bilirubin that has reached the intestines and is not bound by food and is not excreted through the anus with food (Nugraheni et al., 2020; Rusnawati, 2022). A study (Yanti Herawati, 2017) stated that there was an influence between early breastfeeding and the incidence of jaundice in newborns 0-7 days old with a P value of 0.02.

Several factors that can reduce the incidence of jaundice include neonatal supervision, avoiding drugs that can increase jaundice in babies, early initiation of breastfeeding, affectionate care for the baby, skin-to-skin contact, and exposing the baby to sunlight in the morning (Simanungkalit, 2021). This factor is based on the mother's behavior regarding the incidence of jaundice in babies 0-6 days old, where behavior is a response or reaction to external stimuli or stimuli. This behavior occurs through a stimulus process to the organism, and then the organism responds. Behavior is divided into three

domains, namely, knowledge, attitudes, and practices. Many mothers do not understand how to deal with jaundice in babies aged 0-6 days (in the first week of birth) because of poor behavior and the mother's unresponsiveness to the education provided by local health workers (Simanungkalit, 2021).

Marali (2021) found that there is a significant relationship between early initiation of breastfeeding and the incidence of neonatal jaundice in babies born less than three days old at Aminah Hospital, Tangerang City, in 2021 with a value of $r = 0.267$. Rahayuningrum et al. (2021) found less than half (49.1%) of the babies experienced jaundice, and most of the mothers (83.0%) had low knowledge. The bivariate test showed that there was a relationship between the level of maternal knowledge and the incidence of jaundice, $p\text{-value} = 0.024$ ($p < 0.05$) with OR 10.526. Based on research, it can be concluded that mothers who have a low level of knowledge have a 10.526 times risk of developing jaundice in their babies. EIB is a baby who starts breastfeeding as early as possible after birth (Rusli, 2008). Newborn babies who were given the EIB method at 50 minutes after birth were able to breastfeed better than babies who did not use the EIB method at 50 minutes after birth, so it was found that babies were not able to breastfeed well by 50%. At the age of 6 months and 1 year, 59% and 38% of babies who had the opportunity to breastfeed were still breastfed, while 29% and 8% of babies who did not get their turn to breastfeed at the same age were still breastfed (Mashudi, 2014).

One of the recommended primary treatments for jaundice is early initiation of breastfeeding (EIB) or early provision of breast milk. Providing breast milk as early as possible after birth or EIB and exclusive breastfeeding is one of the informal actions taken by the government to improve the health and continuity of life of newborn babies (Apipah & Mariyani, 2022; Yulita et al., 2021). As many as 10 million deaths of children under five in the world per year, and 30,000 infant deaths are found in Indonesia, can be prevented by providing exclusive breastfeeding for six months starting from the date of birth of the baby, without giving additional food and drinks/accompaniments to the baby, as supported by the United Nations Children's Fund (UNICEF) (Aprillia, 2010).

The role of mothers in overcoming the problem of lack of breast milk in newborn babies is important, so they need to be educated and empowered to avoid health problems that can be prevented if mothers and babies receive timely care. Empowerment is essentially the process of enabling someone to improve their self-development, make the right decisions, and have control over the activities carried out (Nutbeam & Muscat, 2021). Several research results state that empowerment can influence various aspects of health. The Center of Expertise has carried out health promotion efforts by providing educational research to improve health and empower women. Based on this, mothers must be provided with education about lactation and jaundice, which are preventable causes of neonatal morbidity/mortality. Increasing knowledge will help mothers realize the importance of breastfeeding and early detection of jaundice if it occurs. Therefore, this research aims to analyze the effect of maternal empowerment on preventing early jaundice in babies in Pematangsiantar City.

METHODS

Research design & data source

This research uses a quantitative study with a quasi-experimental design using a pre-post model with a control group design. This research was conducted at four independent midwife practices in Pematangsiantar City, namely PMB Yanti, T. Napitu, R. Manurung, and T. Hutapea. The population in this study were third-trimester pregnant women.

Sampling

The population in this study was 293 pregnant women in the third trimester at four independent midwife practices in the city of Pematang Siantar from June to October. The sample for this study was pregnant women of term gestation, maternal age 19-49 years, able to read and understand Indonesian, and had no history of illness based on anamnesis and records. The sample in this research is *non-probability sampling*, namely, *consecutive sampling*. The sample size in this study was 62 (31 samples in the intervention group and 31 in the control group). The sample size was determined based on the sample size calculation formula using two independent populations (Madiyono et al., 2011).

Data analysis

Empowerment carried out by researchers is through providing information about EIB, breastfeeding, and jaundice, then carrying out demonstrations and re-demonstrations that community empowerment can be carried out through activities: program preparation, equipment preparation, program implementation (socialization, implementation of training using lecture methods, demonstrations, and re-demonstrations), and then mentoring, monitoring and evaluation. Data were collected using a checklist for implementing early breastfeeding initiation, assessing the degree of jaundice, and a knowledge questionnaire that had been tested for validity and reliability. To analyze the differences between the two groups, the chi-square test was used. Data processing and analysis used Statistical Package and Service Solution (SPSS) version 25.0 for Windows. Before filling out the questionnaire, participants were explained the research. Prospective participants who were willing to take part in the research were asked to sign informed consent.

Ethical approval

This research has received ethical approval from the Medan Ministry of Health Polytechnic Research Ethics Committee No:01.0186/KEPK/POLTEKKES KEMENKES MEDAN 2022.

RESULTS AND DISCUSSION

The research results are presented in the following table:

Table 1. Characteristics of respondents.

| Variable | Intervention Group (n=31) | Control Group (n=31) | p |
|---------------|------------------------------|-------------------------|-------|
| Age (years) | | | |
| Mean \pm SD | 28.94 \pm 5.87 | 28.55 \pm | 0.790 |
| Median | 28 (19 - 40) | 5.53 | |
| (min-max) | | 28 (20 - 43) | |
| Gravida | | | |
| Mean \pm SD | 2.35 \pm 1.08 | 2.00 \pm | 0.194 |
| Median | 2 (1 - 5) | 1.03 | |
| (min-max) | | 2 (1 - 5) | |
| BBL | | | |
| Mean \pm SD | 3075 \pm | 3241 \pm | 0.032 |
| Median | 243.19 | 343.29 | |
| (min-max) | 3050 (2600 - 3500) | | |

| | 3200 (2800 - 4100) | | |
|------------|--------------------------|-------|-------|
| Education | | | |
| - | 3.2% | 0 % | 0.701 |
| Elementary | 6.5% | 6.5% | |
| School | 77.4% | 74.2% | |
| - Junior | 12.9% | 19.4 | |
| High | | | |
| School | | | |
| - Senior | | | |
| High | | | |
| School | | | |
| - PT | | | |
| Job-status | | | |
| - Work | 9.7% | 22.6% | 0.300 |
| - IRT | 90.3% | 77.4% | |
| Baby's | | | |
| gender | 45.1% | 51.6% | 1.000 |
| - Man | 54.9% | 48.4% | |
| - Woman | | | |

SD = Standard Deviation;
Housewife = Housewife;

EIB = Early Initiation of Breastfeeding;
BBL = Birth Weight of Baby

The mean age of participants and gravida in the intervention group were higher than those in the control group, respectively 28.94 ± 5.87 years and 28.55 ± 5.53 . The mean value of baby weight at birth was higher in the control group at 3241 ± 343.29 . The highest level of education in both groups was high school, respectively 77.4% and 74.2%. The occupational status of the largest group is a housewife (90.3% and 77.4%). The majority of participants' ethnicity is Batak, at 87.1% in the control group. Most knowledge about EIB and jaundice (pre-intervention) was sufficient, respectively 74.2% and 54.8%.

Table 2. Effect of Mother's Empowerment on Knowledge of EIB, Breastfeeding, Jaundice, and Implementation of EIB between the Two Groups after Intervention.

| Variable | Intervention Group (n=31) | Control Group (n=31) | <i>p</i> * |
|---|------------------------------|-------------------------|------------|
| Knowledge of EIB (pre-test): | | | |
| - Good | 12.9% | 12.9% | 1.000 |
| - Enough | 74.2% | 74.2% | |
| - Not enough | 12.9% | 12.9% | |
| (post-test) | | | 0.001 |
| - Good | 80.6% | 32.3% | |
| - Enough | 19.4% | 64.5% | |
| - Not enough | 0% | 3.2% | |
| Knowledge about breastfeeding (pre-intervention) | | | |
| - Good | 61.3% | 67.7% | 0.861 |
| - Enough | 35.5% | 29% | |
| - Not enough | 3.2% | 3.2% | |
| (post-intervention) | | | |
| - Good | | | |
| - Enough | 87.1% | 71% | 0.241 |
| - Not enough | 12.9% | 25.8% | |
| | 0% | 3.2% | |
| Knowledge about jaundice (Pre- intervention) | | | |
| - Good | 6.5% | 45.2% | 0.000 |
| - Enough | 74.2% | 54.8% | |
| - Not enough | 19.4% | 0% | |
| (Post-intervention) | | | |
| - Good | 83.9% | 61.3% | 0.088 |
| - Enough | 16.1% | 38.7% | |
| - Not enough | 0% | 0% | |
| Implementation of EIB | | | |
| - Yes | 90.3% | 83.9% | 0.707 |
| - No | 9.7% | 16.1% | |

| | | | |
|------------------------|-------|-------|-------|
| Occurrence of jaundice | | | |
| - Yes | 6.5% | 29.0% | 0.046 |
| - No | 93.5% | 71.0% | |

**Chi-Square Test; Mann-Whitney Test*

Table 2 shows that, after empowerment, there were 80.6% of respondents with good knowledge about EIB in the intervention group and 32.3% of respondents in the control group. The results of statistical tests show that there is a difference in knowledge between the two groups ($p=0.001$). After empowerment, there were 87.1% of respondents with good knowledge about breastfeeding in the intervention group and 71.1% of respondents in the control group. The statistical test results showed that there was no difference in knowledge between the two groups ($p=0.241$). Based on knowledge about jaundice, after empowerment, there were 83.9% of respondents with good knowledge in the intervention group and 61.3% of respondents in the control group. The statistical test results showed that there was no difference in knowledge between the two groups ($p=0.088$). After empowering mothers, there were 90.3% who implemented EIB in the intervention group and 83.9% in the control group ($p=0.707$). These results indicate that statistically there is no difference between the two groups. After empowering mothers, there were 93.5% of babies did not experience jaundice, and 71.0% in the control group. These results show that statistically there is a difference between the two groups ($p=0.46$).

In this study, we found that, after empowering mothers, the level of knowledge about EIB increased and was higher compared to the control group. Empowerment is the process of enabling someone to improve their progress, make the right decisions, and have control over the activities carried out. Knowledge is a phenomenon that humans encounter and obtain through sensory observation. Knowledge arises when someone uses the senses or cultivated mind to recognize certain objects or events that have never been seen or felt before. Lack of knowledge from parents and medical authorities, as well as reluctance to do so, means that Early Breastfeeding Initiation is still rarely practiced. Many parents feel sorry for and do not believe that a newborn

baby can find its own mother's milk. Alternatively, there is the embarrassment of asking the doctor who assisted with the birth to do it (Idris, 2019). This can be seen in knowledge, or cognitive, which is a very important domain for the formation of action; if the behavior is not based on knowledge, then the behavior will not last long (Notoatmodjo, 2007).

Early initiation of breastfeeding is the practice of giving breast milk to babies within the first hour after birth. Good knowledge about the benefits of breast milk and the practice of early initiation of breastfeeding can increase a mother's likelihood of adopting this practice. When pregnant women have adequate knowledge about the benefits of breast milk and early breastfeeding initiation procedures, they tend to have a positive attitude toward this practice. They may be more likely to prepare themselves physically and psychologically to provide breast milk as soon as possible after birth. Conversely, if pregnant women lack knowledge about the benefits of breast milk and early initiation of breastfeeding, they may have a less positive or even skeptical attitude toward this practice. They may not feel more confident or motivated to do it (Limbong et al., 2023).

Several research results state that empowerment can influence various aspects of health. The Center of Expertise has carried out one of the health promotion efforts by providing education, research to improve health, and empowering women, which has beneficial values. Research carried out by Yuniarti (2019) also found that maternal empowerment has a significant influence on developing themselves and being able to make the right decisions to improve their health through antenatal care (ANC).

This is in line with research (Sukmawati et al., 2018) that shows there is a difference between the intervention group and the control group before and after the EIB intervention with $p<0.05$. There is an effect of education on mothers' knowledge about EIB with $p<0.05$; the intervention group's knowledge is $p=0.000$, and the control group's knowledge is $p=0.000$. There is an increase in pregnant



women's knowledge about EIB after education (counseling). Research results from Selviyanti et al. (2022) found there were 20 prospective mothers, seven pregnant women, and four breastfeeding mothers with post-test scores higher than the pre-test scores or a total of 88.57%. This shows that there has been an increase in knowledge regarding the importance of early initiation of breastfeeding for the success of providing exclusive breast milk to babies.

After research was carried out, the implementation of EIB on babies showed that it was mostly implemented by mothers who received intervention. Early initiation of breastfeeding is a very important government program to make it easier for babies and mothers to start the lactation process. The principle of good feeding for babies and young children is to carry out Early Breastfeeding Initiation (EIB), give exclusive breast milk for six months, provide appropriate complementary breast milk (MPASI) starting when the baby is six months old, and continue giving breast milk until two years. Early initiation of breastfeeding is a real preventative step in saving newborn babies, will reduce the burden on curative health services, and is the first step in the success of exclusive breastfeeding. If this EIB is not carried out, then it can have an impact on the death of neonates aged 0-28 days. Early initiation of breastfeeding should not be late because the sucking reflex in newborn babies will reach its peak at the age of 20-30 minutes, and then this reflex will decrease and weaken. (Damayanti, 2018).

The results of the study revealed that breastfeeding from an early age is related to the success of exclusive breastfeeding ($p = 0.04$); sucking from the baby will influence the release of the hormones oxytocin and prolactin, in addition to which the baby also learns to breastfeed so there is a possibility that breastfeeding from an early age affects production and excretion of breast milk (Irawan, 2018). When a baby is placed on the chest to breastfeed, the baby will feel the warmth of the mother's skin, which can reduce the risk of death due to hypothermia. During breastfeeding, the baby will coordinate sucking, swallowing, and breathing. At that time, the mother may have already expressed colostrum. Babies who get colostrum will get

antibodies and intestinal cell growth factors; antibodies in breast milk can increase resistance to infection. Various literature states that immediately after birth the baby must be placed on the mother's chest by attaching the baby to the mother's breast; in this case, it is not to provide nutrition but so that the baby can learn to breastfeed and get to know the mother's nipple, also the stimulation of the baby's sucking will stimulate the pituitary gland. The posterior secretes the hormone oxytocin to speed up the release of breast milk. (Irawan, 2018). The results of statistical tests by Periselo (2021) obtained a value of $p = .003$; this shows that there is a relationship between the EIB variable and the success of exclusive breastfeeding ($p < 0.05$), so the hypothesis is accepted that there is a relationship with EIB. Apart from that, based on the results of research by Amaliyah and Futriani (2023) on the relationship between maternal knowledge about early initiation of breastfeeding (EIB) and the implementation of EIB, it can be concluded that there was an influence on the implementation of EIB with a p -value of 0.000 or p -value < 0.05 .

This study also showed that, after empowering mothers, 93.5% of babies did not experience jaundice, which means that statistically, there was a difference between the two groups ($p = 0.046$). Based on this, mothers must be provided with education about lactation and jaundice, which are preventable causes of neonatal morbidity/mortality. Increasing knowledge will help mothers realize the importance of breastfeeding and early detection of jaundice if it occurs. Ilawati and Susanti (2022) showed that there was a relationship between maternal knowledge and the prevention of physiological jaundice in babies aged 0-14 in Hamlet I Sei Mencirim Village in 2022 with the results of analysis from the chi-square statistical test showing p value $= 0.23$ ($p < 0.05$). Likewise, the research results in this study are in line with that research; there is a relationship between maternal knowledge and attitudes and the incidence of jaundice in newborn babies. Mothers with good or sufficient knowledge are more likely to respond to any information given so that, when a situation occurs to the mother, the mother already understands how to deal with it. The knowledge gained directly or from other people's experiences always has

levels as that knowledge increases and develops. When acquiring knowledge, a person will start their knowledge in the process of just knowing, which then increases to understanding after obtaining sufficient information to develop that knowledge, and along with the ongoing and continuous interaction process, the knowledge gained becomes something that is ultimately integrated with a person and will influence their behavior. A person's behavior is largely determined by his knowledge of developing the knowledge he has so that their future behavior can be even better (Simanungkalit, 2021).

CONCLUSION

Empowerment carried out on mothers can prevent jaundice in babies. Health workers need to implement empowerment through education about EIB, breastfeeding, and jaundice to improve the health of mothers and babies.

REFERENCES

- Amaliyah, N.R., & Futriani, E.S. (2023). Hubungan Pengetahuan Ibu Tentang Inisiasi Menyusui Dini (IMD) Terhadap Pelaksanaan IMD di BPM Rumah Berkah Kabupaten Bekasi Tahun 2023. *Jurnal Pendidikan Dan Konseling (JPDK)*, 5(2), 2280-2286.
- Ansong-Assoku, B., Shah, S.D., Adnan, M., & Ankola, P.A. (2018). *Neonatal Jaundice*.
- Apipah, A., & Mariyani, M. (2022). The Effectiveness of IMD Implementation on Infant Weight Gain at The Kolelet Health Center Lebak Banten in 2022. *International Journal of Medicine and Health*, 1(3), 11-21.
- Aprillia, Y. (2010). *Analisis sosialisasi program inisiasi menyusui dini dan ASI eksklusif kepada bidan di Kabupaten Klaten*. Universitas Diponegoro.
- Damayanti, W. (2018). Analisis pelaksanaan inisiasi menyusui dini (imd) di puskesmas kabupaten tangerang provinsi banten. *IMJ (Indonesian Midwifery Journal)*, 1(2).
- Dopongnuha, A. (2019). *Asuhan Kebidanan Berkelanjutan pada Ny JA Di Puskesmas Kabir Tanggal 19 April Sampai Dengan 14 Juni 2019*. Poltekkes Kemenkes Kupang.
- Fetriyah, U., Sari, A., Rahmayani, D., Yuliana, F., & Jayanti, R. (2019). Correlation between gestational and maternal age with pathological neonatal jaundice. *Third International Conference on Sustainable Innovation 2019-Health Science and Nursing (IcoSIHSN 2019)*, 123-129.
- Idris, F.P. (2019). *Efektivitas Media Audio Visual Dalam Peningkatan Perilaku Inisiasi Menyusu Dini (IMD) pada Ibu Hamil di Wilayah Kerja Tinggimoncong Tahun 2019*.
- Ilawati, S., & Susanti, N. (2022). Hubungan Pengetahuan dan Sikap Ibu Terhadap Pencegahan Ikterus Fisiologis Pada Bayi Usia 0-14 Hari Dusun I Desa Sei Mencirim. *Journal of Healthcare Technology and Medicine*, 8(2), 1354-1361.
- Irawan, J. (2018). Hubungan Inisiasi Menyusu Dini (IMD) dan Pemberian Air Susu Ibu (ASI) Eksklusif di RSUD Wangaya Kota Denpasar. *Jurnal Skala Husada: The Journal of Health*, 15(1).
- Kemenkes, R.I. (2014). *Profil kesehatan indonesia. Jakarta: Kementrian Kesehatan Republik Indonesia*.
- Kemenkes, R.I. (2018). *Hasil utama riset kesehatan dasar (Riskesdas) 2018. Jakarta: Kementrian Kesehatan Republik Indonesia Badan Penelitian Dan Pengembangan Kesehatan*.
- Klemming, S., Lilliesköld, S., & Westrup, B. (2021). Mother-Newborn Couplet Care from theory to practice to ensure zero separation for all newborns. *Acta Paediatrica*, 110(11), 2951-2957.
- Limong, T., Handayani, R., & Akib, A. (2023). *Pendidikan Dan Pengetahuan Ibu Hamil Trimester III Dengan Sikap Terhadap Inisiasi Menyusui Dini*.
- Madiyono, B., Mz Moeslichan, S., Sastroasmoro, S., Budiman, I., & Purwanto, S. (2011). *Perkiraan Besar Sampel*. In S. Sastroasmoro & S. Ismael (eds.), *Dasar-Dasar Metodologi Penelitian Klinis*. Jakarta: Sagung Seto.
- Marali, A.O. (2021). Hubungan Inisiasi Menyusui Dini Terhadap Kejadian Ikterus Neonatorum Bayi Lahir Kurang 3 Hari Di Rumah Sakit Kota Tangerang. *COMSERVA: Jurnal Penelitian Dan Pengabdian Masyarakat*, 1(8), 449-459.
- Mariance, M.M. (2019). *Asuhan Kebidanan Berkelanjutan Pada Ny. MM Di*

- Puskesmas Waigete Kabupaten Sikka Periode 08 April Sampai Dengan 27 Juni 2019.* Poltekkes Kemenkes Kupang.
- Mashudi, S. (2014). Inisiasi Menyusui Dini Langkah Awal Keberhasilan Program ASI Eksklusif. *Jurnal Florence*, 2(4), 27-30.
- Mayunita, A. (2020). KARAKTERISTIK BAYI YANG MENGALAMI IKTERUS NEONATORUM DI BIDAN PRAKTIK MANDIRI BUNDA SUHARNI KOTA BOGOR TAHUN 2020. *Jurnal Kesehatan*, 8(4).
- Mujiarto, M., Susanto, D., & Bramantyo, R.Y. (2019). Strategi Pelayanan Kesehatan Untuk Kepuasan Pasien Di UPT Puskesmas Pandean Kecamatan Dongko Kabupaten Trenggalek. *Jurnal Mediasosian: Jurnal Ilmu Sosial Dan Administrasi Negara*, 3(1).
- Myle, A.K., & Al-Khattabi, G.H. (2021). Hemolytic disease of the newborn: a review of current trends and prospects. *Pediatric Health, Medicine and Therapeutics*, 12, 491-498.
- Nugraheni, N.P., Widyastuti, Y., & Kurniati, A. (2020). KARAKTERISTIK NEONATUS YANG MENGALAMI IKTERUS NEONATORUM DI RSUD PANEMBAHAN SENOPATI BANTUL TAHUN 2018. Poltekkes Kemenkes Yogyakarta.
- Nutbeam, D., & Muscat, D.M. (2021). Health promotion glossary 2021. *Health Promotion International*, 36(6), 1578-1598.
- Obeagu, E.I., & Katya, M.C. (2022). A Systematic Review on Physiological Jaundice: Diagnosis and Management of the Affected Neonates. *Madonna University Journal of Medicine and Health Sciences* 2(3), 25-41.
- Organization, W.H. (2013). *Global tuberculosis report 2013*. World Health Organization.
- Parwata, W.S.S., Putra, P.J., Kardana, M., Artana, W.D., & Sukmawati, M. (2019). The characteristic of neonatal hyperbilirubinemia before and after phototherapy at Sanglah Hospital, Denpasar, Bali in 2017. *Intisari Sains Medis*, 10(2).
- Periselo, H. (2021). Hubungan Inisiasi Menyusui Dini (Imd) Dengan Keberhasilan Asi Eksklusif Di Puskesmas Wara Barat Kota Palopo Tahun 2019. *Jurnal Kesehatan Luwu Raya*, 7(2), 156-161.
- PPN, K. (2010). Laporan Pencapaian Tujuan Pembangunan Milenium di Indonesia 2010. *Jakarta: Badan Perencanaan Pembangunan Nasional (BAPPENAS)*, 107-113.
- Rahayuningrum, D.C., Irman, V., & Apriyeni, E. (2021). Hubungan Tingkat Pengetahuan Ibu Dengan Kejadian Ikterik Pada Bayi. *Prosiding Seminar Nasional Stikes Syedza Saintika*, 1(1).
- Revenis, M., & Wong, E.C.C. (2021). Disorders in the neonatal period. In D. Dietzen, M. Bennett, E.Wong & S.Haymond (eds.), *Biochemical and Molecular Basis of Pediatric Disease* (pp. 71-116). Elsevier.
- Rusli, U. (2008). *Inisiasi menyusui dini plus ASI eksklusif*. Puspa Swara.
- Rusnawati, Y. (2022). HUBUNGAN PERSALINAN SECTIO CAESAREA DENGAN KEJADIAN IKTERUS NEONATORUM DI RUMAH SAKIT PRATAMA YOGYAKARTA. Poltekkes Kemenkes Yogyakarta.
- Safitri, Y., & Haflah, N. (2022). Penyuluhan Tentang Faktor Yang Menyebabkan Kejadian Bayi Kuning Pada Bayi Baru Lahir. *Jurnal Abdimas Flora*, 1(1), 38-44.
- Selviyanti, E., Kartika, R.C., Umbaran, D.P.A., Fitriyah, D., & Yuanta, Y. (2022). Peningkatan Pengetahuan Ibu Tentang Inisiasi Menyusui Dini (IMD) Untuk Keberhasilan Memberikan ASI Eksklusif di Kabupaten Jember. *Journal of Community Development*, 3(2), 224-232.
- Simanungkalit, E.S.P. (2021). HUBUNGAN PERILAKU IBU DENGAN KEJADIAN IKTERUS PADA BAYI USIA 0-28 HARI DI WILAYAH KERJA PUSKESMAS SELESAI TAHUN 2021. *Evidence Based Journal*, 2(3), 62-69.
- Sreedha, B., Nair, P.R., & Maity, R. (2023). Non-invasive early diagnosis of jaundice with computer vision. *Procedia Computer Science*, 218, 1321-1334.
- Sukmawati, S., Stang, S., & Bustan, N. (2018). Pengaruh Edukasi Terhadap Pengetahuan dan Sikap Ibu Hamil Tentang Inisiasi Menyusui Dini (IMD) Di Wilayah Kerja Puskesmas Parangloe Kabupaten Gowa. *Jurnal Kesehatan Masyarakat Maritim*, 1(1).
- Sulistiyani, Dp. D., Santi, M.Y., & Setya, D.N. (2020). HUBUNGAN JENIS

PERSALINAN SECTIO CAESAREA
DENGAN EJADIAN IKTERUS
NEONATORUM DI RS PKU
MUHAMMADIYAH YOGYAKARTA
TAHUN 2018. Poltekkes Kemenkes
Yogyakarta.

Yanti Herawati, M.I. (2017). Pengaruh
Pemberian Asi Awal terhadap
Kejadian Ikterus pada Bayi Baru Lahir
0-7 Hari. *Jurnal Bidan, III* (1).

Yuliarty, D. (2020). FAKTOR-FAKTOR YANG
MEMPENGARUHI PENGETAHUAN IBU
NIFAS TENTANG IKTERUS
NEONATORUM PADA BAYI UMUR 0-7

HARI DI PUSKESMAS KECAMATAN
SENEN JAKARTA PUSAT PERIODE
NOVEMBER 2019-JANUARI 2020.
STIKES RSPAD GATOT SOEBROTO.

Yulita, E., Mappaware, N.A., Nontji, W., &
Usman, A.N. (2021). The effect of
breastfeeding on body temperature,
body weight, and jaundice of 0-72 h
old infants. *Gaceta Sanitaria, 35*,
S254-S257.

Yuniarti, S. (2019). Pengaruh
Pemberdayaan Ibu Hamil Terhadap
Antenatal Care. *Semnaskes, 73-79*.

Development of a Website-Based Online Health Screening and Education Database Related to Noncommunicable Diseases (NCDs) in Realizing Health Promoting University

La Ode Reskiaddin^{✉1)}, Budi Aswin¹⁾, Sri Astuti Siregar¹⁾, Yodi Prasetyo¹⁾

¹ Public Health Study Program, Faculty of Medicine and Health Sciences, Universitas Jambi, Jambi, Indonesia 36122

✉Email: ld.reskiaddin@unja.ac.id

ABSTRACT

Background: The use of website-based reporting in reporting screening databases and health services is still rarely used and developed in educational institutions. Websites can also be used as educational services to increase literacy and knowledge of the community, especially the academic community. **Objectives:** This research aims to develop a website database for noncommunicable disease screening and website-based health education to create a healthy campus. This is in line with the increasing trend of noncommunicable diseases in the university setting. **Method:** This research uses a quantitative R&D model approach by implementing several development stages. The informants in this study numbered 23, consisting of three experts for website assessment and 20 website users who were selected purposively. **Results:** The research results showed that the need assessment of a website entailed a) Information systems can be used as a medium for health-related education, especially those related to noncommunicable diseases, b) Information systems are used to record visits by Posbindu participants, c) Information systems are used to process and display data on risk factors for noncommunicable diseases, and d) Information systems process and display information related to healthy campuses. The average assessment validation of professionals was 94.07% (very feasible), and participants validation was 91.44% (very feasible). **Conclusion:** Development of a noncommunicable disease screening database website and website-based health education to make a healthy campus a viable medium for providing health information.

Keywords: Education, Noncommunication Disease, Screening, Website

INTRODUCTION

Noncommunicable diseases (NCDs) are one of the leading causes of death in the world. Data from the World Health Organization (WHO) show that as many as 41 million people die each year due to noncommunicable diseases or equivalent to 71% of all deaths globally. In addition, data show that more than 15 million people die from NCDs between the ages of 30 and 69 every year (World Health Organization, 2021). The causes of these high NCD deaths are smoking, physical inactivity, harmful use of alcohol, and unhealthy diet which can increase the risk of death (World Health Organization, 2021).

NCDs can attack anyone, including the academic community in higher education. This is because most of the academic community spends their time on campus. In addition, stress, workload, unhealthy lifestyle patterns, and welfare

levels that are not proportional to performance demands on lecturers can trigger the occurrence of NCDs. Based on the results of research conducted by Kalsum et al. (2020) The number of lecturers at Jambi University who died from 2015 to 2021 was 25 (2.5%). The main causes of death in lecturers were noncommunicable diseases (96%), especially diabetes mellitus (28%), heart attack, hypertension, liver cancer, and autoimmune. Various efforts have been made to reduce the high number of NCDs, one of which is through early detection and screening. Early detection is a health effort that includes activities such as blood pressure measurement, blood sugar measurement, body mass index measurement, risk behavior interview, and healthy lifestyle behavior education (Minister of Health of Republic of Indonesia, 2019).

The results of early detection measurements are needed to determine

the interventions to be carried out. Reporting is usually done manually and in print. However, reporting through this method is not very effective (Mardian et al., 2019). This is ineffective because it has several weaknesses including manual recording being carried out from one datum to another, inefficient in its work, there is a risk of difficulty finding data or losing data and there needs to be high supervision because the data are not automatically done. One of the efforts made to overcome these problems is that reporting can be done by utilizing website-based technology (Putri & Nurlaila, 2022). In addition, the website can also be used in consultation and education services, especially regarding non-communicable diseases.

One of the efforts made to overcome these problems, reporting can be done by utilizing website-based technology especially it can also be used in consultation and education services, especially regarding NCDs. The increase in NCD cases is expected to increase the burden on society and the government because its handling is costly and requires high-technology (Sulistyaningsih & Listyaningrum, 2021). The presence of website-based mHealth as one of the technology products is expected to help in accessing information or data in the agency. (Mardian et al., 2019). The website can also be used as an educational service to increase public literacy and knowledge. Chau et al. (2012) found people are satisfied with the web-based education service by paying attention to the aspects of format, content and accuracy of the education program.

High morbidity rates and risk factors for death from noncommunicable diseases in the university environment and the use of website-based reporting in terms of reporting database screening and health services is still rarely utilized at Jambi University, especially in the Faculty of Medicine and Health Sciences. In addition, reporting of NCD risk factor screening data is still done manually and is not well-organized. Therefore, there is a need for a website development study related to this matter. This is in line with the commitment of Jambi University in realizing a healthy campus through the Health Promoting University (HPU) program. This research is also an integration with community service

activities developed by the HPU Pinang Masak Faculty of Medicine and Health Sciences through the noncommunicable disease integrated coaching post (Posbindu) program. Therefore, the purpose of this study is to determine the description of the stages of defining, designing, developing, and obtaining a website-based NCDs screening database and health education in realizing a healthy campus.

METHODS

This research used a quantitative approach with a research and development (R&D) model. The product in question was not only limited to the production of a book or module but can also take the form of procedures or processes such as learning methods or organizational methods that can be in the form of software or hardware (Sanjaya, 2013; Sumarni, 2019). The approach used in this research is the 4-D model (Thiagarajan, 1974). In this study, the product developed is a website that functions as a health database including screening report data and website-based educational services. This research will be carried out at the Faculty of Medicine and Health Sciences, Jambi University as an initial development location and pilot project for website utilization in health services. Activities were carried out from March to September 2023.

The sample in this study was taken by purposive sampling with the following criteria: one community health centers officer who holds the NCD program (Campus work area), one NCD section officer of the Jambi provincial health office, one healthy campus administrator (Health Promoting University) and 20 persons (10 education staff and 10 lecturers) as application users. The stages of this research and development simply consist of: 1) defining stage, 2) design stage, development stage and deployment stage. The data collection techniques in this study were obtained directly through interviews for reviewing the website from experts and using a product development assessment questionnaire. Instrument is an independent development that has been validated. In-depth interviews were conducted with a community health center officer, NCD section officer of the Jambi provincial health office and healthy campus administrator (Health Promoting

University). In addition, other data were obtained using literature studies on noncommunicable diseases.

Data were analyzed using a computer to determine frequency distribution and qualitative data were analyzed manually. The analyzed data were categorized in several levels of feasibility test including: Very feasible (80%-100%), Feasible (60%-79%), Fair (40%-59%), Less Feasible (20%-39%), and Very Unfeasible (0%-19%) (Fikri, 2022; Sunarto & Riduwan, 2017). The website assessment indicators were developed and adopted from various research sources, including aspects of appearance, information adequacy, ease of access and several other aspects (Perwira, 2015; Surandari, 2019). This study has been ethically tested from the Jambi Health Polytechnic No LB.02.06/2/626/2023.

RESULTS AND DISCUSSION

Respondents' Characteristics

Table 1. Respondents' Characteristics.

| Initials/ Age (years) | Gender | Institution | Description |
|-----------------------------|--------|--------------------------------|-------------------|
| SF/47 | Female | Jambi Provincial Health Office | Content Validator |
| ES/45 | Female | PKM Simpang IV Sipin | Content Validator |
| PS/30 | Female | HPU Unja Manager | Content Validator |
| HR/30 | Male | FKIK | Participant |
| JA/42 | Female | FKIK | Participant |
| NS/43 | Female | FKIK | Participant |
| YD/34 | Male | FKIK | Participant |
| DN/34 | Female | FKIK | Participant |
| AS/39 | Male | FKIK | Participant |
| WD/35 | Female | FKIK | Participant |
| PG/30 | Female | FKIK | Participant |
| SW/46 | Female | FKIK | Participant |
| YW/34 | Female | FKIK | Participant |
| RM/25 | Male | FKIK | Participant |
| DS/40 | Female | FKIK | Participant |

| Initials/ Age (years) | Gender | Institution | Description |
|-----------------------------|--------|-------------|-------------|
| HS/38 | Female | FKIK | Participant |
| FJ/31 | Female | FKIK | Participant |
| EAR/53 | Female | FKIK | Participant |
| BA/39 | Male | FKIK | Participant |
| NA/31 | Male | FKIK | Participant |
| AD/32 | Female | FKIK | Participant |
| MB/38 | Female | FKIK | Participant |
| AN/30 | Male | FKIK | Participant |

Respondents in this study totaled 23 participants consisting of three expert validators and 20 participants. Participants were lecturers from the Faculty of Medicine and Health Sciences (FKIK) Jambi University.

Website Development

The development of information systems related to education and noncommunicable disease screening databases is based on the unavailability of information services in the health sector specifically related to non-communicable diseases. In addition, the university already has a means of screening noncommunicable diseases through Posbindu Astano activities, and the database was still manual. In addition, some research conducted by lecturers on the Jambi University campus states that noncommunicable diseases were quite high. This needs to be a concern so it requires an information system that meets these needs.

At this stage, researchers conducted a needs analysis through observation which included analyzing system needs and analyzing hardware and software requirements. The minimum requirements that must exist include: a) Information systems can be used as a medium for health-related education, especially those related to noncommunicable diseases, b) Information systems are used to record visits by Posbindu participants, c) Information systems process and display data on risk factors for noncommunicable diseases, d) Information systems process

and display information related to healthy campuses. In addition, the research conducted a literature study related to website content and templates and data screening. This website was an information website and a database website. The information website referred to the website <https://hpu.ugm.ac.id/>. Gajah Mada University's website was used because the development of a healthy campus in Indonesia was first initiated by the university through HPU (health-promoting university) activities. In addition, the content on the website has also adopted HPU indicators per AUN-HPN ASEAN University Network-Health Promotion (Universitas Gadjah Mada, 2023).

The website content related to the database refers to the Aplikasi Sehat IndonesiaKu (ASIK). It is one of the applications launched by the Indonesian Ministry of Health through the Digital Transformation Office; this application is used to record individual immunizations and to conduct early detection of infectious and non-communicable diseases and UKBM programs (Posyandu) so that in the future it will make it easier for reporting officers to check and verify the target database according to the region. Screening data included information questions regarding participant's personal data, family disease history, personal disease history, risk factors, anthropometric measurements, blood sugar measurements, blood cholesterol, and uric acid measurements, additional examinations (eye examination, ear examination) (Ministry of Health RI, 2023).

In the next stage, researchers conducted interviews with website developers regarding hardware and software requirements. At this stage, an analysis of hardware and software needs was also carried out to know the needs for information systems related to educational websites and databases regarding infectious disease prevention, so that they can be operated properly without constraints. Website developer recommendations related to the needs of software and hardware specifications used tools used to run this system include a laptop computer, Apache Laragon Webserver, PHP 8.0, MySQL Database, and Laravel 9 Framework.

Design Stage

The system design developed includes the design of the United Modeling Language (UML), database, and user interface.

United Modeling Language Design

In this process, there were two stages that needed to be described through a use case diagram consisting of actors and interactions carried out in a system. In the use case diagram system, there are three actors, namely admin, cadres, and guests. In addition, it also uses a class diagram that will compile each command and material in it.

Database Implementation

At this stage, several processes also needed to be completed including: 1) Database Design done using MySQL database and MySQL Workbench as the Graphical User Interface 2) Coding (Translating) web logic into program code; the coding stage was carried out using the PHP programming language, Laravel framework and visual studio code text editor. 3) Deploy (Publish) the website to be online so that it can be accessed by users; the deployment process uses Hostinger web hosting which runs on a Linux operating system server.

Implementation of Display Function

Implementation of Health Promoting University (HPU) information system using Laravel framework, bootstrap, and uikit. Here are some website views of the development results. This stage is a stage in the software development process after analyzing the needs and system design. The design is then implemented in programming language code so that the software can be used in real terms to solve problems according to its function. There are the main page on the education system (Image 1), Login page (Image 2), Website Admin, and Cadre Dashboard Page (Image 3).

Development Stage

At this stage, there were several activity processes, namely website content development and validation carried out by professional expert validators. The first stage is the implementation of website content development; this stage is the stage of fulfilling educational content related to infectious diseases or risk factors related to NCDs. Educational content is sourced from journal references, books, or websites made in the form of articles that will be posted to the website. Here are some views of the

results of content development on the website (Image 4 & 5).

The second stage is the feasibility validation test; at this stage, there are several processes starting from the assessment by three professional expert validators including Posbindu and NCDs officers of Simpang IV Sipin Community Health Center, the Health Office, and HPU Unja administrators. This stage also revised the results of input and suggestions from professional expert validators and finally the product trial process to participants.

Table 2. Average Of Media Expert Recapitulation.

| No | Aspect/ Indicator | Value (N=3) | Max Value | Feasibility Percentage (%) |
|----|---|-------------|-----------|----------------------------|
| 1 | The appearance of the information system is very interesting and not boring | 15 | 15 | 100 |
| 2 | The information generated is quite complete | 13 | 15 | 86.7 |
| 3 | The website is easily accessible to everyone | 15 | 15 | 100 |
| 4 | The information system makes it easy to search and find out about noncommunicable disease information | 15 | 15 | 100 |
| 5 | The text on this website is easy to read and understand | 15 | 15 | 100 |
| 6 | The information generated is helpful to everyone | 15 | 15 | 100 |
| 7 | Website makes it easy for people to get detailed information about health services | 13 | 15 | 86.7 |
| 8 | The process of accessing this information system is quite easy and clear | 13 | 15 | 86.7 |
| 9 | This healthcare information website deserves | 13 | 15 | 86.7 |

| to be published | | | |
|-----------------|-----|-----|-------|
| Total | 127 | 135 | 94.07 |

**Feasibility: Very feasible (80%-100%), Feasible (60%-79%), Fair (40%-59%), Less Feasible (20%-39%), and Very Unfeasible (0%-19%).*

Based on the data from the validation results of the validator assessment above, the average value is the total of the assessment scores from three validators, obtained with a percentage of the feasibility of 94.07%. This indicates feasibility with very feasible criteria.

Design Revision

This stage is the process of improving the design that has been tested by experts with comments, input, and suggestions. The first input is the addition of questions and fields in the screening system including the addition of questions for smoking cessation efforts and filling in data on CO₂ levels in the lungs.

"..Smoking Cessation Attempts (UBM) can also be included, there are students who smoke, lecturers too, it's almost the same as ASIK, but it's okay if it's included, right now there are still many who smoke, in UBM, Pak Ode can add questions about whether there is smoking, whether exposed to smoking, how many packs in a year or a day ..." (ES, 45 Years)

We from the Health Office, yes sir, especially we from the Directorate of Noncommunicable Disease Prevention and Control Unit (P2PTM) and Mental Health Unit (Keswa) section are very supportive. Very grateful for the development of this website, if I see in general this is very supportive of the existing programs in our P2PTM and Keswa sections, and this is also almost the same as the ASIK application that we have, sir ... only in ASIK there are also programs related to Smoking Cessation Efforts that have not yet been included in ASIK, which also from the Ministry of Health is currently still using the SIPTM application, it will also be in the process of entering the ASIK application.... Well maybe also here can be added to the examination related to smoking, the examination of CO levels because what we also

see is that smoking is from school-age children, I'm sure it will increase our coverage of early detection of noncommunicable diseases now too, if other detection of other infectious diseases at FKTP has been carried out with the NCD guide, only that is a bit weak, related to efforts to stop smoking..." (SF, 47 Years)

In addition, several other inputs were given regarding the need for special items related to the IVA Test Screening and Psychiatric Examination (Image 6). This is because it supports programs that are being promoted by the Jambi city government. This is as conveyed by the informant as follows:

"The content and appearance are very good, including examining the eyes, and ears, for beginners for us to start this is quite complete sir, maybe this is also an addition sir, I see that we have a GME (Mental Emotional Disorder) examination which is quite high right, students who are depressed in lectures, we include it, it's good to sir..." (SF, 47 Years)

"Yes, if you look at the risk factors, this is already complete, yes, family history of the disease, personal, risk factors, then physical activity comes in, if this is complete, maybe for women, yes, the examination is added to whether she has done an IVA for lecturers, because one of these NCDs is an IVA and breast examination. IVA and breast examination itself, yes, because in anthropometric measurements it is already right, well the addition may be IVA examination because it is promoted by our Governor's mother, for lecturers yes, because students are not married ..." (ES, 45 Years)

Product Trial to Participants

Based on the data from the participant group results above, the average value which is the total of the assessment scores from 20 participants, from 20 participants shows very feasible

criteria with a feasibility percentage value of 91.44%.

Based on the results of the interview, all respondents understand the content of the website content and the display is attractive. Informants also stated that this is an innovation. However, informants also said that the information presented should be expanded. This is in line with the results of the assessment of the participant group.

Table 3. Average of Product Trial.

| Aspect/Indicator | Value (N=20) | Max Value | Feasibility (%) |
|---|--------------|------------|-----------------|
| The appearance of the information system is very interesting and not boring | 93 | 100 | 93 |
| The information generated is quite complete | 92 | 100 | 92 |
| The website is easily accessible to everyone | 90 | 100 | 90 |
| The information system makes it easy to search and find out about noncommunicable disease information | 88 | 100 | 88 |
| The text on this website is easy to read and understand | 90 | 100 | 90 |
| The information generated is helpful to everyone | 93 | 100 | 93 |
| The website makes it easy for people to get detailed information about health services | 89 | 100 | 89 |
| The process of accessing this information system is quite easy and clear | 93 | 100 | 93 |
| This healthcare information website deserves to be published | 95 | 100 | 95 |
| Total | 823 | 900 | 91.44 |

**Feasibility: Very feasible (80%-100%), Feasible (60%-79%), Fair (40%-59%), Less Feasible (20%-39%), and Very Unfeasible (0%-19%).*

Dissemination Stage

This stage was a stage in system development. At this stage, the researcher published the results and promoted the information to the parties involved. Promotion was done through social media and direct communication.

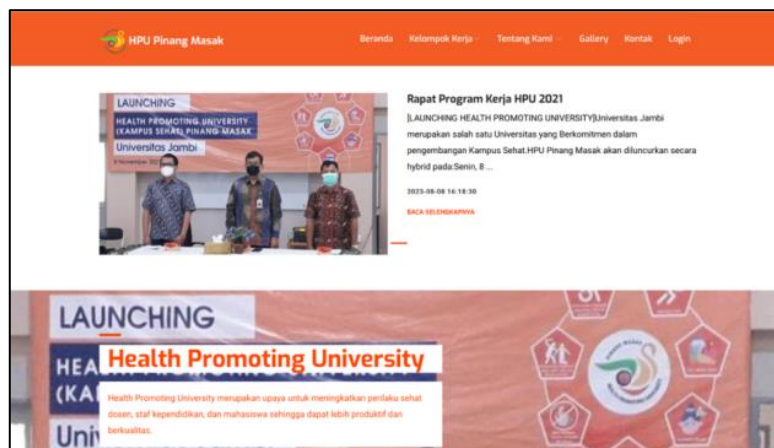


Figure 1. Website Home Page.

The initial stage in a website program development is to analyze its needs. This needs analysis is a very important aspect in program development because of the database in a design and can also avoid a program implementation process that is not good from the system (Anita Azmi et al., 2020). This is in line with the opinion of (Anita Azmi et al., 2020; Triayomi et al., 2023; Waldopo, 2011) that needs are a form of inequality between the current situation and the situation that should be. So indeed if a situation is not what should be then it is a need. The needs analysis stage is the stage of problem identification and literature review according to Triayomi et al. (2023). The information generated in the website design assessment is in the form of analyzing the needs of both the facilities and infrastructure used, school communication media, and collecting journals related to the development of school websites. If the inequality or gap is greater, it needs to be a priority that must be addressed immediately. This priority need is referred to as a problem. Some classify this need into two, namely target needs and learning needs (Hendriyani et al., 2018).

In this research, aspects of system requirements are needed for health information services which specifically discuss NCDs (non-communicable diseases) which are still not available. There are four important items of information obtained in analyzing the needs of website design in this study. These are: a) Information systems can be used as a medium for health-related education, especially those related to noncommunicable diseases; b)

Information systems are used to record visits by Posbindu participants; c) Information systems are used to process and display data on risk factors for noncommunicable diseases; d) Information systems process and display information related to healthy campuses.

Additionally, the service for noncommunicable diseases at the university is in the form of an integrated coaching post-service with screening activities for non-communicable diseases. Regarding the reporting of these activities, it still uses a manual system or is not yet website-based. In this era, various companies have reduced the form of work systems that are still manual, this is because this manual system still has many shortcomings related to long processing time and more labor. Besides that, by utilizing web-based digital technology in managing the payroll system all data can be easily and quickly processed and minimize errors that will occur if it is still done manually (Ahyadu & Danuri, 2011; Efendi et al., 2023; Supriati et al., 2021). This is the basis for consideration of website design in this study.

The design of the database system is useful as an initial description of the system to be created. This design is divided into three parts, namely the United Modeling Language (UML), database (database), and display (user interface). UML is one of the tools/models for designing object-oriented software development (OOP); this development is a tool used by its developers (Ristianti, 2019). Development is with object-oriented programming (OOP) according to

Ramadhani (2015). UML is a programming approach that uses objects and classes. In designing using UML there are several process flows, namely use case diagrams which are descriptions of the functions of a system from a user perspective. Use cases work by describing typical interactions between users of a system and the system itself through stories of how a system is used (Madre et al., 2021).

Furthermore, the class diagram describes and descriptions of classes, attributes, and objects and their relationships with each other. Class diagrams can provide a global view of a system. This is reflected in the existing classes and their relationships with each other. A system usually has several class diagrams. Class diagrams are very helpful in visualizing the class structure of a system. This diagram is commonly used in object-oriented system modeling. Class diagram serves to explain the type of system object and its relationship with other objects. (Rahmatuloh & Revanda, 2022).

The validation was conducted by three professional expert validators, namely Posbindu and PTM officers of Simpang IV Sipin Community Health Center and staff of the Health Office and HPU management of Jabi University. The results of the assessment showed a feasibility percentage of 94.07% with the eligibility criteria of "Very Feasible." Therefore, the website development can continue at the next stage, namely conducting product trials. This feasibility is also very good for the future website development process because this website functions as a means of distributing health-related information consumed by the community. This is in line with a study conducted by Purnaningsi et al. (2022) where research conducted educational activities carried out nine times online. There was an increase in partner knowledge regarding the prevention of free sex from the average results of the thematic pre-test and post-test from 54 to 93.67. They concluded that the learning method using the GEKA.id website was able to increase the knowledge of its users (Purnaningsih et al., 2022).

About the input given, namely the addition of a smoking cessation service column, smoking behavior among the

public is a problem that is difficult to overcome due to various complex factors in society. This is in line with what the WHO said about health problems that occur and are the main cause of the onset of various diseases leading to death. It is stated that the estimated number of smokers in Indonesia until 2025 will rise to 90 million people. Even more sadly, 45% of Indonesians think that cigarettes are one of the things they need (Hasanah & Hayati, 2022). This is a problem that must be prioritized through activities that can influence smokers to quit smoking. Screening of smokers is very important to detect early the impact of cigarettes that have been consumed for a long time. From the results of the research that has been done, it is found that screening related to the impact of smoking behavior can be a motivation for someone to quit smoking because the screening carried out is related to diseases due to the impact of cigarette smoke that is smoked. In this study, lung screening and smoking were integrated. From the research, it turns out that intervening with smokers is more effective in this way because it is more intensive, personalized, and more effective for smokers (Kaufman et al., 2018; Moldovanu et al., 2021). This is why it is important to conduct such services from a website that can be accessed easily.

In addition, professional expert validators also provided suggestions and input regarding the addition of content on the website related to the Screening IV A test and special content for mental examination. Regarding the importance of screening IV A test, is an intervention carried out to reduce cervical cancer cases. This is in line with the results of research that has been conducted in India that found the test has a good impact on services related to cervical cancer screening programs in low-resource areas (Poli et al., 2015). These results are supported by other studies that explain the incidence of cervical cancer which is more prevalent in developing countries compared to high-income countries (Mezei et al., 2017). In addition, the importance of screening is also related to the high case of deaths due to cervical cancer in women. There are 80%-90% of women with this cancer are difficult to cure because they only come to the health center with conditions that are already at an advanced stage, reaching 70% of cervical cancer

cases. So the role of health promotion is needed in this case to reduce cases and provide knowledge on women's awareness for early detection of cervical cancer (Fridayanti & Laksono, 2017). Health promoters can intervene in screening and information provision from the developed website.

Mental examination is a process to examine a person's psyche. According to the WHO, mental health itself can be defined as a condition of well-being of an individual who is aware of the potential of, when an individual experiences pressure and things that can make shake in his life and unable to be more productive and contribute to the place where he is (Thamrin et al., 2023). The importance of psychiatric screening among universities is due to the many cases in universities in the incidence of psychiatric disorders. This is in line with research that has been conducted showing the results of the SRQ29 screening conducted on pharmacy students at one of Yogyakarta's universities which found that there were 75% of people who experienced PTSD, anxiety, and depression disorders as much as 61.36%, drug-induced disorders as much as 2.27% and psychotic disorders as much as 50% (Desvita et al., 2022). In addition, the importance of screening for mental disorders is related to their treatment, which can be controlled if detected early (Talen et al., 2013). This detection is also beneficial for reducing co-occurring mental disorders and medical illnesses (Mertens et al., 2017).

The next stage is to test the website product to participants to assess the feasibility of the product being developed at this time. Based on the data from the results of the participant group consisting of 20 participants, the criteria were "Very Feasible" with a percentage of feasibility of 91.44%. Participants are health workers and also the academic community at the Faculty of Medicine and Health Sciences, Jambi University. So it can be concluded that this website product is very feasible to distribute and use.

In the flow of research, it is very important to disseminate research results to the public. Research dissemination is useful for authors to describe the research process to the community with a focus on gaps. Dissemination can be defined as the active dissemination of evidence-based interventions to the target community by

utilizing certain channels with a planned strategy (Bernhardt et al., 2011). Indeed, in the academic world, there is a lot of searching for truth (research) with scientific rules and methods objectively, systematically, and logically. In universities, lecturers use the results of their research as advice in conveying ideas and solving problems in science or social society. The role of dissemination is here as a means to disseminate the results of research that has been carried out and which absolutely must be applied. Therefore, the importance of disseminating the results of research that has been carried out is so that the results of research can be accessed by many people and are also important for the development of the competence of the lecturer himself (Husin & Nur, 2020).

CONCLUSION

The description of the definition stage includes an analysis of system requirements which include a) Information systems can be used as a medium for health-related education, especially those related to noncommunicable diseases; b) Information systems are used to record visits by Posbindu participants; c) Information systems are used to process and display data on risk factors for noncommunicable diseases and information systems process and display information related to healthy campuses. The description of the design stage includes the design of the developed system including the design of the United Modeling Language (UML) using use case diagrams and class diagrams. Database design is done using MySQL database and MySQL Workbench as a Graphical User Interface. Furthermore, the coding stage is carried out using the PHP programming language, the Laravel framework, and the Visual Studio code text editor. The deployment process uses Hostinger web hosting which runs on a Linux operating system server. The description of the development stage includes website content development activities and validation of feasibility test products by health professionals with a feasibility percentage value of 94.07% and a feasibility percentage from participants of 91.44%. The hpu.pinangmasak.com website is obtained as a website-based

NCD screening database and health education in realizing a healthy campus.

REFERENCES

- Ahyadu, N., & Danuri, Z. M. (2011). Perancangan Sistem Manual Menjadi Sistem Komputerisasi Persediaan Barang Pada Ud. Satria Perkasa Semarang Berbasis Obyek. *Jurnal Ilmia Infokami*, 7(1).
- Anita Azmi, R., Rukun, K., & Maksum, H. (2020). Analisis Kebutuhan Pengembangan Media Pembelajaran Berbasis Web Mata Pelajaran Administrasi Infrastruktur Jaringan. *Jipp*, 4(2), 303-314. <https://ejournal.undiksha.ac.id/index.php/JIPP/article/view/25840>
- Bernhardt, J. M., Mays, D., & Kreuter, M. W. (2011). Dissemination 2.0: Closing The Gap Between Knowledge And Practice With New Media And Marketing. *Journal of Health Communication*, 16(SUPPL. 1), 32-44. <https://doi.org/10.1080/10810730.2011.593608>
- Chau, J. P. C., Chung, L. C. L., Wong, R. Y. M., Loo, K. M., Lo, S. H. S., So, T. T. Y., Lau, M. S. W., Yeung, T. H. M., Leung, B. S. F., Tong, M. L., Li, C. Y. N., Kwok, W. W. Y., Thompson, D. R., & Lee, D. T. F. (2012). An evaluation of a web-based diabetes education program designed to enhance self-management among patients living with diabetes. *CIN - Computers Informatics Nursing*, 30(12), 672-679. <https://doi.org/10.1097/NXN.0b013e318261f1d2>
- Desvita, W. R., Awisarita, R. W., Fikri, M., Nurani, H., & Sikumbang, I. M. (2022). Pandemi Covid-19 Screening of Mental Health , Religiosity , and Quality of Life of Pharmaceutical and Medical Students in the Covid-19 Pandemic. *Medical Sains: Jurnal Ilmiah Kefarmasian*, 7(2), 293-300. <https://ojs.stfmuhammadiyahcirebon.ac.id/index.php/iojs/article/view/342>
- Efendi, E., Yosiyana, K., Panggabean, A., & Halawa, I. (2023). Teknologi Sistem Informasi Manual Dan Digital/Multimedia. *INNOVATIVE: Journal Of Social Science Research*, 3, 11-18.
- Fikri, Z. (2022). *Pengembangan Media Komik Mengenai Faktor Risiko Stunting (Nikah Muda, Tablet Tambah Darah, Dan Informasi Stunting) Pada Remaja*.
- Fridayanti, W., & Laksono, B. (2017). Keefektifan Promosi Kesehatan terhadap Pengetahuan, Sikap dan Perilaku tentang Tes IVA pada Wanita Usia 20-59 Tahun. *Public Health Perspective Journal*, 2(2), 124-130.
- Hasanah, U., & Hayati, Z. (2022). Analisis Faktor Risiko Perilaku Merokok Pada Usia Remaja: Literatur Review. *Jurnal Ilmiah Indonesia*, 7(1), 473-483. <http://dx.doi.org/10.36418/Syntax-Literate.v7i1.60292548-1398>
- Hendriyani, Y., Jalinus, N., Delianti, V. I., & Mursyida, L. (2018). Analisis Kebutuhan Pengembangan Media Pembelajaran Berbasis Video Tutorial. *Jurnal Teknologi Informasi Dan Pendidikan*, 11(2), 85-88.
- Husin, H., & Nur, S. (2020). Program Diseminasi Hasil Penelitian Serta Pendampingan Penelitian Dosen Pemula Se-Kalimantan Selatan. *JCES (Journal of Character Education Society)*, 3(1), 78-85.
- Kalsum, U., Nasution, H. S., & Nurwaqiah, I. (2020). Karakteristik Individu dan Penyebab Kematian di Kalangan Dosen di Jambi. *Prosiding SNIP Unja 2020*, 360-369.
- Kaufman, A. R., Dwyer, L. A., Land, S. R., Klein, W. M. P., & Park, E. R. (2018). Smoking-Related Health Beliefs And Smoking Behavior In The National Lung Screening Trial. *Addictive Behaviors*, 84, 27-32. <https://doi.org/10.1016/j.addbeh.2018.03.015>
- Madre, J., Yudi Sukmono, H., & Gunawan, S. (2021). Perancangan Sistem Informasi Berbasis Website Sebagai Salah Satu Media Promosi Pada Perusahaan. *Journal of Industrial and Manufacture Engineering*, 5(2). <https://doi.org/10.31289/jime.v5i2.5594>
- Mardian, R. D., Agoes, S., & Riffany, R. S. (2019). Perancangan Aplikasi Pelaporan Berbasis Android Pada Komunikasi Jaringan Data 4G. *Jurnal FTIK*, 816(1).
- Mertens, J., Lu, Y., Parthasarathy, S., Moore, C., & Weisner, C. (2017). Medical And Psychiatric Conditions Of Alcohol And Drug Treatment Patients In An HMO: Comparison With Matched Controls. *Arch Intern Med*, 163(20),

- 2511-2517.
<https://doi.org/10.1001/archinte.163.20.2511>
- Mezei, A. K., Armstrong, H. L., Pedersen, H. N., Campos, N. G., Mitchell, S. M., Sekikubo, M., Byamugisha, J. K., Kim, J. J., Bryan, S., & Ogilvie, G. S. (2017). Cost-Effectiveness Of Cervical Cancer Screening Methods In Low- And Middle-Income Countries: A Systematic Review. *International Journal of Cancer*, 141(3), 437-446.
<https://doi.org/10.1002/ijc.30695>
- Minister of Health of Republic of Indonesia. (2019). *Buku Pedoman Manajemen Penyakit Tidak Menular*. Direktorat Pencegahan dan Pengendalian Penyakit Tidak Menular, Kementerian Kesehatan Republik Indonesia.
- Ministry of Health RI. (2023). *Aplikasi Sehat IndonesiaKu*.
<https://link.kemkes.go.id/multi/Links/lists/faqasik>
- Moldovanu, D., De Koning, H. J., & Van Der Aalst, C. M. (2021). Lung Cancer Screening And Smoking Cessation Efforts. *Translational Lung Cancer Research*, 10(2), 1099-1109.
<https://doi.org/10.21037/tlcr-20-899>
- Perwira, H. N. (2015). (2015). *Pengembangan Sistem Informasi Perpustakaan Berbasis Web di SMK Muhammadiyah 1 Yogyakarta*. 1-170.
http://eprints.uny.ac.id/33984/1/husain_nanda_p.pdf
- Poli, U. R., Bidinger, P. D., & Gowrishankar, S. (2015). Visual Inspection With Acetic Acid (VIA) Screening Program: 7 Years Experience In Early Detection Of Cervical Cancer And Pre-Cancers In Rural South India. *Indian Journal of Community Medicine*, 40(3), 203-207.
<https://doi.org/10.4103/0970-0218.158873>
- Purnaningsih, N., Aditya Putra, R., Anggini, A., Husni Tamami, M., & Ashfi Furoida, D. (2022). Efektivitas Penggunaan Website GEKA.id dalam Peningkatan Pengetahuan tentang Pencegahan Seks Bebas Bagi Remaja pada “PIK-R Klorofil” di Kabupaten Kampar. *Jurnal Penyuluhan*, 18(1), 177-184.
<https://doi.org/10.25015/18202237679>
- Putri, D. F., & Nurlaila, N. (2022). Analisis Sistem Pencatatan Manual Laporan Keuangan Terhadap Kinerja Akuntan Di Perusahaan Umum Daerah Pasar Kota Medan. *SIBATIK JOURNAL: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, Dan Pendidikan*, 1(6), 763-770.
<https://doi.org/10.54443/sibatik.v1i6.90>
- Rahmatuloh, M., & Revanda, M. R. (2022). Rancang Bangun Sistem Informasi Jasa Pengiriman Barang Pada PT. Haluan Indah Transporindo Berbasis Web. *Jurnal Teknik Informatika*, 14(1), 54-59.
- Risianti, E. mei. (2019). Konsep Pemrograman Berorientasi Object (Pbo) Pada Delphi. *Fakultas Komputer*, 18.
- Sanjaya, W. (2013). *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*. Kencana.
- Sulistyaningsih, S., & Listyaningrum, T. H. (2021). Deteksi Faktor Risiko Penyakit Tidak Menular melalui Pos Pembinaan Terpadu Warga Sehat di Era Pandemi Covid-19. *Warta LPM*, 24(3), 558-570.
<https://doi.org/10.23917/warta.v24i3.13125>
- Sumarni, S. (2019). *Metode Penelitian Dan Pengembangan (Research and Development/R&D)*.
[https://digilib.uin-suka.ac.id/id/eprint/39153/1/SRI SUMARNI - MODEL FINAL HKI_2019.pdf](https://digilib.uin-suka.ac.id/id/eprint/39153/1/SRI%20SUMARNI%20-%20MODEL%20FINAL%20HKI_2019.pdf)
- Sunarto, & Riduwan. (2017). *Pengantar Statistika Untuk Penelitian Pendidikan Sosial Ekonomi Dan Komunikasi*. Alfabeta.
- Supriati, R., Priyadi, P. R., Sulastri, I., Rizky, A., & Adawiyah, S. A. (2021). Pemanfaatan Teknologi Website Pada Perancangan Sistem Kepegawaian Dalam Mendukung Perhitungan Penggajian Di PT. Herda Sentosa Tangerang. *BEST Journal (Biology Education, Science and Technology)*, 4(2), 28-39.
<https://doi.org/10.30743/best.v4i2.4078>
- Surandari, I. (2019). Analisis Penggunaan Website Perpustakaan Kementerian Pendidikan Dan Kebudayaan Menggunakan Model End User Computing Satisfaction (EUCS). *UIN Syarif Hidayatullah*, 1(1).
- Talen, M., Baumer, J., & Mann, M. (2013). *Screening Measures In Integrated Behavioral Health And Primary Care*

- Settings. Springer Science + Business Media.
- Thamrin, C. W., Kaunang, E. D., & Ratag, G. A. E. (2023). Analisis Pengembangan Program Kesehatan Jiwa Masyarakat di Puskesmas Tombulu. *Medical Scope Journal*, 4(2), 178-185. <https://doi.org/10.35790/msj.v4i2.44859>
- Thiagarajan, S. (1974). *Instructional Development for Training Teachers of Exceptional Children: A Sourcebook*. Indiana University.
- Triayomi, R., Wibagso, S. S., Setiahati, I. P., & Sukarman, S. (2023). Analisis Kebutuhan Perancangan Website Sekolah Dasar. *Jurnal Basicedu*, 7(3), 1446-1453. <https://doi.org/10.31004/basicedu.v7i3.5231>
- Universitas Gadjah Mada. (2023). *Health Promoting University Universitas Gajah Mada*. <https://hpu.ugm.ac.id/>
- Waldopo. (2011). Analisis Kebutuhan Terhadap Program Multi Media Interaktif Sebagai Media Pembelajaran. *Jurnal Pendidikan Dan Kebudayaan*, 17(2), 244-253.
- World Health Organization. (2021). *Noncommunicable diseases*.

The Mode of Delivery and Length of Stay among Pregnant Women with Heart Disease in Makassar

Hasdianto Tri Saputra¹⁾, Azizah Nurdin^{✉1)}, Andi Tihardimanto¹⁾, Dachlia Sri Sakti^{1,2)}, Darussalam¹⁾, Andi Pratiwi³⁾

¹ School of Medicine, Universitas Islam Negeri Alauddin Makassar, Makassar, South Sulawesi, Indonesia 921133

² Hajj Hospital Makassar, Makassar, South Sulawesi, Indonesia 90224

³ RSUP Dr Wahidin Sudirohusodo Makassar, Makassar, South Sulawesi, Indonesia 90174

✉Email: azizahnurdin77@gmail.com

ABSTRACT

Background: The cardiovascular system undergoes physiological and pathological changes due to pregnancy. Heart disease is the leading cause of maternal morbidity and mortality during pregnancy. Pregnancy-related complications are common in mothers, approximately 1-4% of cases. In most countries in the world, including Indonesia, the number of cases and prevalence of heart disease complicating pregnancy is low. **Objectives:** This study focuses on the relationship of heart disease in pregnancy with the mode of delivery and length of stay among pregnant women in Dr. Wahidin Sudirohusodo Hospital 2017-2022. **Methods:** This cross-sectional study was conducted on 124 pregnant women who were determined through a purposive sampling method and carried out in October 2023 - December 2024 at Dr. Wahidin Sudirohusodo Hospital using secondary data, namely medical records of patients diagnosed with heart disease in pregnancy. Data analysis was performed univariately and bivariate using the chi-square comparative test. **Results:** Correlation between variables was analyzed using chi-square comparison test and a significant correlation was obtained for heart disease in pregnancy with mode of delivery (p-value; 0.001 < 0.05), and length of stay (p-value; 0.000). **Conclusion:** There is a significant relationship between heart disease in pregnancy with mode of delivery and length of stay in laboring women at Dr. Wahidin Sudirohusodo Hospital Makassar. The severity of heart disease in pregnant women can affect the mode of delivery, so counseling before delivery is very important, it is expected to determine the right choice of delivery to reduce the risk of morbidity, mortality and length of stay in mothers.

Keywords: Heart disease in pregnancy, Mode of delivery, Length of stay

INTRODUCTION

The cardiovascular system undergoes physiological and pathological changes as a result of pregnancy (Morton, 2021). Heart disease is the leading cause of maternal morbidity and mortality during pregnancy.

Pregnancy-related complications are common in mothers, approximately 1-4% of cases. In most countries in the world, including Indonesia, the number of cases and prevalence of heart disease that complicates pregnancy is very low (Roberts & Adamson, 2013).

Previous research Hayward & Ryland (2017) suggests that women with chronic heart disease (CHD) are more likely to have a surgical delivery. However, the underlying explanation remains unclear.

Cesarean section (CS) delivery is more common in women who have had previous cesarean deliveries, such as cases of breech presentation, dystocia, and fetal distress. Women who undergo cesarean delivery are also less likely to experience symptoms of fetal distress. Therefore, it seems that fetal instability does not lead to more women undergoing cesarean delivery. Doctors or patients may prefer to plan a section delivery due to the belief that the procedure has less impact on the mother's body (Doraiswamy et al., 2021). The study showed that the section delivery rate was higher in women with complicated CHD at 46.2% and 38.8% with non-complicated CHD.

Women with CHD require longer hospital stays after delivery compared to

women without CHD. In addition, the length of hospitalization also increases with the complexity of the CHD. At Dr. Kariadi Hospital, maternity patients were admitted for 2-43 days, with an average of 9-14 days. The longest patient stay was 43 days with a diagnosis of peripartum cardiomyopathy and NYHA IV heart failure. Pregnant women with heart disease are at high risk in pregnancy (Kirkegaard et al., 2021).

Almost all women with NYHA class I and II can bear children without experiencing morbidity. Unless there is an obstetric indication for caesarean delivery, patients with NYHA class I/II without pulmonary hypertension may be considered for vaginal delivery. As patients with NYHA class III/IV or severe decline in systemic ventricular function are at higher risk during pregnancy, the approach to delivery for patients with NYHA class III/IV should be to consider undergoing caesarean delivery. This consideration is based on the woman's willingness to make the decision to keep her fetus knowing the risks and cooperating fully with the doctor about the treatment plan (Cunningham et al., 2021).

Based on the above background, researchers are interested in conducting research on the relationship between heart disease in pregnancy with the mode of delivery and length of stay. The purpose of this study was to determine whether there is a relationship between heart disease in pregnancy with the mode of delivery and length of stay.

METHODS

This cross-sectional study was conducted on 124 pregnant women who

were determined through purposive sampling method and carried out in October 2023-December 2024 at Dr Wahidin Sudirohusodo hospital using secondary data, namely medical records of patients diagnosed with heart disease in pregnancy. Data analysis was performed univariately and bivariate using the chi-square comparative test.

The sample cases comprised 62 people, namely pregnant women diagnosed with heart disease, who have complete medical record data, and had a previous history of heart disease and hypertension. The control sample was 62 people, namely pregnant women who were not diagnosed with heart disease, had complete medical record data and pregnant women in 2021 from January to December (the first five patients at the beginning of January-October and six patients at the beginning of November-December).

The data were analyzed using univariate test and then chi-square comparative test for bivariate analysis to see the association of heart disease in pregnancy with mode of delivery and length of stay. This study has obtained ethical approval from the Health Research Ethics Committee of the State Islamic University of Alauddin Makassar with number: E.015/KEPK/FKIK/I/2023.

RESULTS AND DISCUSSION**Table 1.** Distribution of Sample Characteristics.

| Characteristics | n (%) |
|--|-------------|
| Mother's Age | |
| < 35 years | 97 (78.2 %) |
| ≥ 35 years | 27 (21.8 %) |
| Parity | |
| Primipara | 56 (45.2%) |
| Multipara | 63 (50.8%) |
| Grande multipara | 5 (4%) |
| School education | |
| Elementary school | 11 (8.9%) |
| Junior High school | 15 (16.1%) |
| Senior High school | 53 (42.7%) |
| Diploma And Bachelor degree | 31 (29.1%) |
| Master's degree | 4 (3.2%) |
| Work | |
| Housewives | 70 (56.5%) |
| Student | 2 (1.6%) |
| Private Employer | 33(26.6%) |
| Temporary Employer | 7(5.6%) |
| Civil servants | 12(9.7%) |
| History of congenital heart disease | |
| Yes | 17 (16%) |
| No | 107 (84%) |
| History of hypertension | |
| Yes | 19 (18%) |
| No | 105 (82%) |
| Heart disease in pregnancy | |
| Yes | 62 (50%) |
| No | 62 (50%) |
| Mode Of delivery | |
| Vaginal | 48 (38.7%) |
| Caesarean section | 76 (61.3%) |
| Length of stay | |
| Short treatment (≤5 days) | 70 (56.5%) |
| Length of stay (>5 days) | 54 (43.5%) |
| Total | 124 (100%) |

Table 1 shows the distribution of patient characteristics among 124 samples, consisting of age, education, occupation, and parity. Based on age, it can be seen that the majority of the sample, as many as 97 (78.2%), were in the age group under 35 years, and 27 (21.8%) mothers were 35 years old and older. Based on education, it can be seen that the majority of the sample has a high school education, as many as 53 (42.7%). Based on occupation, it can be seen that the majority of the sample are housewives, as many as 70 (56.5%). Based on parity, it can be seen that the majority of multiparous samples are 63 (50.8%). Based on a history of congenital heart disease as many as 17 people (16%), and a history of hypertension as many as 19 people (18%). Based on this study, there were 62 types of heart disease

cases in pregnancy out of 114 people who fit the inclusion criteria recorded at Dr. Sardjito Hospital. Forty-eight people (38.7%) had vaginal cases, and 76 people (61.3%) had Caesarean section. A total of 70 people (56.5%) underwent hospitalization ranging from less than equal to five days, which was classified as short hospitalization, while the length of hospitalization was more than five days for as many as 54 people (43.5%).

Table 2. Distribution of Heart Disease Patients in Pregnancy.

| Diagnosis | n (%) | Mode of Delivery | |
|--------------------------------------|-----------------|------------------|---------------------|
| | | Vaginal n (%) | C- Section n (%) |
| Congestive heart failure NYHA I | 3(4.8) | 3(4.8) | |
| Congestive heart failure NYHA II | 2(3.2) | 1(1.6) | 1(1.6) |
| Congestive heart failure NYHA III | 14(22.6) | | 14(22.6) |
| Congestive heart failure NYHA IV | 1(1.6) | | 1(1.6) |
| Chronic hypertension | 3(4.8) | 3(4.8) | |
| Pulmonary hypertension | 9 (14.5) | 1(1.6) | 8(12.9) |
| Acute myocardial infection | 4(6.5) | | 4(6.5) |
| Cardiomyopathy, not specific | 2(3.2) | | 2(3.2) |
| Endocarditis | 1(1.6) | 1(1.6) | |
| Rheumatic myocarditis | 1(1.6) | 1(1.6) | |
| Atrial septal defect | 2(3.2) | 2(3.2) | |
| Pericardial effusion | 1(1.6) | | 1(1.6) |
| Severe maternal mitral stenosis | 2(3.2) | | 2(3.2) |
| Nonrheumatic mitral (valve) prolapse | 3(4.8) | | 3(4.8) |
| Supraventricular tachycardia | 6(9.6) | | 6(9.6) |
| Rheumatic mitral valve disease | 1(1.6) | | 1(1.6) |
| Premature atrial depolarization | 1(1.6) | 1(1.6) | |
| Severe vulvar pulmonary stenosis | 1(1.6) | | 1(1.6) |
| Long Qt syndrome | 1(1.6) | 1(1.6) | |
| First degree atrioventricular block | 1(1.6) | | 1(1.6) |
| Premature ventricular contraction | 1(1.6) | | 1(1.6) |
| Ventricular premature depolarization | 1(1.6) | | 1(1.6) |
| Atrial fibrillation | 1(1.6) | 1(1.6) | |
| Total | 62 (100) | 15(24.1) | 47 (75.9) |

Table 2 shows patients with heart disease who underwent vaginal delivery were 15 people (24.1%), with a diagnosis of congestive heart failure (CHF) NYHA I as many as three people (4.8%), CHF NYHA II as many as one person (1.6%), chronic hypertension as many as three people (4.8%), pulmonary hypertension as many as one person (1.6%), endocarditis as many as one person (1.6%), rheumatic myocarditis as many as one person (1.6%), atrial septal defect as many as two people (3.2%), premature depolarization of the atrium as many as one person (1.6%), long Qt syndrome as many as one person (1.6%), atrial fibrillation as many as one person (1.6%). In this study, patients with heart disease who underwent cesarean section delivery were 47 people (75.9%), with a diagnosis of CHF NYHA II as many as one person (1.6%), CHF NYHA III as many as 14 people (22.6%), CHF NYHA IV as many as

one person (1.6%), and pulmonaryhypertension as many as eight people (12.9%). Myocardial infection was found in as many as four people (6.5%); cardiomyopathy, unspecified, as many as two people (3.2%); pericardial effusion, as many as one person (1.6%); severe maternal mitral stenosis two people (3.2%); nonrheumatic mitral (valve) prolapse three people (4.8%); supraventricular tachycardia six people (9.6%); rheumatic mitral valve disease one person (1.6%); pulmonary stenosis severe valvar one person (1.6%); first degree atrioventricular block one person (1.6%); premature ventricular contraction one person (1.6%); and ventricular premature depolarization one person (1.6%).

Table 3. Relationship between Heart Disease in Pregnancy and Mode of Delivery at Dr. Wahidin Sudirohusodo Hospital 2017-2022.

| Heart disease in pregnancy | Mode of Delivery | | | | | | <i>p-value</i> |
|----------------------------|------------------|------|-----------------|------|-------|-----|----------------|
| | Vaginal | | Sectio caesarea | | Total | | |
| | n | (%) | n | (%) | n | (%) | |
| Yes | 15 | 31.3 | 47 | 61.8 | 62 | 50 | <0.000 |
| No | 33 | 68.7 | 29 | 38.2 | 62 | 50 | |
| Total | 48 | 100 | 76 | 100 | 124 | 100 | |

Table 3 shows the bivariate analysis using the chi-square test for the association of heart disease in pregnancy with the mode of delivery. In patients diagnosed with heart disease during pregnancy, 15 people (31.3%) underwent vaginal delivery, and 47 people (61.8%) underwent cesarean section delivery. In patients who did not experience heart disease in pregnancy, as many as 33 people (68.7%) used vaginal delivery routes and 29 people (38.2%) used cesarean section delivery routes. The results of the analysis

of the relationship between heart disease in pregnancy and mode of delivery with the chi-square test obtained a p -value <0.001 , where the p -value was <0.05 . Based on these values, statistically, it can be said that the null hypothesis (H₀) in this study is not accepted, meaning that there is a significant relationship between heart disease in pregnancy and the mode of delivery. The results of the analysis show the relationship between heart disease in pregnancy and mode of delivery.

Table 4. Relationship between Heart Disease in Pregnancy and Length of Stay at Dr. Wahidin Sudirohusodo Hospital 2017-2022.

| Heart disease in pregnancy | length of stay | | | | | | <i>p-value</i> |
|----------------------------|---------------------------|------|--------------------------|------|-------|-----|----------------|
| | Short Treatment (≤5 days) | | Long treatment (>5 days) | | Total | | |
| | n | (%) | n | (%) | n | (%) | |
| | | | | | | | |
| Yes | 25 | 35.7 | 37 | 68.5 | 62 | 50 | <0.000 |
| No | 45 | 64.3 | 17 | 31.5 | 62 | 50 | |
| Total | 70 | 100 | 54 | 100 | 124 | 100 | |

Table 4 shows bivariate analysis using the chi-square test to determine the relationship between heart disease in pregnancy and mode of delivery. The length of treatment based on the diagnosis of heart disease in pregnancy consists of a short treatment group with a total of 25 people (35.7%) and a long treatment group with a total of 37 people (68.5%). While those who did not experience heart disease in pregnancy with the length of treatment, in the short treatment group comprised 45 people (64.3%), and in the long treatment group, 17 people (31.5%). The results of the chi-square bivariate analysis showed a p -value of $0.001 < 0.05$, which indicates a significant relationship. It indicates that

mothers who experience heart disease during pregnancy are associated with longer periods of care.

The consequences of heart disease in pregnancy are enormous. Heart disease is the leading cause of maternal death in developed countries, but it is beginning to emerge in developing countries as the number of heart diseases in low- and middle-income countries increases (Mocumbi et al., 2016).

However, the prevalence of CS in heart disease during pregnancy can be caused by various complications, including the severity of heart failure, which is classified according to the New York Heart Association (NYHA) Heart Failure Classification, and some are accompanied

by complications of other diseases. In research conducted by Nurdin et al. (2021), it was found that the prevalence of premature rupture of membranes (PROM) for CS levels above 12 hours was 32.1%. Meanwhile, in the research results in Table 3, it is known that 61.8% of mothers had heart disease during pregnancy using the CS birth method, so the prevalence of CS in mothers who had heart disease and the prevalence of CS due to premature rupture of membranes differed significantly in the rate of SC (Nurdin et al., 2021).

The study conducted by Nguyen Manh (2019) showed that rheumatic heart disease (RHD) is the most common during pregnancy in developing countries. The study supports the idea that heart disease is currently the main factor affecting women's pregnancy outcomes. As many as 9.15% of the women studied had fetal growth restrictions after 22 weeks of pregnancy. For pregnant women with heart disease, hypertension, the type of heart disease (ASD and tetralogy of Fallot), and its complications (heart failure and pulmonary edema) are significant risk factors (Zhang et al., 2022). The study (Nguyen Manh et al., 2019) provides a foundation to encourage the community to implement medical care during pregnancy for mothers diagnosed with heart disease.

Planned delivery is an important option for pregnant women with cardiovascular diseases (CVDs) and their providers. For obstetric indications, cesarean delivery is usually recommended according to consensus guidelines, except for high-risk diseases (Canobbio et al., 2017). The recommendation for vaginal delivery as the preferred method of delivery for women with CHD is based on the different hemodynamic loads during vaginal delivery and cesarean section, resulting in significant cardiovascular changes. Factors are such as spinal anesthesia during a cesarean section and greater blood loss during labor (Ouzounian, 2014).

CHD severity can be used as a tool to predict the risk of a primary cesarean section because the rate of a primary cesarean section increases with CHD severity (Denayer et al., 2021). Women with a history of severe CHD. Women diagnosed with CHD may prefer vaginal delivery or a cesarean section independently due to their experience

with hospitals and their medical history (Hrycyk et al., 2016).

Relationship between Heart Disease in Pregnancy and Mode of Delivery at Dr. Wahidin Sudirohusodo Hospital 2017-2022

Based on the results of research on the relationship of heart disease in pregnancy found vaginal delivery routes as many as 15 people (31.3%) and caesarean section as many as 47 people (61.8%) at Dr. Wahidin Sudirohusodo Hospital Makassar. The results of the analysis of the relationship between heart disease in pregnancy and mode of delivery with the chi-square test obtained a p-value < 0.001, where the p value < 0.05. Based on this value, statistically, it can be said that Ha in this study is accepted, meaning that there is a significant relationship between heart disease in pregnancy and the mode of delivery.

The results of this study are in accordance with research conducted by Eggleton, McMurrugh and Aiken (2022), which stated that women with cardiomyopathy more often give birth by cesarean delivery than women without heart disease. obtained in patients who experienced heart disease during pregnancy and gave birth by cesarean delivery method, as many as 122 people (79.74%), and vaginal 25 people (16.67%) (Trisnawan et al., 2023).

The results of research by Hussey and Hussey (2021) suggest performing vaginal delivery with good neuraxial anesthesia. Sectio caesarean delivery is usually the preferred mode of delivery in women with heart disease, although the rate of caesarean section delivery is higher in women with heart disease. In the conclusion of their research, Nanna and Stergiopoulos (2014) said that vaginal delivery does not cause complications in most women with heart disease. The advantages are preventing blood loss, faster recovery, the absence of abdominal surgery, and decreased thrombogenic risk. Research by Vidal (2016) states caesarean section delivery eliminates hemodynamic changes in the laboring mother. Allowing for more precise hemodynamic monitoring and management. However, this increases the risk of venous thromboembolism, infection, and postpartum hemorrhage (Bukhari et al., 2022).

In the results of a study by Hidano and Uezono (2011) of 151 pregnancies in

128 women with congenital heart disease, there were 84 vaginal deliveries and 67 caesarean section deliveries. Caesarean section deliveries were performed under neuraxial anesthesia (51) or general anesthesia (16). Neonatal complications occurred in 11 of 84 (13%) pregnancies with vaginal delivery and in 25 of 67 (37%) pregnancies with cesarean delivery. Twenty-three section deliveries occurred due to maternal cardiac problems and were associated with an incidence of maternal (35%) and neonatal (65%) cardiac complications.

Relationship between Heart Disease in Pregnancy and Length of Stay at Dr. Wahidin Sudirohusodo Hospital 2017-2022

Based on the results of the study of the relationship between heart disease in pregnancy and the length of treatment, consisting of 25 people (35.7%) in the short treatment group and 37 people (68.5%) in the long treatment group, the results of the chi-square bivariate analysis showed a p-value of $0.000 < 0.05$, which indicates a significant relationship. It indicates that mothers who experience heart disease during pregnancy are associated with longer periods of care.

In line with research conducted by Kirkegaard (2021) with a national register-based cohort study method, hospital stays after giving birth were significantly longer in women with chronic heart disease (CHD) compared to women without CHD. Furthermore, the length of hospitalization increased as the complexity of CHD increased. The results of the study by Kirkegaard et al. (2021) showed that 29 women with complex CHD (11.1%) and 191 women with non-complex CHD (6.0%) received treatment for more than seven days.

In research conducted by Wiyati & Wibowo (2013) from 2000 to 2010, there was a significant increase in maternity mothers with CHD from 9.0 per 10,000 hospitalizations. The length of hospitalization in maternity mothers with CHD is often due to obstetric complications that occur in women with CHD.

CONCLUSION

There is a significant relationship between heart disease in pregnancy and

the mode of delivery and length of stay in laboring women at Dr. Wahidin Sudirohusodo Hospital Makassar. The severity of heart disease in pregnant women can affect the mode of delivery, so counseling before delivery is very important. It is believed that determining the right choice of delivery is essential to reduce the risk of morbidity, mortality, and length of stay in mothers.

REFERENCES

- Bukhari, S., Fatima, S., Barakat, A. F., Fogerty, A. E., Weinberg, I., & Elgendy, I. Y. (2022). Venous thromboembolism during pregnancy and postpartum period. *European Journal of Internal Medicine*, 97, 8-17.
- Canobbio, M. M., Warnes, C. A., Aboulhosn, J., Connolly, H. M., Khanna, A., Koos, B. J., Mital, S., Rose, C., Silversides, C., & Stout, K. (2017). Management of pregnancy in patients with complex congenital heart disease: a scientific statement for healthcare professionals from the American Heart Association. *Circulation*, 135(8), e50-e87.
- Collis, J., & Hussey, R. (2021). *Business research: A practical guide for students*. Bloomsbury Publishing.
- Cunningham, F. G., Leveno, K. J., Bloom, S. L., Dashe, J. S., Hoffman, B. L., Casey, B. M., & Spong, C. Y. (2021). *Obstetric de Williams-25*. McGraw Hill Brasil.
- Denayer, N., Troost, E., Santens, B., De Meester, P., Roggen, L., Moons, P., Van Calsteren, K., Budts, W., & Van De Bruaene, A. (2021). Comparison of risk stratification models for pregnancy in congenital heart disease. *International Journal of Cardiology*, 323, 54-60.
- Doraiswamy, S., Billah, S. M., Karim, F., Siraj, M. S., Buckingham, A., & Kingdon, C. (2021). Physician-patient communication in decision-making about Caesarean sections in eight district hospitals in Bangladesh: a mixed-method study. *Reproductive Health*, 18, 1-14.
- Eggleton, E. J., McMurrugh, K. J., & Aiken, C. E. (2022). Maternal pregnancy outcomes in women with cardiomyopathy: a systematic review and meta-analysis. *American Journal*

- of *Obstetrics and Gynecology*, 227(4), 582-592.
- Hayward, P. J., & Ryland, J. S. (2017). *Handbook of the marine fauna of North-West Europe*. Oxford university press.
- Hidano, G., Uezono, S., & Terui, K. (2011). A retrospective survey of adverse maternal and neonatal outcomes for parturients with congenital heart disease. *International Journal of Obstetric Anesthesia*, 20(3), 229-235.
- Hrycyk, J., Kaemmerer, H., Nagdyman, N., Hamann, M., Schneider, K. T. M., & Kuschel, B. (2016). Mode of delivery and pregnancy outcome in women with congenital heart disease. *PLoS One*, 11(12), e0167820.
- Kirkegaard, A. M., Breckling, M., Nielsen, D. G., Tolstrup, J. S., Johnsen, S. P., Ersbøll, A. K., & Kloster, S. (2021). Length of hospital stay after delivery among Danish women with congenital heart disease: a register-based cohort study. *BMC Pregnancy and Childbirth*, 21, 1-9.
- Mocumbi, A. O., Sliwa, K., & Soma-Pillay, P. (2016). Medical disease as a cause of maternal mortality: the pre-imminence of cardiovascular pathology: review articles. *Cardiovascular Journal of Africa*, 27(2), 84-88.
- Morton, A. (2021). Physiological changes and cardiovascular investigations in pregnancy. *Heart, Lung and Circulation*, 30(1), e6-e15.
- Nanna, M., & Stergiopoulos, K. (2014). Pregnancy complicated by valvular heart disease: an update. *Journal of the American Heart Association*, 3(3), e000712.
- Nguyen Manh, T., Bui Van, N., Le Thi, H., Vo Hoang, L., Nguyen Si Anh, H., Trinh Thi Thu, H., Nguyen Xuan, T., Vu Thi, N., Minh, L. B., & Chu, D.-T. (2019). Pregnancy with heart disease: maternal outcomes and risk factors for fetal growth restriction. *International Journal of Environmental Research and Public Health*, 16(12), 2075.
- Nurdin, A., Nurdin, H., . R., & Sari, M. (2021). Analysis of the relationship between premature rupture of membranes with delivery method and newborn asphyxia. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 10(12), 4377. <https://doi.org/10.18203/2320-1770.ijrcog20214631>
- Ouzounian, J. G. (2014). Risk factors for neonatal brachial plexus palsy. *Seminars in Perinatology*, 38(4), 219-221.
- Roberts, W. T., & Adamson, D. (2013). Cardiovascular disease in pregnancy. *Obstetrics, Gynaecology & Reproductive Medicine*, 23(7), 195-201.
- Trisnawan, M. H., Mochtar, A. Y. A. B., & Dewantiningrum, J. (2023). Karakteristik pasien hamil dengan penyakit jantung yang dirawat di RSUP Dr. Kariadi tahun 2020-2021. *Intisari Sains Medis*, 14(1), 358-365.
- Vidal, L., Joussein, E., Colas, M., Cornette, J., Sanz, J., Sobrados, I., Gelet, J. L., Absi, J., & Rossignol, S. (2016). Controlling the reactivity of silicate solutions: A FTIR, Raman and NMR study. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 503, 101-109.
- Wiyati, P. S., & Wibowo, B. (2013). Luaran Maternal dan Perinatal pada Hamil dengan Penyakit Jantung di RSUP Dr. Kariadi Semarang. *Majalah Obstetri Dan Ginekologi. Volume 21. Nomor 1. Januari-April 2013*: 20, 30.
- Zhang, S., Qiu, X., Wang, T., Chen, L., Li, J., Diao, J., Li, Y., Qin, J., Chen, L., & Jiang, Y. (2022). Hypertensive disorders in pregnancy are associated with congenital heart defects in offspring: a systematic review and meta-analysis. *Frontiers in Cardiovascular Medicine*, 9, 842878.

The Effects of Cigarette Smoke Exposure on Anthropometric Measurements, Lipid Profile, Fasting Blood Glucose, Fasting Insulin, and Blood Pressure in Overweight/Obese Adolescents

Nur Aisiyiah Widjaja¹✉, Claudia Felisia Magdalena Kurube¹, Febrina Mustika Santoso¹, Tausyiah Rohmah Noviyanti², Yoppi Yeremia Alexander², Rino Tryanto Keya², Edi Hermanto², Iitdrie², Eva Ardianah², Amer Siddiq Amer Nordin³

¹ Department of Child Health, Faculty of Medicine, Universitas Airlangga Surabaya, Surabaya, East Java, Indonesia 60115

² Magister Student of Faculty of Public Health, Universitas Airlangga Surabaya, Surabaya, East Java, Indonesia 60115

³ Department of Psychological Medicine, Faculty of Medicine, Universiti Malaya, Kuala Lumpur, 50603

✉Email: nuril08@yahoo.com

ABSTRACT

Background: Cigarette smoke exposure increases the risk of obesity, metabolic syndrome, hypertension, hyperglycemia, and dyslipidemia. The nicotine content in cigarettes can acutely increase energy expenditure, decrease appetite, and several other chronic diseases such as cardiovascular disease, lung disease, cancer, and so on. **Objectives:** This study aims to determine the effect of cigarette smoke exposure on anthropometric measurements, lipid profiles, fasting blood glucose, fasting insulin, and blood pressure in overweight/obese adolescents. **Methods:** This was a cross-sectional study involving overweight/obese adolescents conducted from September to October 2019 to evaluate the effects of tobacco exposure on anthropometric measurements, lipid profile, fasting blood glucose (FBG), fasting insulin, and blood pressure. **Results:** This study showed no significant differences in the age distribution, body weight, body height, height-for-age z-score (HAZ), hip circumference, body mass index (BMI), BMI-for-age z-score, fasting insulin, FBG, lipid profile, and blood pressure between low, moderate, and high cigarette smoke exposure in overweight/obese adolescents, but the high exposure group had a bigger waist circumference than the moderate exposure group ($107,45 \pm 11,25$ vs $99,35 \pm 11,36$ cm, $p = 0,019$) and low exposure ($107,45 \pm 11,25$ vs $99,04 \pm 12,08$ cm, $p = 0,015$). **Conclusion:** The degree of exposure to heavy cigarette smoke has a greater waist circumference than exposure to light and moderate cigarette smoke. Cigarette smoke exposure is significantly associated with body weight and hip circumference, and heavy cigarette smoke exposure is prevalent in adolescent boys.

Keywords: Adolescents, Cigarette smoke exposure, Metabolic syndrome, Obesity

INTRODUCTION

Exposure to tobacco smoke, both secondhand and active smoking, is one of the modifiable risks of obesity, and one of the public health concerns in the pediatric population, with an exposure of about 40% (Miyamura et al., 2023). Secondhand smoke exposure affects two-thirds of China's child population (Li et al., 2020). Cigarette smoke exposure is an independent factor associated with insulin resistance and may lead to the development of atherosclerosis (Weitzman et al., 2005). Tobacco use in cigarettes is known to correlate with body mass index (BMI), both in decreasing and increasing ways, in a dose- and sex-dependent

manner (Saarni et al., 2009). However, the relationship between obesity and smoking remains unclear. It is suggested that nicotine acutely increases energy expenditure, leading to decreased appetite, so smokers have low body weight. But heavy smokers have a heavy body weight (Chiolero et al., 2008).

Smoking is one of the lifestyle factors that can increase the risk of metabolic syndrome and has a negative influence on the incidence of central obesity (abdominal obesity), blood pressure, blood sugar concentration, and lipid profile (Behl et al., 2023). There is growing evidence that secondhand smokers (SHS) are associated with greater

BMI in children through inflammation, oxidative stress, and endocrine disruption, leading to the development of insulin resistance (IR) and metabolic syndrome (Koyanagi et al., 2020). Cigarette smoke exposure plays a very substantial role in the pathogenesis of several chronic diseases, such as cardiovascular disease (CVD), cancer, lung disease, and so on (Kolovou et al., 2016). In obese children, exposure to cigarette smoke increases the risk of NAFLD by 44.5 times (Lin et al., 2014). Cigarette smoke exposure during conception in infants influences adipocyte accretion from birth to 5 years of age, and this influence is associated with exposure time. Exposure in infancy led to a 1.7% increase in adipocytes at 5 years of age, while exposure in mid-pregnancy and early childhood did not affect adipocytes (Moore et al., 2022). This study was conducted to determine the effect of cigarette smoke exposure on anthropometric measurements, lipid profile, fasting blood glucose, fasting insulin, and blood pressure in overweight/obese adolescents.

METHODS

Study Design

A cross-sectional study involving healthy overweight/obese adolescents was conducted from September to October 2019 to evaluate the effects of tobacco exposure on anthropometric measurements, lipid profile, fasting blood glucose, fasting insulin, and blood pressure.

Subject

This study recruited healthy overweight/obese adolescents aged 13-18 years who attended schools in Surabaya and Sidoarjo. Subjects involved in this study must not use illegal drugs or alcohol and have no infectious diseases or chronic and congenital diseases. Exclusion criteria were taking dyslipidemia medications or hormonal therapy for six months before the study, taking antibiotics or steroids, or medications that affect body weight by asking the subjects they were taking medicine during at least three months when the screening was conducted, and what medicine they were taking. When they could not explain the medicine, we asked them to bring it when the study was conducted.

Anthropometric Measurements

Anthropometric measurements were taken by two researchers by asking the

subjects to wear minimal clothing, without accessories or pigtales (for women), hats, watches, shoes or sandals, belts, etc. Body weight was measured using a digital scale (Seca Robusta 813), by having the subject step on the scale after the "on mode" was activated for 30 seconds, and then the weight displayed on the screen was recorded. For height measurement, the subject was asked to step on the stadiometer floor plate (Seca 213 portable stadiometer) in a straight position, then the head positioner was pulled down until it touched the head. Height was then recorded according to the scale position. To measure waist circumference, the researchers looped a measuring tape (Seca 201) around the subject's abdomen in a standing position, above the hip bone and parallel to the navel, making sure the tape measure was not looped, not too tight or too loose. The 0 end of the tape was placed at the belly button, while the rest of the tape was wrapped around the abdomen, making sure the tape was not twisted. Waist measurement was taken after the subject exhaled. Hip circumference was measured by wrapping the measuring tape around the largest part of the hip in a standing position, making sure the tape was not twisted. The hip measurement is located at the end of the tape that meets the zero on the tape measure wrapped around the body.

Blood Check

Blood was drawn through the cubitus vein by the laboratory staff as much as 5 ml and then put into a non-EDTA tube. Name, gender, date of birth, and school ID were recorded using labeled paper and wrapped around the tube for identification. After that, the tubes were put into an ice box containing ice blocks and then taken to the laboratory for further analysis, which included fasting blood sugar, fasting insulin, and lipid profile.

Blood Pressure Measurements

To measure blood pressure with a digital tensimeter, the subjects were asked to sit comfortably in a chair in a relaxed position. Making sure the measuring arm was level with the heart, the blood pressure cuff was placed around the upper arm above the elbow, making sure it fitted snugly without being too tight or too loose. The blood pressure tube was connected to a monitor or blood pressure readout. The blood pressure monitor was

turned on and waited for instructions or warnings. After pressing the button to start the measurement, the cuff will inflate to compress the arm and measure blood pressure. There is a need to be quiet and avoid talking during the measurement. The monitor shows the systolic and diastolic pressure results after the process is completed.

Determination of Metabolic Syndrome (MetS)

Metabolic syndrome (MetS) criteria were determined based on the International Diabetes Foundation (IDF) criteria, namely central obesity (abdominal obesity; waist circumference > 90th percentile or adult cut-off value) accompanied by at least two other signs: glucose intolerance (fasting glucose > 100 mg/dL), triglycerides > 150 mg/dL, and HDL-c (high-density lipoprotein cholesterol) < 40 mg/dL, high blood pressure (systole blood pressure > 130 mmHg or diastole blood pressure > 85 mmHg) (Magge et al., 2017; Zimmet et al., 2007).

Statistical Analysis

Statistical analysis carried out in this study includes: the normality test (Kolmogorov-Smirnov) and homogeneity

test, followed by one-way ANOVA or Kruskal Wallis test (depending on the normality and homogeneity of variables) to determine the real difference between groups (divided into low exposure, medium exposure, and high exposure), Pearson correlation test or Spearman Rho, and Pearson chi-square or Fischer exact test. Statistical tests were declared significant if the p-value was <0.05.

Cigarette Smoke Exposure Assessment

Cigarette smoke exposure was assessed using the World Health Organization-Global School Student Health Survey (WHO-GSHS), as it is an easy and inexpensive tool. The results of the assessment are shown in Table 1. We divided cigarette smoke exposure into three groups: low (<7), medium (8-11) and high (>12). The mean cigarette smoke exposure was 8.53 ± 2.51 (min-max 6 - 23).

Research Ethics

This study has been ethically tested and declared ethically passed by the Health Research Ethics Committee of the Faculty of Medicine, Airlangga University, Surabaya, Indonesia, No. 141/EC/KEPK/FKUA/2020.

Table 1. Assessment of Cigarette Smoke Exposure Using the Global School-based Student Health Survey (GSHS).

| Variable | Low exposure (n=73) | Moderate exposure (n=74) | High exposure (n=14) | p |
|---|------------------------|-----------------------------|-------------------------|--------------------|
| Age, months-old | 190.22 \pm 16.93 | 190.38 \pm 16.14 | 194.14 \pm 16.54 | 0.707 ³ |
| Smoking frequency per month | | | | 0.000 ¹ |
| - 0 day | 73 (100%) | 70 (94.59%) | 7 (50%) | |
| - 1-2 day | 0 | 4 (5.41%) | 2 (14.28%) | |
| - 3-4 day | 0 | 0 | 3 (21.42%) | |
| - In a whole month | 0 | 0 | 2 (14.28%) | |
| Age of first smoking | | | | 0.000 ¹ |
| - Never tried | 70 (95.89%) | 64 (86.48%) | 4 (28.57%) | |
| - 7 years or younger | 0 | 0 | 2 (14.28%) | |
| - 10-11 year | 1 (1.36%) | 3 (4.05%) | 3 (21.42%) | |
| - 12-13 year | 1 (1.36%) | 4 (5.40%) | 2 (14.28%) | |
| - 14-15 year | 1 (1.36%) | 1 (1.35%) | 3 (21.42%) | |
| - 16-17 year | 0 | 2 (2.70%) | 0 | |
| Use of other tobacco products except cigarettes (such as betelnut, cigar, electrical cigarette) | | | | 0.002 ¹ |
| - 0 day | | | | |
| - 1-2 day | 73 (100%) | 73 (98.64%) | 11 (78.57%) | |
| - 3-4 day | 0 | 1 (1.35%) | 1 (7.14%) | |
| - In a whole month | 0 | 0 | 1 (7.14%) | |

| Variable | Low exposure (n=73) | Moderate exposure (n=74) | High exposure (n=14) | p |
|---|------------------------|-----------------------------|-------------------------|--------------------|
| The frequency of smoke exposure from the environment or people around | | | | 0.000 ² |
| - 0 day | | | | |
| - 1-2 day | 44 (60.27%) | 4 (5.41%) | 8 (57.14%) | |
| - 3-4 day | 28 (38.35%) | 18 (24.32%) | 0 | |
| - 5-6 day | 1 (1.36%) | 19 (25.67%) | 3 (21.42%) | |
| - 7 full day | 0 | 7 (9.45%) | 1 (71.42%) | |
| | 0 | 28 (37.83%) | 10 (71.42%) | |
| Efforts to quit smoking | | | | 0.000 ¹ |
| - Never smoked | 73 (100%) | 63 (85.13%) | 1 (71.42%) | |
| - No smoking during | 0 | 3 (4.05%) | 3 (21.42%) | |
| - 12 month | 0 | 7 (9.45%) | 8 (57.14%) | |
| - Yes. | 0 | 1 (1.35%) | 2 (14.28%) | |
| - No. | | | | |
| Smokers in the family | | | | 0.000 ¹ |
| - None | | | | |
| - Father | 60 (82.19%) | 25 (33.78%) | 4 (28.57%) | |
| - Don't know | 12 (16.43%) | 47 (63.51%) | 10 (71.43%) | |
| | 1 (1.36%) | 2 (2.70%) | 0 | |

¹Fischer exact test; ² Pearson chi square; ³One way ANOVA.

RESULTS AND DISCUSSION

A total of 161 subjects were involved in this study, with a male-to-female ratio of 87/74. Subject characteristics are shown in **Table 2**. There were no significant differences in the distribution of age, weight, height, HAZ, hip circumference, BMI, BMI-for-age z-score,

fasting insulin, FBG, lipid profile, and blood pressure between low, medium, and high cigarette smoke exposure in overweight/obese adolescents, but the high exposure group had a larger waist circumference compared to the medium exposure group. (107.45 ± 11.25 vs 99.35 ± 11.36 cm, $p = 0.019$) and low exposure (107.45 ± 11.25 vs 99.04 ± 12.08 cm, $p = 0.015$).

Table 2. Subjects' Characteristics.

| Variable | Low exposure (n=73) | Moderate exposure (n=74) | High exposure (n=14) | P value |
|-------------------------|------------------------|-----------------------------|-------------------------|--------------------|
| Age | 190.22 ± 16.93 | 190.38 ± 16.14 | 194.14 ± 16.54 | 0.707 ¹ |
| Body weight, kg | 89.98 ± 15.39 | 90.79 ± 14.97 | 99.02 ± 17.36 | 0.130 ¹ |
| Body height, cm | 143.84 ± 26.76 | 145.88 ± 25.16 | 144.48 ± 24.42 | 0.811 ² |
| HAZ | -0.48 ± 1.11 | -0.66 ± 0.96 | -0.88 ± 0.87 | 0.327 ¹ |
| Waist circumference, cm | 99.35 ± 11.36 | 99.04 ± 12.08 | 107.45 ± 11.25 | 0.043 ¹ |
| Hip circumference, cm | 111.23 ± 9.01 | 112.20 ± 11.72 | 114.61 ± 8.65 | 0.518 ¹ |
| BMI | 33.96 ± 4.52 | 34.84 ± 5.79 | 36.85 ± 4.99 | 0.144 ¹ |
| BMI for age | 2.89 ± 0.58 | 2.96 ± 0.68 | 3.30 ± 0.63 | 0.090 ¹ |
| Fasting insulin | 23.25 ± 13.59 | 26.89 ± 17.77 | 26.00 ± 12.67 | 0.344 ² |
| FBG | 87.51 ± 7.68 | 86.78 ± 6.95 | 86.14 ± 4.97 | 0.791 ² |
| Total cholesterol | 171.22 ± 28.53 | 179.81 ± 37.80 | 170.07 ± 23.24 | 0.240 ¹ |
| HDL-c | 42.68 ± 6.95 | 44.20 ± 8.10 | 40.50 ± 6.93 | 0.179 ¹ |
| LDL-c | 112.77 ± 24.53 | 119.01 ± 32.22 | 118.86 ± 25.22 | 0.386 ¹ |
| Triglycerides | 117.37 ± 55.25 | 115.87 ± 68.13 | 113.57 ± 47.10 | 0.704 ² |
| Systolic-BP | 126.84 ± 13.97 | 127.12 ± 12.78 | 125.21 ± 14.94 | 0.874 ² |
| Diastolic-BP | 82.20 ± 9.30 | 82.39 ± 9.66 | 81.64 ± 8.78 | 0.905 ² |

¹One way ANOVA; ² Kruskal Wallis

Cigarette smoke exposure includes both active and passive smoking (Florescu et al., 2009). The definition of passive

smoking is inhaled cigarette smoke, also known as second-hand smoke (SHS) and environmental tobacco smoke (ETS), which refers to people who do not actively smoke, but get exposure to cigarette smoke from relatives, friends, and other family members who actively smoke (Ebrahimi et al., 2019). Cigarette smoke exposure is one of the environmental factors that may play an important role in the development of childhood obesity (Srivastava et al., 2024). Parental cigarette smoke exposure increases the risk of overweight/obesity by 2.10 times in adolescents (Wang et al., 2014). The relationship between cigarette smoke exposure and obesity and central obesity is not entirely clear. However, it is known that individuals who are obese and smoke have a shorter lifespan of 13 years than normal people who do not smoke (Tuovinen et al., 2016). Active smokers who increased their cigarette consumption by one cigarette per day had a 0.14% increase in waist circumference and a smaller hip circumference (Morris et al., 2015). Research on female smokers showed that active smokers had a larger waist circumference than non-smoking women ($p=0.004$), and increased levels of androstenedione and estradiol (Ellberg et al., 2018). Morris et al (2015) stated that every increase in consumption of 1 cigarette per day will be accompanied by an increase of 0.14% in waist circumference, due to the redistribution of adipocytes towards central obesity. Adult studies show that people who have never smoked have a smaller waist-hip ratio, waist circumference, and hip circumference than people who have smoked and are currently smoking (Morris et al., 2015). Similar evidence was seen in the level of exposure to cigarette smoke in this study.

While research on parental cigarette smoke exposure to children shows it is positively associated with the prevalence of overweight/obesity, both preconception and post-conception exposure, although only dominant in males. This relationship was influenced by the quantity of smoking, duration, and age of exposure (Srivastava et al., 2024). Another study also found a positive association between cigarette smoke exposure and the prevalence of central obesity in boys (Jaakkola et al., 2021), which is also in line with other findings of increased prevalence of central

obesity and larger waist circumference. However, passive exposure to cigarette smoke did not affect the incidence of prediabetes, insulin resistance, and visceral fat (Davis et al., 2016). However, one study showed insignificant results, with parental cigarette smoke exposure not affect BMI, and even having a lower BMI (Yaghoubi et al., 2015), which is in line with the results of this study. The pediatric study showed an increase in waist circumference of 0.93 and 1.56 cm in children with transient and continuous exposure, and this was accompanied by an increase in BMI of 0.48 and 0.81 points 23. The in vitro study showed a modified body fat distribution due to chronic cigarette smoke exposure in mice, especially in visceral fat reserves (Dubois-Deruy et al., 2020).

Correlations between tobacco exposure and anthropometric measurements, lipid profile, fasting blood glucose, fasting insulin, and blood pressure are summarized in **Table 3**. Tobacco exposure score was weakly correlated with body weight ($r=-0.162$, $p=0.040$) and hip circumference ($r=-0.163$, $p=0.039$), while it showed no correlation with other parameters. It almost showed a significant correlation with waist circumference.

Table 3. Correlation between Tobacco Exposure Scores and Anthropometric Measurements, Lipid Profile, Fasting Blood Glucose, Fasting Insulin, and Blood Pressure.

| Variable | R | P |
|-----------------------------|---------|--------------------|
| HAZ | -0.0554 | 0.479 ¹ |
| Body weight | 0.162 | 0.040 ¹ |
| Body height | -0.052 | 0.515 ² |
| Waist circumference | 0.151 | 0.055 ¹ |
| Hip circumference | 0.163 | 0.039 ¹ |
| BMI | 0.135 | 0.087 ¹ |
| Score z BMI-for-age z-score | 0.144 | 0.057 ¹ |
| Fasting insulin | 0.058 | 0.465 ² |
| FBG | -0.012 | 0.796 ² |
| Total cholesterol | -0.061 | 0.444 ¹ |
| HDL-c | 0.003 | 0.968 ¹ |
| LDL-c | 0.072 | 0.366 ¹ |
| TG | 0.014 | 0.864 ² |
| Systolic-BP | 0.019 | 0.808 ² |
| Diastolic-BP | 0.057 | 0.472 ² |

¹Pearson Correlation; ² Spearman Rho Correlation.

Cigarette smoke exposure leads to decreased pre- and postnatal weight and length in children, resulting in poor growth

parameters (increased risk of being underweight, wasting, and stunting), but increased BMI in children (Nadhiroh et al., 2020). In contrast to the results of this study, which found a positive correlation between cigarette smoke exposure score and body weight, it showed a positive correlation between exposure weight and weight gain. Exposure to cigarette smoke through active smoking mothers' children's weight showed a negative effect, whereas exposed children experienced a weight loss of about 0.53 kg (Dasgupta et al., 2018). An in vitro study in rats showed a 23% reduction in caloric intake (Chen et al., 2007). However, when studies on adolescent active smokers were

conducted, the results were contradictory, adolescents in France, Suriname, and Indonesia had a 72% risk of being underweight, but cigarette users in Uganda, Nigeria, and Namibia had 2.30 times the risk of being overweight/obese (Wang, 2021). The same study also found that while smoking was associated with weight loss and BMI, smoking intensity did not affect body weight, and there was no dose-response relationship (Jitnarin et al., 2014). The positive association of cigarette smoke exposure with weight is thought to be related to the eating preferences of subjects who like to consume unhealthy foods (Srivastava et al., 2024).

Table 4. Comparison of Severity of Cigarette Smoke Exposure by Gender, MetS and MetS Components.

| Variable | Low exposure | Moderate exposure | High exposure | P |
|-----------------------------|--------------|-------------------|---------------|--------------------|
| Gender, n (%) | | | | 0.005 ¹ |
| - Male | 40 (54.79%) | 34 (45.95%) | 13 (92.86%) | |
| - Female | 33 (45.21%) | 40 (54.05%) | 1 (7.14%) | |
| MetS, n (%) | 33 (45.21%) | 29 (39.18%) | 5 (35.71%) | 0.681 ¹ |
| Status BMI, n (%) | | | | 0.626 ¹ |
| - Overweight | 34 (46.57%) | 32 (43.24%) | 8 (57.14%) | |
| - Obesity | 39 (53.42%) | 42 (56.75%) | 6 (42.85%) | |
| Abdominal obesity, n (%) | 67 (91.78%) | 69 (93.24%) | 14 (100) | 0.730 ² |
| Hypertriglyceridemia, n (%) | 27 (36.98%) | 26 (35.13%) | 4 (28.57%) | 0.885 ² |
| Hyperglycemia, n (%) | 2 (2.73%) | 2 (2.70%) | 0 | 1.000 ² |
| Hypertension, n (%) | 39 (53.42%) | 38 (51.35%) | 6 (42.85%) | 0.700 ² |
| Hipo HDL-c, n (%) | 37 (50.68%) | 31 (41.89%) | 7 (50%) | 0.559 ² |

Table 4 shows that high exposure to cigarette smoke is more prevalent in males than females. There were no differences between the severity of exposure to tobacco smoke and incidence of MetS, overweight/obesity, and components of MetS. Health surveys using the World Health Organization Global Adult Tobacco Survey (WHO GATS) questionnaire showed men were exposed to tobacco from less than 18 years of age (Birmipili et al., 2012). In adolescent studies, males are more heavily exposed to secondhand smoke than females (Birmipili et al., 2012), which is in line with the results of this study.

Research in China showed an increase in leptin, retinol binding protein-4 (RBP-4), and a decrease in adiponectin in children exposed to cigarette smoke by 39.2%, 11.4%, and 4.6%, respectively (Li et al., 2020). The suspected influence of cigarette smoke exposure on the incidence of obesity through the leptin pathway, although population studies are still controversial. Active maternal smoking (6

mg/kg/day) from day two to 16 of lactation causes neonatal hyperleptinemia and primary hyperthyroidism. Nicotine causes an increase in body fat due to high levels of leptin (Lisboa et al., 2012). Other studies have also shown an increase in pro-inflammatory markers such as IL-6 and C-reactive protein (CRP) (Nagel et al., 2009). Cigarette exposure triggers the formation of free radicals that can interact with vascular homeostasis, increase inflammation/oxidation stress, and damage pancreatic β -cell function. In addition, exposure to cigarette smoke also has a positive influence on pro-inflammatory factors such as peroxisome proliferator-activated receptors (PPAR) and tumor necrosis factor- α (TNF- α) (Behl et al., 2023).

Research has also shown the effect of parental cigarette smoke exposure on elevated blood pressure (Li et al., 2020), by 0.44 mmHg systole and 0.26 mmHg diastole in females, by increasing the risk of hypertension by 1.11 times compared to

girls who were not exposed (Zhang et al., 2019). However, the relationship between cigarette smoke exposure and blood pressure was not confirmed in this study. We suspect that the difference in results is due to differences in the determination of the exposure dose. Studies in adolescents using serum cotinine (>0.05 ng/mL in passive smokers) as a marker of exposure to cigarette smoke, showed a significant association between exposure to cigarette smoke and the incidence of metabolic syndrome (OR=4.7, 95% CI: 1.7 - 12.9), and the risk increased in active smokers (OR=6.1, 95% CI: 2.8 - 13.) 3. 3. A study in Iran also found increased triglyceride levels in children and adolescents of secondhand smoke, and its association with metabolic syndrome (OR=1.63, 95% CI: 1.17-2.29) (Ebrahimi et al., 2019). These results contradict the results of this study, possibly using different criteria for metabolic syndrome.

The weakness of this study is that it did not use cotinine as a marker of cigarette smoke exposure, so the effect of exposure on markers of metabolic syndrome has not been seen. Moreover, leptin and adiponectin levels were not examined.

CONCLUSION

The degree of heavy cigarette smoke exposure had a larger waist circumference than light and moderate cigarette smoke exposure. Cigarette smoke exposure was significantly associated with body weight and hip circumference, and heavy smoke exposure was more prevalent among adolescent boys.

REFERENCES

- Behl, T.A., Stamford, B.A., Moffatt, R.J., 2023. The Effects of Smoking on the Diagnostic Characteristics of Metabolic Syndrome: A Review, *Am. J. Lifestyle Med*, 17(3):397-412. doi: 10.1177/15598276221111046
- Birmipili, E., Katsiki, N., Malhotra, A., Dimopoulou, E., Mikhailidis, D.P., Tsiligioglou-Fachantidou, A., 2012. Gender and Socio-economic Differences in Daily Smoking and Smoking Cessation Among Adult Residents in a Greek Rural Area. *Open Cardiovasc. Med. J.* 6, 15-21.
- Chen, H., Hansen, M.J., Jones, J.E., Vlahos, R., Anderson, G.P., Morris, M.J., 2007. Detrimental metabolic effects of combining long-term cigarette smoke exposure and high-fat diet in mice. *Am. J. Physiol. - Endocrinol. Metab.* 293, 1564-1571.
- Chiolo, A., Faeh, D., Paccaud, F., Cornuz, J., 2008. Consequences of smoking for body weight, body fat distribution, and insulin resistance. *Am. J. Clin. Nutr.* 87, 801-809.
- Dasgupta, K., Ghimire, K.M., Pacheco, G., 2018. *The impact of smoking during pregnancy on children's body weight*. Economics Working Paper Series.
- Davis, C.L., Tingen, M.S., Jia, J., Sherman, F., Williams, C.F., Bhavsar, K., Wood, N., Kobleur, J., Waller, J.L., 2016. Passive Smoke Exposure and Its Effects on Cognition, Sleep, and Health Outcomes in Overweight and Obese Children. *Child. Obes.* 12, 119-125.
- Dubois-Deruy, E., Rémy, G., Alard, J., Kervoaze, G., Chwastyniak, M., Baron, M., Beury, D., Siegwald, L., Caboche, S., Hot, D., Gosset, P., Granette, C., Pinet, F., Wolowczuk, I., Pichavant, M., 2020. Modelling the impact of chronic cigarette smoke exposure in obese mice: metabolic, pulmonary, intestinal, and cardiac issues. *Nutrients* 12.
- Ebrahimi, M., Aghdam, M.H., Qorbani, M., Abbaspour Kaboodan, F., Shafiee, G., Khatami, F., Ahadi, Z., Motlagh, M.E., Ziaodini, H., Taheri, M., Kelishadi, R., Heshmat, R., 2019. Passive smoking and cardiometabolic risk factors in Iranian children and adolescents: CASPIAN-V study. *J. Diabetes Metab. Disord.* 18, 401-408.
- Ellberg, C., Olsson, H., Jernström, H., 2018. Current smoking is associated with a larger waist circumference and a more androgenic profile in young healthy women from high-risk breast cancer families. *Cancer Causes Control* 29, 243-251.
- Florescu, A., Ferrence, R., Einarson, T., Selby, P., Soldin, O., Koren, G., 2009. Methods for quantification of exposure to cigarette smoking and environmental tobacco smoke: Focus on developmental toxicology. *Ther. Drug Monit.* 31, 14-30.
- Jaakkola, J.M., Rovio, S.P., Pahkala, K., Viikari, J., Rönnemaa, T., Jula, A.,

- Niinikoski, H., Mykkänen, J., Juonala, M., Hutri-Kähönen, N., Kähönen, M., Lehtimäki, T., Raitakari, O.T., 2021. Childhood exposure to parental smoking and life-course overweight and central obesity. *Ann. Med.* 53, 208-216.
- Jitnarin, N., Kosulwat, V., Rojroongwasinkul, N., Boonpradern, A., Haddock, C.K., Poston, W.S.C., 2014. The Relationship Between Smoking, Body Weight, Body Mass Index, and Dietary Intake Among Thai Adults. *Asia Pacific J. Public Heal.* 26, 481-493.
- Kolovou, G.D., Kolovou, V., Mavrogeni, S., 2016. Cigarette smoking/cessation and metabolic syndrome. *Clin. Lipidol.* 11, 6-14.
- Koyanagi, A., Smith, L., Oh, H., Yang, L., Jackson, S.E., Haro, J.M., Shin, J.I., Carvalho, A.F., Jacob, L., 2020. Secondhand Smoking and Obesity among Nonsmoking Adolescents Aged 12-15 Years from 38 Low- And Middle-Income Countries. *Nicotine Tob. Res.* 22, 2014-2021.
- Li, Y., Wang, D., Wang, Y., Zhao, Y., Han, L., Zhong, L., Zhang, Q., Speakman, J.R., Li, M., Gao, S., 2020. Impact of parental smoking on adipokine profiles and cardiometabolic risk factors in Chinese children. *Atherosclerosis* 301, 23-29.
- Lin, C., Rountree, C.B., Methratta, S., LaRusso, S., Kunselman, A.R., Spanier, A.J., 2014. Secondhand tobacco exposure is associated with nonalcoholic fatty liver disease in children. *Environ. Res.* 132, 264-268.
- Lisboa, P.C., de Oliveira, E., de Moura, E.G., 2012. Obesity and endocrine dysfunction programmed by maternal smoking in pregnancy and lactation. *Front. Physiol.* 3 NOV, 1-9.
- Magge, S.N., Goodman, E., Armstrong, S.C., 2017. The Metabolic Syndrome in Children and Adolescents: Shifting the Focus to Cardiometabolic Risk Factor Clustering. *Pediatr.* 140(2), e20171603.
- Miyamura, K., Nawa, N., Isumi, A., Doi, S., Ochi, M., Fujiwara, T., 2023. Impact of exposure to secondhand smoke on the risk of obesity in early adolescence. *Pediatr. Res.* 93, 260-266.
- Moore, B.F., Kreitner, K.J., Starling, A.P., Martenies, S.E., Magzamen, S., Clark, M., Dabelea, D., 2022. Early-life exposure to tobacco and childhood adiposity: Identifying windows of susceptibility. *Pediatr. Obes.* 17, 1-18.
- Morris, R.W., Taylor, A.E., Fluharty, M.E., Bjørngaard, J.H., Åsvold, B.O., Gabrielsen, M.E., Campbell, A., Marioni, R., Kumari, M., Korhonen, T., Männistö, S., Marques-Vidal, P., Kaakinen, M., Cavadino, A., Postmus, I., Husemoen, L.L.N., Skaaby, T., Ahluwalia, T.V.S., Treur, J.L., Willemsen, G., Dale, C., Wannamethee, S.G., Lahti, J., Palotie, A., Rääkkönen, K., McConnachie, A., Padmanabhan, S., Wong, A., Dalgård, C., Paternoster, L., Ben-Shlomo, Y., Tyrrell, J., Horwood, J., Fergusson, D.M., Kennedy, M.A., Nohr, E.A., Christiansen, L., Kyvik, K.O., Kuh, D., Watt, G., Eriksson, J.G., Whincup, P.H., Vink, J.M., Boomsma, D.I., Smith, G.D., Lawlor, D., Linneberg, A., Ford, I., Jukema, J.W., Power, C., Hyppönen, E., Jarvelin, M.R., Preisig, M., Borodulin, K., Kaprio, J., Kivimäki, M., Smith, B.H., Hayward, C., Romundstad, P.R., Sørensen, T.I.A., Munafò, M.R., Sattar, N., 2015. Heavier smoking may lead to a relative increase in waist circumference: Evidence for a causal relationship from a Mendelian randomisation meta-analysis. The CARTA consortium. *BMJ Open* 5.
- Nadhiroh, S.R., Djokosujono, K., Utari, D.M., 2020. The association between secondhand smoke exposure and growth outcomes of children: A systematic literature review. *Tob. Induc. Dis.* 18, 1-12.
- Nagel, G., Arnold, F.J., Wilhelm, M., Link, B., Zoellner, I., Koenig, W., 2009. Environmental tobacco smoke and cardiometabolic risk in young children: Results from a survey in south-west Germany. *Eur. Heart J.* 30, 1885-1893.
- Saarni, S.E., Pietiläinen, K., Kantonen, S., Rissanen, A., Kaprio, J., 2009. Association of smoking in adolescence with abdominal obesity in adulthood: A follow-up study of 5 birth cohorts of Finnish twins. *Am. J. Public Health* 99, 348-354.
- Srivastava, P., Trinh, T.A., Hallam, K.T., Karimi, L., Hollingsworth, B., 2024.

- The links between parental smoking and childhood obesity: data of the longitudinal study of Australian children. *BMC Public Health* 24, 1-11.
- Tuovinen, E.L., Saarni, S.E., Männistö, S., Borodulin, K., Patja, K., Kinnunen, T.H., Kaprio, J., Korhonen, T., 2016. Smoking status and abdominal obesity among normal- and overweight/obese adults: Population-based FINRISK study. *Prev. Med. Reports* 4, 324-330.
- Wang, L., Mamudu, H.M., Alamian, A., Anderson, J.L., Brooks, B., 2014. Independent and joint effects of prenatal maternal smoking and maternal exposure to second-hand smoke on the development of adolescent obesity: A longitudinal study. *J. Paediatr. Child Health* 50, 908-915.
- Wang, Q., 2021. Underweight, overweight, and tobacco use among adolescents aged 12-15 years: Evidence from 23 low-income and middle-income countries. *Tob. Induc. Dis.* 19, 1-12.
- Weitzman, M., Cook, S., Auinger, P., Florin, T.A., Daniels, S., Nguyen, M., Winickoff, J.P., 2005. Tobacco smoke exposure is associated with the metabolic syndrome in adolescents. *Circulation* 112, 862-869.
- Yaghoubi, A., Ghojzadeh, M., Abolhasani, S., Alikhah, H., Khaki-Khatibi, F., 2015. Correlation of Serum Levels of Vitronectin, Malondialdehyde and Hs-CRP With Disease Severity in Coronary Artery Disease. *J. Cardiovasc. Thorac. Res.* 7, 113-117.
- Zhang, Z., Ma, J., Wang, Z., Dong, Y., Yang, Z., Dong, B., Ma, Y., 2019. Parental smoking and blood pressure in children and adolescents: A national cross-sectional study in China. *BMC Pediatr.* 19, 1-6.
- Zimmet, P., Alberti, K., Kaufman, F., Tajima, N., Silink, M., Arslanian, S., Wong, G., Bennett, P., J. S., Caprio, S., IDF Consensus Group, 2007. The metabolic syndrome in children and adolescents - an IDF consensus report. *Pediatr Diabetes* 8, 299-306.

Empowering Women in Pioneering Oral Health Initiatives for Elderly with Hypertension

Gilang Rasuna Sabdho Wening^{✉1)}, Ganendra Anugraha²⁾, Jihan Az' Zahra' Medina³⁾, Maulida Putri Syarifina³⁾, Mayang Aziza Hanif Ardianto³⁾, Naqiya Ayunnisa³⁾, Nathania Nurani Fripertiwi³⁾, Ni Putu Clara Pitaloka⁴⁾

¹ Department of Public Health, Faculty of Dental Medicine, Universitas Airlangga Surabaya, Surabaya, East Java, Indonesia 60115

² Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Universitas Airlangga Surabaya, Surabaya, East Java, Indonesia 60115

³ Postgraduate Student, Faculty of Dental Medicine, Universitas Airlangga Surabaya, Surabaya, East Java, Indonesia 60115

⁴ Menur Public Health Center (Puskesmas Menur) Surabaya, Surabaya, East Java, Indonesia 60118

✉Email: gilang-r-s-w@fkgunair.ac.id

ABSTRACT

Background: An epidemiology study at Menur Public Health Center revealed that the highest case of hypertension was found in the late elderly (56-65 years) in the period of September-October 2023, most of them have dental and oral problems. Based on data, most elderly (41.82%) don't seek any treatment when they experience toothache due to limited access and lack of individual awareness. Therefore, an empowerment program of periodic basic oral screening by cadres in Posyandu is needed for early detection to overcome possible obstacles when visiting the dentist experienced by elderly with hypertension. **Objectives:** To provide training for cadres in Posyandu Werda Asih regarding basic oral screening through the "Srikandi" program to improve oral health-seeking behavior for elderly with hypertension. **Method:** The program was conducted by providing direct training to cadres through guidebooks and posters. The program was evaluated using post-test related to basic oral screening and checklist sheet for skills. **Results:** After training, all cadres in Posyandu Werda Asih for the Elderly (100.00%) had a good level of understanding with an average score of 14 (the lowest score was 13 (18.18%), the highest score was 15 (18.18%)). The skills evaluation showed that all cadres (100%) were able to conduct all of the examination. **Conclusion:** According to post-test and checklist results, the "Srikandi" program can improve cadres' understanding and ability to perform basic oral screening. This will allow cadres to identify early dental and oral health issues and promote oral health-seeking behavior in the elderly with hypertension.

Keywords: Health cadre, Hypertension in elderly, Oral health-seeking behavior, Oral screening, Women empowerment.

INTRODUCTION

Hypertension, or an abnormal increase in blood pressure, is a major health problem nowadays due to its high prevalence throughout the world. Hypertension is thought to be the cause of about 7.5 million deaths or 12.8% of total annual deaths worldwide (Singh et al., 2018). In East Java, hypertension is a major concern, with an estimated 11,686,430 people aged ≥ 15 suffering from the condition, with the proportion of men and women at 48.38% and 51.62%, respectively. In comparison to Riskesdas (2013), which found a prevalence of 26.4%,

Riskesdas (2018) shows a considerable increase in the prevalence of hypertension in East Java at 36.3% (East Java Provincial Health Service, 2021).

According to the data from the Menur Public Health Center polyclinic register report for September-October 2023, hypertension cases ranked fourth among the five most frequent diseases, totaling 229 cases. In terms of distribution, hypertension was most commonly experienced by the late elderly age group (56-65 years) with a total of 153 patients, followed by the oldest elderly age group (>65 years) as many as 96 patients, early elderly (46-55 years) as many as 73



patients, late adults (36-45 years) as many as 30 patients, and young adults (26-35 years) as many as eight patients (Menur Public Health Center, 2023).

Based on these data, a preliminary survey was conducted on elderly people with hypertension in the Nginden Jangkungan and Semolowaru areas. The results showed that most elderly people with hypertension neither routinely took their prescription for hypertension nor visited the health center for examinations. The oral cavity examination among the elderly found several dental and oral problems, including loose teeth, missing teeth, calculus, gingival recession, residual roots, and poor oral hygiene.

Dental problems in the elderly, especially tooth loss, cause chewing and swallowing difficulties, resulting in dietary changes that result in reduced nutritional intake, such as vitamins and fiber. Low fiber consumption can reduce potassium and increase sodium levels, which is a risk factor for hypertension (Marito et al., 2022). In addition, tooth loss can be associated with inflammatory conditions in the gingival, alveolar, and periodontal tissues. Inadequate dental and oral care can lead to local infections, which may increase the risk of hypertension by causing systemic inflammation and endothelial dysfunction (Woo et al., 2021). Longitudinal research conducted by Woo et al. (2021) found that tooth loss can increase the risk of hypertension. The prevalence of periodontal disease increases with age, especially when it is not balanced with good dental and oral health behaviors. Unmaintained dental and oral hygiene causes an accumulation of food residue, therefore supporting the role of bacteria in causing disease (Sopianah, 2018).

Based on our preliminary survey results, most elderly people in the Menur Public Health Center area (41.82%) do not seek any treatment, whether self-medication, herbal or alternative medicines, or dental health service facilities, when they experience tooth and oral problems. Some reasons why elderly people do not seek dental treatment from dental and oral health services include laziness, cost constraints, bad experiences with dentists, no time, limited access to transportation, embarrassment, lack of self-confidence because many teeth are missing, and complaints of pain, which

then goes away on its own, and treatment is contraindicated due to hypertension.

Dental problems are often ignored because they are not considered serious or life-threatening, so elderly people are reluctant to have their teeth and mouth checked at a health service facility (Janto et al., 2022). Apart from that, limited access and transportation are some of the obstacles most often encountered by elderly people with dental problems that cannot be resolved by medical personnel (Gopalakrishnan et al., 2019).

To address health issues and enhance the social welfare of the elderly population, the central government, through regional governments, has established integrated service posts called Posyandu for the Elderly (Ainiah et al., 2021). Posyandu for the Elderly program was created based on *Republic of Indonesia government regulation no. 43 of 2004* regarding the implementation to improve the social welfare of the elderly. Posyandu for the elderly has various roles, including preserving their health at the highest possible level, improving communication between the elderly, assisting in their physical and mental well-being, assisting in the early detection of diseases and other health issues in the elderly, and enhancing their psychological state through improved social interaction with others (Latumahina et al., 2022).

Local community members willingly participate in Posyandu as health cadres who were trained to assist in health activities organized by the Public Health Centers (*Pusat Kesehatan Masyarakat, Puskesmas*) with the task of being able to promote health to the community (Yulis et al., 2022). Health cadres have the potential to become change agents since they have close contact with the local communities, and they have been established as community health counselors by the government (Ministry of Health, Republic of Indonesia, 2019). At Posyandu Werda Asih for the Elderly, all the cadres are women who live in the surrounding area and actively manage elderly health activities every month. Therefore, through the assistance of women cadres at Posyandu Werda Asih, basic dental and oral examinations can become an important program to be held periodically as an early detection to overcome various obstacles in visiting the dentist.

The objective of this study is to determine the impact of the "Srikandi" training program on empowering women as cadres at Posyandu Werda Asih, specifically focusing on their understanding and skills in carrying out basic dental and oral examinations for the elderly. Additionally, this study aims to ascertain how the "Srikandi" training program improves cadres' abilities in early detection of dental and oral diseases to encourage oral health service-seeking behavior in elderly with hypertension.

METHODS

Program Outline

The empowerment program in this study is known as the "Srikandi" (*Screening Gigi Kader Mandiri*) program, which means dental screening by cadres independently. The empowerment program involves training cadres in Posyandu Werda Asih to carry out dental and oral screening for the elderly. This program aims to improve the behavior of seeking dental and oral health services. It is expected to help change the behavior of the elderly, who tend not to treat their dental and oral problems to the dentist.

Target

The program targeted all health cadres at Werda Asih Elderly Posyandu. According to Yulis et al. (2022), health cadres are local community members or volunteers who were trained to assist in health activities organized by the local Community Health Centers (*Pusat Kesehatan Masyarakat, Puskesmas*) with the task of being able to promote health to the community. Health cadres have the potential to become change agents since they have close contact with the local communities, and they have been established as community health counselors by the government (Ministry of Health, Republic of Indonesia, 2019).

Subjective Norm

Cadres were chosen as the subjective norm in this study because they have an important role in improving health quality through elderly health promotion activities at Posyandu, which include health education, recording body mass index (BMI) on the *Kartu Menuju Sehat* (KMS), completing personal health monitoring books, and managing exercise. The role and duties of cadres are considered to be able to help health workers by influencing the elderly's visits

to the Posyandu because the services provided are pleasant, friendly, and provide information and health education that is clear and easy to understand, which is expected to motivate the awareness of the elderly to come to the Posyandu (Setyoadi *et al.*, 2013).

Objectives of the Program

The empowerment program was created to provide training to cadres at the Posyandu Werda Asih regarding basic oral screening as an early detection of dental and oral problems in the elderly. Through this program, cadres will be trained in both aspects, knowledge and skill, regarding dental and oral cavity conditions and examination techniques. Then, by encouragement from cadres, the program aims to increase awareness of the elderly to seek treatment for dental and oral diseases at the dentist.

Planning and Design

The empowerment program was designed based on epidemiological research results from October 30 to November 18, 2023. After determining priority problems, an empowerment program was prepared as an intervention for these problems. The health promotion media chosen for the empowerment program were guidebooks and "Srikandi" posters, developed from the Australian Institute of Health and Welfare (AIHW) Caring for Oral Health Assessment Tool in Australian Residential Care (2009). The "Srikandi" guidebook contains explanations and photos related to dental and oral problems found in the elderly, which are divided into nine sections, which include lips, tongue, gums and mucosa, saliva, teeth, dentures, oral cavity, toothache, and tooth loss. Each section is divided into three categories of condition: healthy, preservation condition, and sick. In the guidebook, there are also procedures for carrying out screening, which includes procedures for dental and oral examinations as well as how to fill out the assessment sheet for the "Srikandi" examination form. The "Srikandi" poster contains explanations and photos of dental and oral problems found in the elderly, which are designed more concisely and can be used as a reference that can be seen directly when the screening is taking place.

Before implementing the empowerment program, a strategic planning method was carried out first by

conducting a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis. This analysis is useful for determining strategies and identifying influencing factors in a program.

Ethical Clearance

All described procedures had been evaluated and authorized by the Universitas Airlangga Faculty of Dental Medicine Health Research Ethical Clearance Commission (Certificate number: 1276/HRECC.FODM/XI/2023).

Implementation

The implementation of the "Srikandi" program was on Wednesday, 6 December, 2023, at the Posyandu Werda Asih for the Elderly, Nginden Jangkungan and the program was attended by 10 cadres. The program is implemented as basic dental and oral examination training using the "Srikandi" media guidebook to improve the abilities of Posyandu cadres to perform dental and oral screening for the elderly. This is expected to improve the behavior of elderly individuals in seeking out dental and oral health services by enabling them to detect abnormalities in their oral cavities at an early age through the program.

Evaluation

Following the implementation of the empowerment program, evaluation was carried out to measure the level of

knowledge and skills that the cadres have acquired. The evaluation of cadres' knowledge is carried out by assessing their understanding through post-test questions presented in question sheets related to basic dental and oral examinations. The post-test questions are arranged in nine sections containing pictures of the oral cavity's condition, and cadres are asked to categorize them into one of three categories: healthy, changed conditions, and unhealthy. Subsequently, a skills assessment is also conducted on cadres using a skills checklist containing 10 steps for carrying out basic oral screening. The cadres' skills in conducting basic oral screening are observed and assessed to determine whether they can perform the screening correctly and completely according to the 10 steps.

RESULTS AND DISCUSSION

The "Srikandi" program was held on Wednesday, December 6th, 2023, at the Posyandu Werda Asih for the Elderly, Nginden Jangkungan. The number of cadres who received intervention through this empowerment program was 10 cadres out of a total of 11 cadres invited (90.9% of arrivals) and all cadres were women.

Respondent Characteristics

Table 1. Distribution of Respondents Based on Age and Education Level.

| Age | Level of Education | | | | Total |
|-----------------|--------------------|--------------------|--------------------|----------|-----------|
| | Elementary School | Junior High School | Senior High School | Bachelor | |
| 40-45 years old | 0 (0%) | 1 (10%) | 0 (0%) | 0 (0%) | 1 (10%) |
| 46-50 years old | 0 (0%) | 1 (10%) | 2 (20%) | 0 (0%) | 3 (30%) |
| 51-55 years old | 1 (10%) | 2 (20%) | 0 (0%) | 0 (0%) | 3 (30%) |
| 56-60 years old | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 61-65 years old | 0 (0%) | 1 (10%) | 0 (0%) | 1 (10%) | 2 (20%) |
| 66-70 years old | 0 (0%) | 1 (10%) | 0 (0%) | 0 (0%) | 1 (10%) |
| Total | 1 (10%) | 6 (60%) | 2 (20%) | 1 (10%) | 10 (100%) |

The characteristics of respondents in this empowerment program vary from age 43 to 68 years with different

educational backgrounds, as shown in table 1. The majority of Posyandu Werda Asih cadres fall into the age group of 46-50

years and 51-55 years, respectively, with an average of three people per group. In terms of educational background, the cadres predominantly have completed education at secondary school level, with a frequency of six people.

The empowerment program can be considered successful when cadres acquire the understanding and skills needed to perform basic oral screening. Evaluation of the cadres' understanding and skills was carried out with post-test and assessment

during oral screening simulation using a checklist and the "Srikandi" examination form.

Post-test Results

The results of the evaluation of the cadre's understanding about basic oral screening is obtained through a post-test consisting of nine points regarding findings of conditions in the oral cavity which have been explained to cadres using the "Srikandi" guidebook.

Table 2. Distribution of Cadres' Understanding Categories Based on Post-Test Scores.

| Category | Score Range | Frequency | Percentage |
|----------|-------------|-----------|------------|
| Poor | 0-6 | 0 | 00.00% |
| Fair | 7-12 | 0 | 00.00% |
| Good | 13-18 | 10 | 100.00% |
| Total | | | 100.00% |

As can be seen in Table 2, there two levels of assessment regarding cadres' understanding of the conditions in the oral cavity: good, moderate, and poor. Based on the table, it can be seen that all cadres in Posyandu Werda Asih for the Elderly (100.00%) have a good level of understanding with an average score of 14. The lowest score from the post-test was 13 (two people; 18.18%), while the highest score from the post-test was 15 (two people; 18.18%). This result shows that all cadres have a good understanding of basic oral and dental examinations. Cadres' skills in performing basic oral examinations are evaluated using a checklist assessment

derived from observations made during dental and oral screening simulations by using a guidebook and the "Srikandi" assessment sheet.

Skills Evaluation Result

Cadres' skills in basic dental and oral examinations are evaluated through an assessment checklist obtained based on observations when cadres carry out oral screening simulations using the "Srikandi" guidebook and assessment sheet. Oral screening skills carried out by cadres are assessed from the patient's preparation until recording the results of the examination.

Table 3. Distribution of Cadres' Skills Based on Skill Evaluation Result.

| Aspect | Frequency | | Percentage |
|---------------------------------|--------------|----------------|------------|
| | Accomplished | Unaccomplished | |
| Preparation for examination | 10 | 0 | 100.00% |
| Dental and oral examination | 10 | 0 | 100.00% |
| Recording of inspection results | 10 | 0 | 100.00% |

Based on Table 3, it was found that all cadres in Werda Asih Posyandu (10 people; 100%) were able to carry out each

stage of the examination following the criteria assessed in the skills aspect.



Figure 1. Documentation of “Srikandi” Program: (A) Presentation of the “Srikandi” guidebook and a poster; (B) Direct demonstration of basic oral screening; (C) Cadres’ evaluation session; (D) “Srikandi” Guidebook and Poster.

Empowerment activities for health cadres began with presenting the materials contained in the “Srikandi” guidebook using the guidebook and a poster (Figure 1A), followed by a direct demonstration of basic oral screening for the elderly (Figure 1B). At the end of the activity, an evaluation of the cadres’ understanding and skills was carried out with post-test and assessment of the cadres during oral screening simulation using a checklist and the “Srikandi” examination form (Figure 1C).

The media used in the “Srikandi” program were in the form of guidebooks and posters (Figure 1D), targeting the cadres of the Posyandu Werda Asih for the Elderly. These posters and guidebooks are physical media that are easy to use, store, and carry when conducting the screening program. The “Srikandi” guidebook contains a guide to identifying dental and oral problems in the elderly that includes explanations and photos that are easy to understand. The dental and oral problems are divided into nine sections, which include lips, tongue, gingiva and mucosa, saliva, teeth, dentures, oral cleanliness, and tooth pain and tooth mobility. Each section is then divided into three condition categories which are healthy, transitional

condition, and unhealthy. The guidebook also contains the basic dental and oral examination procedure and how to fill out the “Srikandi” examination form. The “Srikandi” poster contains explanations and photos of dental and oral problems found in the elderly, similar to the guidebook, in a more concise form and can be read directly when the screening is taking place.

The basic dental and oral health screening training provided by the implementation team through the “Srikandi” program is designed so that the cadres can carry out independent basic dental and oral examinations on the elderly periodically to increase the oral health-seeking behavior in the elderly. Oral health-seeking behavior is an important element in overall health and significantly impacts the quality of life and the health system. A study suggests that inadequate oral health-seeking behavior results in poor oral health outcomes, increased morbidity and mortality, and poor oral health statistics (Uguru et al., 2021).

Referring to Lawrence Green’s theory (1991), healthcare-seeking behavior is influenced by three factors: predisposing factors, which include knowledge, attitudes, and perceptions; enabling factors, which include health facilities, health personnel, and health resource affordability; as well as reinforcing factors, which include social support, family, and the surrounding environment (Pakpahan et al., 2021). Implementers intervene in reinforcing factors through the “Srikandi” program, such as the support from cadres in performing basic oral and dental examinations for the elderly.

Based on the two evaluation results, it can be seen that the “Srikandi” counseling and training program is effective in increasing cadres’ understanding and skills in carrying out dental and oral examinations, thereby effective in promoting awareness and behavior of the elderly in seeking dental and oral health services. The effectiveness of this training program is supported by research by Heningtyas et al. (2020) who conducted a similar community empowerment program through training dental and oral health cadres in Pendul Village, Yogyakarta Special Region Province (DIY) in measuring the DMF-T

index for their respective family members. Based on the results of the data recap, data on dental caries status in the form of the DMF-T index from 37 respondents was produced properly and correctly. Arini et al. (2019) conducted a basic dental and oral health examination training program for cadres in Kukuh Village, Tabanan Regency and showed results in the form of an increase in dental and oral health knowledge by 62.9%, an increase in brushing teeth skills by 100%, and an increase in early detection skills for cavities by 100% after training. These various studies prove that the potential of training programs for cadres can be an effort to improve dental and oral health that is effective in the long term because cadres can motivate and educate the community to maintain dental and oral health and seek health services when experiencing dental and oral complaints (Hidayat et al., 2017).

To identify and analyze aspects that influence the implementation of the "Srikandi" program, the SWOT (Strength, Weakness, Opportunity, Threat) method is applied in the planning process. The SWOT analysis acknowledges the critical external and internal factors involved in achieving a program's objectives. While external factors are outside the program's control, internal aspects relate to characteristics that the program can regulate (Benzaghta, 2021). The strength factor is that there has been no training for cadres in the Menur Community Health Center working area regarding early basic dental and oral health checks for the elderly as in the "Srikandi" program. The media used in this program is designed with contrasting colors and a font size large enough so that it is easy to read for the cadres. Apart from that, the "Srikandi" guidebook, which is a printed pocketbook, does not require internet access so it is practical, easy to carry, and easy to store. Then, to make it easier for cadres to understand, this media guidebook is designed to be attractive and accompanied by pictures that can make it easier for cadres to determine the condition of the oral cavity when screening the dental and oral of the elderly. The weakness of the "Srikandi" program is the limited tools that cadres have for screening, such as mouth mirrors, sondes, and tweezers. Furthermore, the cadres receive a lot of new information so it takes time to understand how to do basic dental

and oral examinations for the elderly. The "Srikandi" program has the opportunity to be continued by cadres in the Posyandu Werda Asih for the Elderly activities which are held regularly for 1-3 months. Posyandu cadres can implement dental and oral screening activities following the training provided with a guidebook as a reference in carrying out examinations. The threat of the "Srikandi" program is human error from cadres in understanding the information provided, as well as negligence in keeping the guidebook.

The "Srikandi" guide book can be distributed to the Posyandu Werda Asih Nginden Jangkungan and can be easily applied as a dental and oral screening guide for elderly people at every Posyandu for the Elderly activity. Cadres who have participated in the empowerment program in the form of "Srikandi" training regarding basic dental and oral screening for the elderly can educate the elderly about the condition of their teeth and mouth when abnormalities occur, thus encouraging the elderly to seek health services. Therefore, the "Srikandi" program can be implemented well by Posyandu Werda Asih for the Elderly cadres because it is an innovative and practical program that runs sustainably.

CONCLUSION

The empowerment of women as cadres in the Posyandu Werda Asih through the "Srikandi" training program can increase the understanding and ability of the cadres in carrying out basic dental and oral examinations in the elderly as shown in the evaluation result of post-tests and checklist assessments. With the "Srikandi" training program, the cadres can carry out early detection of dental and oral diseases and, as a result, can encourage and increase oral healthcare-seeking behavior in the elderly with hypertension.

REFERENCES

- Ainia, S. N., Afifuddin, A., & Hayat, H. (2021). Implementation of the Posyandu Program for the Elderly (Seniors) in RW I, Polowijen Village (Case Study at the Integrated Service Post for the Elderly, Polowijen Village, Blimbing District, Malang City) (Implementasi Program Posyandu Lanjut Usia (Lansia) di RW

- I Kelurahan Polowijen (Studi Kasus Pada Pos Pelayanan Terpadu Lansia Kelurahan Polowijen Kecamatan Blimbing Kota Malang). *Jurnal Inovasi Penelitian*, 1(12), 2861-2868.
- Arini, N.W., Ratmini, N.K., Wirata, I.N. & Sirat, N.M. (2019). Efforts to Increase the Degree of Dental and Oral Health Through Posyandu Cadre Training in Marga District, Tabanan Regency in 2018 (Upaya Meningkatkan Derajat Kesehatan Gigi dan Mulut Melalui Pelatihan Kader Posyandu Di Kecamatan Marga Kabupaten Tabanan Tahun 2018). *Jurnal Pengabmas Masyarakat Sehat*, 1(1).
- Benzaghta, M. A., Elwalda, A., Mousa, M. M., Erkan, I., & Rahman, M. (2021). SWOT analysis applications: An integrative literature review (Aplikasi analisis SWOT: Tinjauan literatur integratif). *Journal of Global Business Insights*, 6(1), 54-72.
- East Java Provincial Health Service. (2021). *East Java Health Profile 2021 (Profil Kesehatan Jawa Timur 2021)*. Surabaya: Dinas Kesehatan Provinsi Jawa Timur.
- Gopalakrishnan, A., Kahu, E., Jones, L., & Brunton, P. (2019). Access and barriers to oral health care for dependent elderly people living in rest homes (Akses dan hambatan terhadap layanan kesehatan mulut bagi lansia tanggungan yang tinggal di rumah jompo). *Gerodontology*, 36(2), 149-155
- Heningtyas, A.H., Utami, S., & Astuti, N.R. (2020). Empowerment of Dental and Oral Health Cadres in the "Attitude" Program in Pendul Hamlet (Pemberdayaan Kader Kesehatan Gigi Dan Mulut Dalam Program "Sikap" Di Dusun Pendul). *Prosiding Seminar Nasional Program Pengabdian Masyarakat*.
- Hidayat, W., Nur'aeny, N., & Wahyuni, I.S. (2017). Providing Knowledge and Independence in Dental and Oral Health Care (Pembekalan Pengetahuan Dan Kemandirian Dalam Perawatan Kesehatan Gigi Dan Mulut). *Dharmakarya*, 6(3).
- Janto, M., Iurcov, R., Daina, C. M., Neculoiu, D. C., Venter, A. C., Badau, D., Cotovanu, A., Negrau, M., Suteu, C. L., Sabau, M., & Daina, L. G. (2022). Oral health among elderly, impact on life quality, access of elderly patients to oral health services and methods to improve oral health: a narrative review (Kesehatan mulut di kalangan lansia, dampak terhadap kualitas hidup, akses pasien lanjut usia terhadap layanan kesehatan mulut dan metode untuk meningkatkan kesehatan mulut: tinjauan naratif). *Journal of Personalized Medicine*, 12(3), 372.
- Latumahina, F., Istia, Y. J., Tahapary, E. C., Anthony, V. C., Solelisa, V. J., & Solissa, Z. (2022). The Role of Elderly Posyandu in the Welfare of the Elderly in Ihmahu Village, East Saparua District, Central Maluku Regency (Peran Posyandu Lansia Terhadap Kesejahteraan Para Lansia di Desa Ihmahu, Kec. Saparua Timur, Kab. Maluku Tengah). *Jurnal Karya Abdi Masyarakat*, 6(1), 39-45.
- Marito, P., Hasegawa, Y., Tamaki, K., Sta. Maria, M.T., Yoshimoto, T., Kusunoki, H., Tsuji, S., Wada, Y., Ono, T., & Sawada, T. (2022). The Association of Dietary Intake, Oral Health, and Blood Pressure in Older Adults: A Cross-Sectional Observational Study (Asosiasi Asupan Makanan, Kesehatan Mulut, dan Tekanan Darah pada Lansia: Studi Observasional Cross-Sectional). *Nutrients*, 14, 1279.
- Menur Public Health Center. (2023). *Report on the 10 Most Common Diseases (Laporan 10 Penyakit Terbanyak)*. Surabaya: Surabaya City Health Service.
- Ministry of Health, Republic of Indonesia (MoH-RI). (2013). *National Basic Health Research Report 2018 (Laporan Nasional Riset Kesehatan Dasar 2018)*. Jakarta: Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan.
- Ministry of Health, Republic of Indonesia (MoH-RI). (2018). *National Basic Health Research Report 2018. (Laporan Nasional Riset Kesehatan Dasar 2018)*. Jakarta: Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan.
- Ministry of Health, Republic of Indonesia (MoH-RI). (2019). *Ministry of Health Regulation number 8 of 2019:*



- community empowering in the area of health (Peraturan Menteri Kesehatan Nomor 8 Tahun 2019: Pemberdayaan Masyarakat di Bidang Kesehatan).
- Pakpahan, M., Siregar, D., Susilawaty, A., Mustar, T., Ramdany, R., Manurung, E., Sianturi, E., Tompunu, M., Sitanggang, Y. & Maisyarah. (2021). Health Promotion and Health Behavior (Promosi Kesehatan dan Perilaku Kesehatan). Kita Menulis Foundation.
- Setyoadi, S., Ahsan, A. & Abidin, A.Y. (2013). The relationship between the role of health cadres and the level of quality of life of the elderly (Hubungan peran kader kesehatan dengan tingkat kualitas hidup lanjut usia). *Journal of Nursing Science Update (JNSU)*, 1(2): 183-192.
- Singh, S., Shankar, R., & Singh, G.P. (2017). Prevalence and Associated Risk Factors of Hypertension: A Cross-Sectional Study in Urban Varanasi (Prevalensi dan Faktor Risiko Terkait Hipertensi: Studi Cross-Sectional di Urban Varanasi). *International Journal of Hypertension*, 2017, 5491838.
- Sopianah, Y. (2018). Implementation of Appropriate Toothbrushing Education in Order to Increase Toothbrushing Knowledge in the Elderly (Implementasi Pendidikan Menyikat Gigi yang Tepat dalam Rangka Meningkatkan Pengetahuan Menyikat Gigi pada Lanjut Usia). *Prosiding Seminar Nasional & Diseminasi Hasil Pengabdian kepada Masyarakat Berbasis Riset*, pp. 167-170.
- Uguru, N., Onwujekwe, O., Uguru, C., Ogu, U., Okwuosa, C., & Okeke, C. (2021). Oral health-seeking behavior among different population groups in Enugu Nigeria (Perilaku pencarian kesehatan mulut di antara kelompok populasi yang berbeda di Enugu Nigeria). *PLoS One*, 16(2): e0246164.
- Woo, H. G., Chang, Y., Lee, J. S., & Song, T. J. (2021). Tooth loss is associated with an increased risk of hypertension: A nationwide population-based cohort study (Kehilangan gigi dikaitkan dengan peningkatan risiko hipertensi: Sebuah studi kohort berbasis populasi nasional). *PLoS One*, 16(6): e0253257.
- Yulis, D. M., Yahya, M., & Mandra, M. A. S. (2022). Application of the antenatal education model on improving cadres' capacity on health services (Penerapan model pendidikan antenatal dalam meningkatkan kapasitas kader dalam pelayanan kesehatan). In *1st World Conference on Social and Humanities Research (W-SHARE 2021)* (pp. 47-50). Atlantis Press.

Why Do Most Children Not Walk or Cycle to and from School?

Anna Fitriani✉¹⁾, Hidayati²⁾

¹ Nutrition Science Study Program, Faculty of Health Sciences, University of Muhammadiyah Prof. Dr. Hamka, Kebayoran Baru, Jakarta, Indonesia 12130

² Public Health Study Program, Faculty of Health Sciences, University of Muhammadiyah Prof. Dr. Hamka, Kebayoran Baru, Jakarta, Indonesia 12130

✉Email: annafitriani@uhamka.ac.id

ABSTRACT

Background: Physical activity plays a crucial role in children's health and well-being. Active school commuting (ASC), one of the strategies to enhance physical activity among children, has declined globally. However, no data is available for Indonesian children. None of the determinants of children's ASC has been examined in Indonesian studies. **Objectives:** This study aimed to 1) measure the ASC rate and 2) analyze the association between individual, social, and physical environmental factors and the ASC rate among primary school children in three urban areas in Indonesia (South Jakarta, Central Jakarta, and South Tangerang). **Methods:** This is a cross-sectional study using an online survey completed by mothers as representatives of their children. The survey was completed by 441 parents from 9 primary schools in South Jakarta, Central Jakarta, and South Tangerang. **Results:** 1) Only 28.3% of children engage in ASC (walking or cycling), 2) individual factor ('do not dare to go to school alone'), social factors ('having a friend for going to school' and 'afraid of street crime'), and environmental factors (inadequacy of public transport, broken roads, and school distance) are significantly associated with ASC. **Conclusion:** less than one-third of primary school children in South Jakarta, Central Jakarta, and South Tangerang walk or bike to go to and back from school. Perceived individual, social, and environmental factors might hinder active school commuting among children. Future interventions need to attenuate negative perceptions toward ASC from individual, social, and environmental perspectives.

Keywords: Active commuting, Active travel, Children, School.

INTRODUCTION

The beneficial roles of physical activity in improving children's health and well-being in their age and later life have been recognized (Gao et al., 2018; Janssen & LeBlanc, 2010), including for obesity prevention (Wyszynska et al., 2020), fitness enhancement cognitive performance (Bidzan-Bluma & Lipowska, 2018), mental health (Biddle et al., 2019), and immunity (Shao et al., 2021). A review of cross-sectional and longitudinal studies found that children who have more physical activity, particularly vigorous intensity, have lower total body fat and abdominal fat both at this age and during older age. With one-third of school-age children in Indonesia overweight and obese, the scaling up of school-based physical activity strategies, such as active school commuting (ASC) is a fundamental public health concern.

Worldwide data reported that in 2016, 81% of children had insufficient physical activity. In lower-middle-income

countries, this prevalence was higher (83.9%) (Guthold et al., 2020). Indonesia as one of the lower-middle-income countries has an increase in inactivity behavior from 26,1% in 2013 to 33,5% in 2018 as reported by a national survey (Health Research and Development, 2013, 2018). ASC, introduced in the early 2000s, allows students to integrate physical activity into their daily schedules (Hills & Cambourne, 2002), as they typically make 360-400 trips per year (Craw, 2018). Likewise, the trend of active school commuting has also declined globally (Lam et al., 2023). ASC was found to have decreased from 84,4% in 2003 to 78,3% in 2017 in Germany (Reimers et al., 2021), as well as in Victoria, Australia which also declined from 33.6% in 2009-10 to 32.3% in 2012-13 (Adepoyibi et al., 2022). Spanish girls have also been reported to have a remarkable decline of ASC from 61% (2001-2002) to 46% (2006-2007) (Chillon et al., 2013).

A broad range of psychosocial factors including personal/perceptual, social, and environmental affect ASC

among children (Savolainen et al., 2024). In Jordan, student who have a better perception about health were more likely to be more active (Alkhawaldeh et al., 2021). In China, parental physical activity positively correlated with children and teenager's physical activity (Lu et al., 2017). In England, school hour setting and physical environment contributed to the long-term physical activity behavior among school children (Mantjes et al., 2012). This study found that children maintained more moderate to vigorous physical activity with a prolonged morning break and a safer physical environment (cycling infrastructure, crossing guard) (Mantjes et al., 2012). Self-efficacy also has a positive correlation with children and adolescent physical activity. In 2008, research found a conceptual framework of walking to school behavior in Austin, Texas, USA and revealed several factors including personal factors (sociodemographic, attitudes, barrier), social factors (school and peer influence), and physical environment (walkability, safety) associated with the walking behavior (Zhu et al., 2008).

Unfortunately, this data is limited to Asian countries such as Indonesia. To date, information that reveals the ASC level and factors that may contribute to it among primary school children in Indonesia, particularly in urban areas, has not been provided. In Indonesia, children in urban regions are less active than children in rural areas (Health Research and Development, 2018). South Jakarta, Central Jakarta, and South Tangerang are typical urban areas in Indonesia where the children population tends to have high inactivity. In Jakarta, for example, data revealed that there was an elevation of insufficiency in physical activity from 44,2% in 2013 to 47,8% in 2018 (Health Research and Development, 2013, 2018). There are over a thousand primary schools in Jakarta and the surrounding areas, and most of them have inadequate facilities and don't encourage students to walk or ride bikes. Given the obstacles, including social, personal, and environmental factors that may affect ASC, it is important to examine these factors toward ASC among primary school children.

In Indonesia, ASC among children and adolescents has been examined in

civil engineering and urban planning studies (Argarima & Naipospos, 2023; Budiman et al., 2020; Yumita et al., 2020). However, they mainly focused in investigating physical/built environment factors, and no studies inform behavioral and social factors affected ASC with a health science perspective. Therefore, information about ASC to and from school as well as its association with individual, social and environmental factors, should be addressed to provide useful information for local stakeholders and the future health promotion program. This study aimed to 1) measure the active school commuting rate and 2) analyse the association between individual, social and physical environmental factors, and ASC levels among primary school children in South Jakarta, Central Jakarta, and South Tangerang.

METHODS

Study Design

This study is a cross-sectional study using the survey to examine parents' perception of their child's ASC behavior, as well as individual, social, and physical environmental factors that might contribute to it. This survey was conducted in urban areas that are inhabited by populations with a wide range of socioeconomic status, including South Jakarta, Central Jakarta, and South Tangerang. Ethics approval has been received from The Medical and Health Research Ethics Committee Muhammadiyah University of Prof. Dr. Hamka (KEPKK UHAMKA) No.03/22.06/01763. Informed consent was delivered and signed by parents as they were willing to participate before completing the survey.

Study Participants

The participants are parents of students in grades 3-6 from nine primary schools (three schools from each location) who have a maximum of three kilometers walking distance and five kilometers cycling distance (based on Google Maps walking and cycling distance) and voluntarily completed a questionnaire distributed through Google Form. The initial explanation of the questionnaire has outlined the inclusion criteria, which encompass those residing in South Jakarta, Central Jakarta, and South Tangerang.

Surveys

All parents completed an online questionnaire consisting of questions related to family demographic characteristics (e.g., working status, highest level of education), ASC pattern (mode, frequency, distance) during the last week, and factors (individual, social, and environmental barriers and facilitators) that might influence their children's ASC to and from schools.

Statistical Analysis

Descriptive statistics of categorical variables are presented as percentages, while continuous variables are presented as mean and standard deviation. Normality assumptions were made using the Kolmogorov-Smirnov test. Chi-square and Fisher's exact test were employed to examine the association between each indicator of individual, social, and

environmental factors (yes/no) as the independent variables and the active school commuting (yes/no) as the dependent variable. The analysis was performed by using SPSS Statistic v. 23.0 (IBM SPSS Statistic for Windows, Version 23.0. Armonk, NY, USA).

RESULTS AND DISCUSSION

Participants' characteristics

A total of 441 students' mothers took part in this study. Table 1 demonstrates the family characteristics of each participant. The average age of children is 9.5 years (3rd- 4th-grade age). More than half of the mothers (61.7%) are unemployed. Over 50% of them attained low to middle education (completed middle and high education degrees).

Table 1. The Family Characteristics.

| Variables | Data |
|--|----------------|
| Children's age (years; mean \pm SD) | 9.5 \pm 0.53 |
| Parent's working status (%) | |
| Unemployed | 61.7 |
| Employed | 38.3 |
| Parents' educational level (%) | |
| Low (Unschool/Primary school) | 6.4 |
| Middle (Junior/Senior high school) | 51.0 |
| High (Bachelor/Master/Doctoral degree) | 42.6 |

ASC Level

Table 2 shows that most children prefer to be transported to and from school by their parents (77.3%), with the private vehicle being the most popular mode of transportation (81.6%). Although the school-home distance is relatively short (averaging less than 3 km), only less than one-third of the children (28.3%) engage in active school commuting. To the author's knowledge, this is the first study measuring ASC rates among primary school children in Jakarta and South Tangerang, Indonesia. Previously, the ASC rate among children was mostly studied in high-income nations such as Australia, Switzerland, and the United Kingdom (Lam et al., 2023). While the global data have shown a worldwide decline of ASC school among children age 6-12 years old (Lam et al., 2023) No trend data are available in Indonesia.

This study finds that the percentage of ASC among children in Jakarta and South Tangerang, Indonesia, is

low (28.3%). This percentage is only slightly higher than their counterparts in developed, industrial countries, such as Australia (27%), Portugal (23%), and the US (13%). This study found that ASC among Jakarta and South Tangerang children is significantly lower compared to those found in developed European countries, including Great Britain (48%), the Netherlands (86%), Denmark (63%), and Russia (59%). According to the Global Matrix 3.0 which examines active travel among children and adolescents across 49 countries, it is found that the global average grade was a C, indicating that the country successfully manages active travel with about half of children and adolescents (Gonzalez et al., 2020). It is concluded that the prevalence of ASC among primary school children in DKI Jakarta and South Tangerang is significantly lower compared to children worldwide.

A systematic review has summarized that ASC positively contributes to children's physical activity

level during their active school days, including longer duration of recommended moderate-intensity physical activity and higher daily steps (Lam et al., 2023). This increased physical activity level due to ASC may contribute partially to the children's health and well-being, such as lower

adiposity (e.g., body mass index, body fat mass), higher fitness level, fewer depressive symptoms and better psychological well-being (Lam et al., 2023). However, the association between ASC and children's health and well-being is still inconsistent (Lam et al., 2023).

Table 2. Children's ASC Habit.

| Variables | Data |
|--|-------------|
| School distance (km; mean, SD) | 2.42 ± 2.91 |
| Trip preference (%) | |
| Delivered and picked up | 77.3 |
| Delivered or picked up (one of them) | 8.5 |
| Go to school and go home alone | 14.2 |
| Transportation mode (%) | |
| Walking | 17.0 |
| Cycling | 0.7 |
| Private vehicle | 81.6 |
| Public transport | 0.7 |
| Walking/cycling (trip/week) | 1.06 ± 1.91 |
| Active commuting to/from school (%) | 71.7 |
| Never | 11.3 |
| Sometimes (1-4 trips/week) | 17.0 |
| Daily (≥5 trips/week) | |

Individual barriers to children's ASC

Figure 1 indicates that the majority of parents believe their children 'do not dare to go to school alone' (60.3%). About a quarter of parents (28.4%) perceived that their children are 'too lazy to move' as the reason for not walking or cycling to and from school. Other barriers, but not significant, include laziness, disability, and illness. Table 3 reveals that among those barriers, 'do not dare to go to school alone' is the only barrier that is significantly associated with active school commuting among children (P -value <0.005).

The perceived safety of travel and neighborhood has been found as a mediating factor for the parental decision to allow their children to go to school actively by walking or cycling (Wangzom et al., 2023). In this study, although the average home-school distance is relatively short (less than 2.5 km), more than half of the students do not dare to go to school alone. A qualitative study involving parents of children aged 7-12 revealed that parents' perception of risk, such as getting injuries while walking or cycling to school, may hinder children's ability to utilise

active school commuting (Lindqvist et al., 2023).

A study among primary school children in Granada, Spain, found that children may have individual motivational barriers and social support barriers higher than their parents (Aranda-Balboa et al., 2021). While their parents are more concerned about child safety (e.g., home-school distance, traffic safety, crime-related safety), the children have more individual barriers, such as laziness, low motivation, and fear of going to school alone (Aranda-Balboa et al., 2021). These individual barriers are significantly associated with lower ASC (Aranda-Balboa et al., 2021). A study among primary school children in Texas, the United States, found that children's self-efficacy, such as emotional states and social modeling, affected ASC (Lu et al., 2015). Interestingly, parents' self-efficacy toward ASC had a stronger influence on children's active school commuting behavior. Individual health status, enjoyment, knowledge of the road, and discomfort may also influence children's ASC. The impact of parental safety concerns on children's ASC may decrease as children

age. Future interventions need to attenuate the perceived safety of both children and parents, as well as improve

self-efficacy toward ASC among both populations.

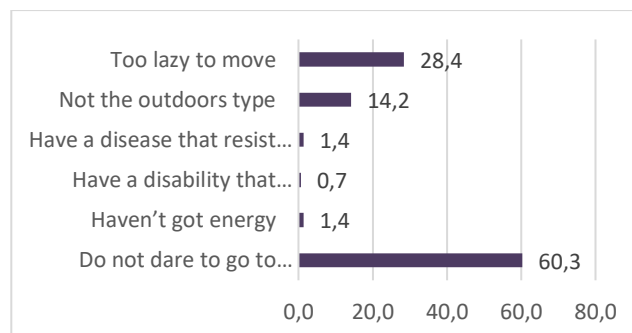


Figure 1. Individual factors for children's ASC (%).

Table 3. Individual factors associated with ASC.

| Individual factors | ASC | | P-value |
|--|--------|---------|---------|
| | No (%) | Yes (%) | |
| Do not dare to go to school alone | | | |
| Yes | 90.6 | 9.4 | 0.000** |
| No | 42.9 | 57.1 | |
| Haven't got energy | | | |
| Yes | 50 | 50 | 0.491* |
| No | 71.7 | 28.3 | |
| Have a disability that resists movement | | | |
| Yes | 0 | 100 | 0.279* |
| No | 72.7 | 27.3 | |
| Have a disease that resists movement | | | |
| Yes | 50 | 50 | 0.488* |
| No | 71.9 | 28.1 | |
| Not the outdoors type | | | |
| Yes | 70 | 30 | 1.000 |
| No | 71.9 | 28.1 | |
| Too lazy to move | | | |
| Yes | 92.5 | 7.5 | 0.460 |
| No | 97 | 3 | |

*Fisher exact test

**Statistically significant

Social barriers to children's ASC

Figure 2 shows that most of the participants perceived that their children 'having many friends in the neighborhood' (78%), 'having friends for going to school together' (78%), 'knowing many people in the neighborhood' (70.9%), and 'living in a close-knit neighborhood' (64.5%) as facilitator for ASC. However, they are afraid of street crime (75.9%). It indicates that the parents and children are socializing yet expressing concern about

their child's safety during school commutes. Table 4 shows that 'having friends for going to school' and 'being afraid of street crime' are the significant factors for ASC among children (P -value<0.005). Contextual factors such as parent's safety concern have been revealed as a consistent factor for ASC among school children aged 6-12 years old (Lam et al., 2023). According to McMillan's framework of the Elementary-Aged Child's Travel Behavior, neighborhood safety, traffic safety, and household

transportation options are the mediated factors created by the physical/built environment (McMillan, 2016). These mediating factors, along with the moderating factors (social/cultural norms, parental attitudes, sociodemographic) may influence parental decision-making that allow or do not allow the children to have an active travel to go to and back from their school (McMillan, 2016).

Parental concerns may positively be influenced by the physical environment if it provides adequate facilities (e.g., walkability features, bike facilities). A study among secondary school students in Blitar, Indonesia, found that students' bike ownership may be positively associated with their ASC (Budiman et al., 2020). Conversely, parental decisions may also be negatively influenced by high car ownership, street crime, and unsafe roads. A study among secondary school students in Central Jakarta found that parents' car ownership is negatively associated with

ASC (Argarima & Naipospos, 2023). In Australia, despite the close distance between house and school, parents decide to transport their children to and from school by car due to its speed, safety, and convenience, aligning with their family's schedule.

Moreover, parents' demographics, such as education level and work status, may also affect ASC among children. In this study, more than half of the mothers of the students are housewives with low to middle education levels. A finding from a study among primary school students in the United States suggested that mothers' worries about traffic conditions in the area can discourage children from engaging in ASC (Sener et al., 2019). Nevertheless, a flexible parents' work environment, particularly for mothers, is positively associated with ASC among children (Sener et al., 2019).

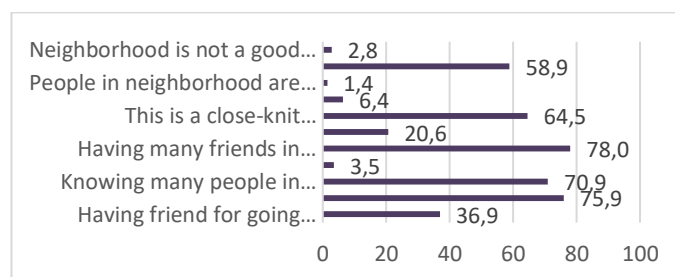


Figure 2. Social factors for children's ASC (%).

Environmental barriers to children's ASC

This research shows that most parents perceived that their neighborhoods are comfortable and safe for walking (65.2%) and cycling (58.2%), and have many alternative routes (53.9%) that may support their children in actively going to school by walking or biking. However, more than half of parents indicate that the roads in their neighborhood have no adequate pedestrian/footpath (57.4%) and traffic light for crossing (51.7%). In addition, one-third (33.3%) of the parents indicate that public transportation in their city is inadequate. Then, it shows that inadequacy of public transport, broken roads, and school distance are the physical environmental factors significantly associated with ASC among children (P -value <0.005). Traditionally, physical environment has been considered as a primary factor for ASC (Lam et al., 2023). In Indonesia, the physically active built

environment has been associated with ASC, such as distance from home to school (Argarima & Naipospos, 2023), and inadequacy or low quality of public transport (Yumita et al., 2020). As the basic factors of ASC, built environment and urban planning may influence home-school distance and parents' perceived safety (McMillan, 2016). Again, perceived neighborhood safety, travel safety, and distance to school have been found theoretically as mediating factors of parental decisions on their children's ASC. It is suggested that schools should be situated in areas with high population density to enable a larger number of children to commute to school by walking and cycling (Wangzom et al., 2023).

School zonation is an example of a promising strategy that may reduce distance to school and improve parental perceived neighborhood safety to promote students having more walking and cycling

to school, as found in Surakarta (Lestari & Dewanti, 2021) and Central Jakarta (Argarima & Naipospos, 2023), Indonesia. It is also suggested to design interventions to promote children's ASC by including modifications to the physical environment (e.g., pedestrian infrastructure close to schools) and developing secure pathways for students to commute to school to alleviate parental concerns over road safety (Hume et al., 2009). The current results support the policymakers to tailor effective interventions and policies for children about ASC.

Efforts to promote active transportation for children should emphasize the societal advantages, such as the chance to interact with peers, through educational initiatives. Furthermore, the implementation of school-based intervention to promote walking for students who live near the school or cycling for students residing farther from school, and establishing designated drop-off spots along a secure walking path to school could effectively enhance the utilization of ASC among children (Dalton et al., 2011). Given that ASC can account for 25% of children's overall daily moderate-to-vigorous physical activity, it is suggested that schools promote physical activity either before or after school, as well as during school hours through physical education classes and active recess (World Health Organization, 2021).

CONCLUSION

The prevalence of ASC among primary school children in several urban areas in Indonesia is 28.3%, much lower than those found among children around the world. Various psychosocial factors (individual, social, and environmental factors) are associated with children's active commuting. These findings have significant implications for policymakers in terms of locating schools within neighborhoods and ensuring they are within a reasonable walking distance for the majority of students. In addition, the result of this study demonstrated the importance of reducing the negative perceptions of children and their parents toward travel safety to encourage ASC. It is important to create solutions tailored to individual obstacles and involve both children and their parents.

REFERENCES

- Adepoyibi, T., Dixon, H., Gidding, H., Taylor, R., & Morley, B. (2022). Trends and determinants of active school travel among Australian secondary school students: national cross-sectional data from 2009 to 2018. *Australia and New Zealand Journal of Public Health*, 46(6), 800-806. <https://doi.org/10.1111/1753-6405.13315>
- Alkhalwaldeh, A., Omari, O. A., Bashtawy, M. A., Khatatbeh, M., Suliman, M., Abdalrahim, A., Qaddumi, J., Ibrani, A., Bashtawy, B. A., Ayed, A., Alsaraireh, M., Khraisat, O., Dammerly, K. A., & Bashtawy, S. d. A. (2021). School Students' Physical Activity: Physical Activity and Its Contributing Factors in Young People. *Journal of Hunan University (Natural Sciences)*, 48(9), 466-473.
- Aranda-Balboa, M. J., Chillón, P., Saucedo-Araujo, R. G., Molina-García, J., & Huertas-Delgado, F. J. (2021). Children and Parental Barriers to Active Commuting to School: A Comparison Study. *International Journal of Environmental Research and Public Health*, 18(5). <https://doi.org/10.3390/ijerph18052504>
- Argarima, A., & Naipospos, B. P. (2023). Strategi Kebijakan Transportasi dalam Rangka Peningkatan Penggunaan NonMotorized Transport Pelajar Sekolah Menengah di Jakarta Pusat. *Jurnal Birokrasi dan Pemerintahan*, 5(2).
- Biddle, S. J. H., Ciacconni, S., Thomas, G., & Vergeer, I. (2019). Physical activity and mental health in children and adolescents: An updated review of reviews and an analysis of causality. *Psychology of Sport and Exercise*, 42, 146-155. <https://doi.org/10.1016/j.psychsport.2018.08.011>
- Bidzan-Bluma, I., & Lipowska, M. (2018). Physical Activity and Cognitive Functioning of Children: A Systematic Review. *Int J Environ Res Public Health*, 15(4). <https://doi.org/10.3390/ijerph15040800>
- Budiman, A., Wibisono, B. H., & Keiichi, O. (2020). Effectiveness of bike to

- school policy for junior high school students in Blitar Municipality, Province of East Java, Indonesia. *Inovasi Pembangunan - Jurnal Kelitbangan*, 8(3).
- Chillon, P., Martinez-Gomez, D., Ortega, F. B., Perez-Lopez, I. J., Diaz, L. E., Veses, A. M., Veiga, O. L., Marcos, A., & Delgado-Fernandez, M. (2013). Six-year trend in active commuting to school in Spanish adolescents. The AVENA and AFINOS Studies. *Int J Behav Med*, 20(4), 529-537. <https://doi.org/10.1007/s12529-012-9267-9>
- Craw, J. (2018). *Statistic of the Month: How Much Time do Students Spend in School?* Retrieved from <https://ncee.org/quick-read/statistic-of-the-month-how-much-time-do-students-spend-in-school/>
- Dalton, M. A., Longacre, M. R., Drake, K. M., Gibson, L., Adachi-Mejia, A. M., Swain, K., Xie, H., & Owens, P. M. (2011). Built environment predictors of active travel to school among rural adolescents. *American Journal of Preventative Medicine* 40(3), 312-319. <https://doi.org/10.1016/j.amepr.2010.11.008>
- Gao, Z., Chen, S., Sun, H., Wen, X., & Xiang, P. (2018). Physical Activity in Children's Health and Cognition. *BioMed Research International*, 2018, 8542403. <https://doi.org/10.1155/2018/8542403>
- Gonzalez, S. A., Aubert, S., Barnes, J. D., Larouche, R., & Tremblay, M. S. (2020). Profiles of Active Transportation among Children and Adolescents in the Global Matrix 3.0 Initiative: A 49-Country Comparison. *International Journal of Environmental Research in Public Health*, 17(16). <https://doi.org/10.3390/ijerph17165997>
- Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2020). Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1.6 million participants. *Lancet Child Adolescent Health*, 4(1), 23-35. [https://doi.org/10.1016/S2352-4642\(19\)30323-2](https://doi.org/10.1016/S2352-4642(19)30323-2)
- Health Research and Development, I. M. o. H. (2013). *National Basic Health Survey 2013*.
- Health Research and Development, I. M. o. H. (2018). *National Basic Health Survey 2018*.
- Hills, A. P., & Cambourne, B. (2002). Walking to school—A sustainable environmental strategy to prevent childhood obesity. *Australasia Epidemiology*, 9(2).
- Hume, C., Timperio, A., Salmon, J., Carver, A., Giles-Corti, B., & Crawford, D. (2009). Walking and cycling to school: predictors of increases among children and adolescents. *American Journal of Preventative Medicine*, 36(3), 195-200. <https://doi.org/10.1016/j.amepr.2008.10.011>
- Janssen, I., & LeBlanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, 7(40), 1-16.
- Lam, H. Y., Jayasinghe, S., Ahuja, K. D. K., & Hills, A. P. (2023). Active School Commuting in School Children: A Narrative Review of Current Evidence and Future Research Implications. *International Journal of Environmental Research in Public Health*, 20(20). <https://doi.org/10.3390/ijerph20206929>
- Lestari, S., & Dewanti. (2021). Preferensi Pemilihan Moda Transportasi Siswa Sebelum dan Sesudah Pemberlakuan Kebijakan Zonasi Layanan Pendidikan. *Jurnal Penataan Ruang*, 16(2), 59-70.
- Lindqvist, A.-K., Lugnet, J., Niska, A., & Rutberg, S. (2023). One should really be more worried about too little physical activity than injuries while walking or cycling to school. Parents' perception of risk concerning active school transportation. *Journal of Transport & Health*, 29. <https://doi.org/10.1016/j.jth.2023.101573>
- Lu, C., Stolk, R. P., Sauer, P. J., Sijtsma, A., Wiersma, R., Huang, G., &

- Corpeleijn, E. (2017). Factors of physical activity among Chinese children and adolescents: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*14(1), 36. <https://doi.org/10.1186/s12966-017-0486-y>
- Lu, W., McKyer, E. L., Lee, C., Ory, M. G., Goodson, P., & Wang, S. (2015). Children's active commuting to school: an interplay of self-efficacy, social economic disadvantage, and environmental characteristics. *International Journal of Behavioral Nutrition and Physical Activity* 12, 29. <https://doi.org/10.1186/s12966-015-0190-8>
- Mantjes, J. A., Jones, A. P., Corder, K., Jones, N. R., Harrison, F., Griffin, S. J., & Sluijs, E. M. v. (2012). School related factors and 1yr change in physical activity amongst 9-11 year old English schoolchildren. *International Journal of Behavioral Nutrition and Physical Activity*, 9(153), 1-12.
- McMillan, T. E. (2016). Urban Form and a Child's Trip to School: The Current Literature and a Framework for Future Research. *Journal of Planning Literature*, 19(4), 440-456. <https://doi.org/10.1177/0885412204274173>
- Reimers, A. K., Marzi, I., Schmidt, S. C. E., Niessner, C., Oriwol, D., Worth, A., & Woll, A. (2021). Trends in active commuting to school from 2003 to 2017 among children and adolescents from Germany: the MoMo Study. *European Journal of Public Health*, 31(2), 373-378. <https://doi.org/10.1093/eurpub/ckaa141>
- Savolainen, E., Lindqvist, A. K., Mikaelsson, K., Nyberg, L., & Rutberg, S. (2024). Children's active school transportation: an international scoping review of psychosocial factors. *Systematic Reviews*, 13(1), 47. <https://doi.org/10.1186/s13643-023-02414-y>
- Sener, I. N., Lee, R. J., & Sidharthan, R. (2019). An examination of children's school travel: A focus on active travel and parental effects. *Transportation Research Part A: Policy and Practice*, 123, 24-34. <https://doi.org/10.1016/j.tra.2021.05.023>
- Shao, T., Verma, H. K., Pande, B., Costanzo, V., Ye, W., Cai, Y., & Bhaskar, L. (2021). Physical Activity and Nutritional Influence on Immune Function: An Important Strategy to Improve Immunity and Health Status. *Frontiers in Physiology*, 12, 751374. <https://doi.org/10.3389/fphys.2021.751374>
- Wangzom, D., White, M., & Paay, J. (2023). Perceived Safety Influencing Active Travel to School-A Built Environment Perspective. *International Journal of Environmental Research in Public Health*, 20(2). <https://doi.org/10.3390/ijerph2021026>
- World Health Organization. (2021). *Promoting physical activity through schools: a tool kit*. Geneva: World Health Organization.
- Wyszynska, J., Ring-Dimitriou, S., Thivel, D., Weghuber, D., Hadjipanayis, A., Grossman, Z., Ross-Russell, R., Deren, K., & Mazur, A. (2020). Physical Activity in the Prevention of Childhood Obesity: The Position of the European Childhood Obesity Group and the European Academy of Pediatrics. *Frontiers in Pediatrics*, 8, 535705. <https://doi.org/10.3389/fped.2020.535705>
- Yumita, F. R., Irawan, M. Z., & Malkhamah, S. (2020). Faktor Keengganan Pelajar Menggunakan Angkutan Umum dalam Perjalanan ke Sekolah. *Jurnal Aplikasi Teknik Sipil*, 18(2).
- Zhu, X., Arch, B., & Lee, C. (2008). Personal, social, and environmental correlates of walking to school behaviors: case study in Austin, Texas. *Scientific World Journal*, 8, 859-872. <https://doi.org/10.1100/tsw.2008.63>

Mini Poster Education on Toddler Nutrition Toward Mother's Knowledge and Attitudes in Batusari Brebes Village

Milhatul Azizah✉¹⁾, Rakhmat Susilo¹⁾

¹ Undergraduate Nursing Study, Program, Faculty of Health Sciences, Muhammadiyah University Purwokerto, Purwokerto, Central Java, Indonesia 53181

✉Email: mieelhaazizah124@gmail.com

ABSTRACT

Background: Nutrition is important to support the growth and development of toddlers. Toddlers are an age group that is very susceptible to nutritional disorders because, at the toddler age, the nutrition required is greater for growth and development. **Objectives:** This research aimed to determine the effect of educational mini posters on toddler nutrition on mothers' knowledge and attitudes in Batusari Village. **Methods:** This research used a quantitative design with a pre-experimental design, with one group, a pretest, and a post-test. There were 40 samples in the research of mothers with toddlers aged 1-5 years. Samples were taken using total sampling. The instrument used was a questionnaire and the test used was the Wilcoxon test. **Results:** The results of the Wilcoxon statistical test obtained a p-value of 0.000, which means $p < 0.05$, to determine the results of the intervention before and after being given education using mini-poster media. The results of the study showed that the average knowledge before being given the mini-poster intervention obtained a value of 4.70, after being given the mini-poster intervention the knowledge score was 9.53, and the average attitude score before being given the mini-poster intervention was 33.48 And after being given the mini-poster intervention the attitude score was 47.75. **Conclusion:** There is a difference in the effect of providing education to mothers of toddlers using media such as posters compared to providing education without using media.

Keywords: Attitudes, Knowledge, Mini Poster, Mother's, Toddler Nutrition.

INTRODUCTION

The World Health Organization (WHO) found that, in 2018, Indonesia was the third country with the highest prevalence in the Southeast Asian region of stunting under five after Timor Leste (50.5%), and India (38.4%) at 36.4%. In Indonesia, from 2014 to 2018, the number of children aged 0-59 months who experienced stunting tended not to experience significant changes, in 2014 the percentage was 28.9%, and in 2018 the percentage was 29.6% (Al Amin, 2017).

Based on data from the Indonesian Nutrition Status Survey (SSGI) released by the Ministry of Health, in 2022, the prevalence of stunting in Indonesia will decrease by 2.8% compared to 2021 from 24.4% to 21.6%. In 2018, the rate of malnutrition among children under five reached 3.9%, undernutrition was 13.8%, and stunting was 30.8% (Ministry of Health of the Republic of Indonesia, 2017). The same results show that, in 2019, the number of children under five with malnutrition reached 3.9%, malnutrition

13.8%, and stunting 27.67% (Siswati, 2022). In terms of the prevalence of obesity among children under five in Indonesia, the figure is 11.5%, and the country is ranked 21st in the world in this regard. Cases of malnutrition in Central Java Province were 3.7%, while malnutrition among toddlers decreased to 5.4%. According to the 2019 Central Java Province Health Profile information, the prevalence of underweight toddlers based on BB/TB in the Wonogiri Regency reached 3.0% (Han et al., 2022).

Toddlers must pay attention to their nutritional needs from an early age because this is the "golden period" for growth and development, and if disturbances occur during this period it will hurt the quality of the next generation (Abiyoga, 2019; Ironside & Spurlock Jr, 2014; Lipsey & Wilson, 2017). Toddlers with nutritional problems can experience delays in their growth and development as well as incomplete and protracted nutrition which is related to the health, growth, susceptibility to infectious infections, and intelligence of toddlers

(Balasundaram & Avulakunta, 2021). Lack of nutrition education is one of the causes of the high rate of nutritional disorders among toddlers in Indonesia (Siswati, 2022). The nutritional status of toddlers can be influenced by mothers' lack of nutrition knowledge, and it is difficult for them to choose nutritious food for their children (Clark et al., 2020). Lack of nutrition knowledge can be a determining factor because of the mother's attitude or behavior when choosing food for toddlers, as well as toddlers' eating patterns which include the amount, type, and frequency that will influence toddlers' food intake and their nutritional status (Cook, 2011; McKinney, 2014).

Mothers' lack of understanding regarding nutrition in toddlers can result in a lack of nutritional intake needed by the toddler (Forh et al., 2022). Knowledge has a crucial role in shaping a person's behavior (Patel et al., 2018), including how they meet nutritional needs (Clifford et al., 2015; Hamulka et al., 2018). Previous research has indicated that when a mother has a limited understanding of nutrition, the food given to toddlers tends not to meet their needs and the impact can affect the toddler's health condition (Cheng et al., 2016; Ferreira-Maia et al., 2016; Vardanjani et al., 2015). Mothers who have wide access to various sources of information will tend to have richer knowledge regarding toddler nutrition compared to mothers who have limited knowledge. Mothers' knowledge about how to provide balanced nutritional intake for toddlers plays an important role. Such knowledge can guide mothers in monitoring the growth and development of toddlers by providing balanced food, according to the nutritional needs of the child. By maintaining a balance in nutritional intake, the nutritional condition of toddlers can be within the normal range and the incidence of malnutrition in children under five can be minimized (O'Brien et al., 2014; Savage et al., 2016; Verhage et al., 2018).

METHODS

Based on data collection, the respondent population in this study was 40 mothers who had babies aged 1 to 5 years. The research design used by this researcher is a pre-experimental method with a one-group pretest-posttest design

with a total sampling technique. Total sampling is a sampling strategy where the entire population is represented in the sample. This research was carried out from October 2022 to July 2023 in Batusari Village, Sirampog District, Brebes Regency.

This research flow has three stages, namely: Preparation Stage, Implementation Stage, and Completion Stage. The preparation stage is the first step that must be taken to arrange permits in the Batusari sub-district. Then the next step is to consult with the head of the RT to determine the research schedule, the second stage is the implementation stage. At this stage, an initial test is carried out, namely a pretest on respondents to determine the mother's knowledge and attitudes toward toddler nutrition, the next step is to provide education using mini posters to respondents and the final step is giving a final test, namely a posttest, to respondents who have been given education through mini posters to find out the final results. The third stage is the final stage, after all the data have been collected, the data will be processed and analyzed and then a hypothesis test will be carried out to find out whether the hypothesis that has been made is accepted or rejected.

| | | |
|----------------|----------------|----------------|
| (pretest) | (intervention) | (posttest) |
| O ₁ | X | O ₂ |

Information:

- O₁: Mother's knowledge and attitudes toward toddler nutrition before being given a mini poster educational intervention (Kusaka et al., 2016).
- X: Providing mini-poster educational interventions (Alam, 2019).
- O₂: Knowledge after being carried out and mothers' attitudes toward toddler nutrition after being given a mini poster educational intervention.

RESULTS AND DISCUSSION

Based on data collection and sample size in this study, 40 respondents had toddlers aged 1-5 years. Researchers observed respondents who had toddlers aged 1-5 years, then researchers gave a pretest of knowledge and attitudes to respondents with a questionnaire on mothers' knowledge and attitudes toward the importance of toddler nutrition on March 3-7 2023. Then education was

conducted using mini posters for respondents on March 8-11, 2023, and finally a posttest was carried out on March 13-17, 2023, after providing education, researchers were able to see the development of respondents' knowledge of toddler nutrition.

Based on Rosdiana's (2022) research, a person's attitude is influenced by the source of information obtained. The right source of information will improve health behavior. The mother's attitude regarding nutrition at the age of 1-5 years will influence the mother's behavior in providing nutritional balance to the child. From the results of this research, health education influences mothers' attitudes about nutrition in children aged 1-5 years. This is because mothers who have received health education have a more positive attitude. Apart from that, before this research, mothers tended to be negatively aware that they did not want to participate in Posyandu activities and tended to be less likely to check their children's nutritional status at the Community Health Center. The lack of knowledge about nutrition in children also influences community attitudes. Therefore, there is a need for health education about nutrition to increase information and increase maternal awareness of children aged 1-5 years.

Posters are a publication medium that combines writing, images, or a combination of both to provide information to the public. According to the Big Indonesian Dictionary (KBBI), posters are placards placed in public places through announcements or advertisements. Posters are usually installed in busy and strategic areas. Due to its inviting nature, it is very important to place the poster in a place that is easily seen (Megawati, 2017).

Like other media for conveying information, posters also have characteristics, including:

- 1) Immediately attract attention when seen by people.

- 2) Use concise, clear and easy-to-understand language.

- 3) Contains persuasive or invitational sentences.

- 4) Use drawings/sketches/paintings and color combinations.

- 5) Can leave an impression, even if read while passing by.

- 6) Installed on a flat surface and in a strategic location or a public place.

- 7) Consists of letters, numbers, symbols, images, or a combination thereof.

- 8) Designed on paper or cloth.

Poster Purpose:

- 1) So that mothers know about the activities or events that will be held.

- 2) To make products or services known and used by the public.

- 3) To remind mothers about things that must be done.

- 4) To remind mothers to avoid things that are detrimental to themselves and others.

Judging from the content inside, posters can be classified into several types, namely:

- 1) Commercial posters, namely posters created to offer goods or services.

- 2) Community service posters are posters that contain information to educate the general public about something.

- 3) Activity posters are a medium for telling about an activity that will be held.

- 4) Educational posters, namely posters that have the aim of educating the public, usually related to the world of education and installed in schools.

The results of the study showed the knowledge and attitudes of respondents who had toddlers aged 1-5 years who had been given the toddler nutrition mini poster intervention experienced an increase in knowledge and attitudes. So it can be concluded that knowledge and attitudes in reducing maternal knowledge and attitudes toward toddler nutrition in Batusari Village can increase if the behavior provided uses mini poster media.

The influence of toddler nutrition education mini posters on mothers' knowledge and attitudes, is achieved by which there are educational mini posters given to respondents. The results of the research show that there is an influence on mothers' knowledge and attitudes toward toddler nutrition, namely there is an influence and attitude toward the use of poster and video media (Nanlohy et al., 2021).

1. Univariate Analysis

a. Respondent Characteristics

Based on the characteristics of the respondents in this study, including age, occupation, and education in Batusari village.

Table 1. Frequency distribution of characteristics of mothers of toddlers.

| Characteristics | N | % |
|-----------------|----|------|
| Age | | |
| 20-25 years | 13 | 32.5 |
| 26-30 years old | 8 | 20.0 |
| 31-35 years old | 10 | 25.0 |

| | | |
|-----------------------|----|------|
| 36-40 years old | 9 | 22.5 |
| Total | 40 | 100 |
| Work | | |
| a. Housewife | 19 | 47.5 |
| b. Farmer | 17 | 42.5 |
| c. Trader | 2 | 5.0 |
| d. Teacher | 2 | 5.0 |
| Total | 40 | 100 |
| Education | | |
| a. Elementary school | 26 | 65.0 |
| b. Junior High School | 8 | 20.0 |
| c. Senior High School | 4 | 10.0 |
| d. College | 2 | 5.0 |
| Total | 40 | 100 |

Based on Table 2, the sample used in this study was 40 mother respondents who had toddlers aged 1-5 years. The largest number of respondents was 13 respondents aged 20-25 years (32.5), 10 respondents aged 31-35 years (25.0), nine respondents aged 36-40 years (22.5), and 26-30 years (20.0). The job characteristics of the respondents were mostly housewives with 19 respondents (47.5), farmers with 17 respondents (42.5), traders with two respondents (5.0), and teachers with two respondents (5.0). Educational characteristics were dominated by respondents, mostly elementary school, with 26 respondents (65.0). SMP as many as eight respondents (20.0). SMA has as many as four respondents (10.0) and two respondents (5.0) namely universities.

b. Pretest - Posttest Mother's Knowledge of Toddler Nutrition

Below are the results of data analysis of differences in mothers' knowledge level scores regarding toddler nutrition in Batusari Village before and after being given mini-poster education on toddler nutrition.

Table 2. Knowledge scores before and after being given the intervention.

| Parameter | Mean elementary school | Min | Max |
|--------------------|------------------------|-----|-----|
| Knowledge Pretest | 4.70 1.682 | 2 | 8 |
| Knowledge Posttest | 9.53 640 | 8 | 10 |

Based on Table 2, the results of the pretest analysis above, the average value is 4.70 the minimum value is 2 and the maximum value is 8. The posttest value is 9.53 with a minimum value of 8 and a maximum value of 10.

Table 3. Pretest - posttest knowledge categories.

| Category | Pretest n % | Posttest n % |
|------------|----------------|-----------------|
| Good | 2 5.0 | 40 100.0 |
| Enough | 19 47.5 | 0 0 |
| Not enough | 19 47.5 | 0 0 |
| Total | 40 100.0 | 40 100.0 |

Based on Table 3, the results show that the level of knowledge before and after the intervention is carried out is different; this is proven by the results of the pretest and posttest which are in the increasing category. The good category which initially had two (5.0%) respondents became 40 (100.0%) respondents, the sufficient category which initially had 19 (47.5%) respondents became 0 (0%) respondents and the poor category which initially had 19 (47.5%) respondents became 0 (0%) respondents.

c. Posttest Mother's Attitudes toward Toddler Nutrition

Below are the results of data analysis of differences in mothers' attitude scores toward toddler nutrition in the Batusari sub-district before and after being given mini-poster education on toddler nutrition.

Table 4. Attitude scores before and after being given the intervention.

| Parameter | Mean elementary school | Min | Max |
|-------------------|------------------------|-----|-----|
| Attitude Pretest | 33.48 2,309 | 28 | 39 |
| Attitude Posttest | 47.75 1,056 | 46 | 50 |

Based on Table 4, the results of the pretest analysis above show the average value is 33.48, with a minimum value of 28 and a maximum value of 39. The posttest value has an average value of 47.75 with a minimum value of 46 and a maximum value of 50.

Based on Rosdiana's (2022) research, a person's attitude is influenced by the source of the information obtained. The

right source of information will improve health behavior. The mother's attitude regarding nutrition at the age of 1-5 years will influence the mother's behavior in providing nutritional balance to the child. From the results of this research, there is an influence of health education on mothers' attitudes about nutrition in children aged 1-5 years. This is because mothers who have received health education have a more positive attitude. Apart from that, before this research, mothers tended to have a negative awareness that they did not want to take part in Posyandu activities and tended to be less likely to check their children's nutritional status at the Community Health Center. Community attitudes are also influenced by the lack of knowledge about nutrition in children. Therefore, there is a need for health education about nutrition to increase information and increase maternal awareness of children aged 1-5 years.

Table 5. Pretest - posttest attitude categories.

| Category | Pretest n % | Posttest n % |
|------------|----------------|-----------------|
| Good | 11 27.5 | 40 100.0 |
| Enough | 29 72.5 | 0 0 |
| Not enough | 0 0 | 0 0 |
| Total | 40 100.0 | 40 100.0 |

Based on Table 5, the results show that attitudes before and after the intervention were carried out had differences; this was proven by the results of the pretest and posttest which had increased categories.

The good category, which initially had 11 (27.5%) respondents, became 40 (100.0%) respondents, the sufficient category, which initially had 29 (72.5%) respondents, became 0 (0%) respondents and the poor category, which initially had 0 (0%) respondents, became 0 (0%) respondents.

2. The influence of toddler nutrition mini poster education on mothers' knowledge and attitudes.

- a. Normality test

The normality test aims to determine whether the data population is regularly distributed or not. In this work, the normality test was carried out after a sample of pretest and posttest, and the results were calculated using the

Shapiro-Wilk test with $\text{sig} > 0.05$. The pretest and posttest normality tests of the research sample produced the following anticipated results.

Table 6. Pretest and posttest normality test results.

| | Results | Normal Criteria | Conclusion |
|---|---------|--------------------|------------|
| Score before education mini poster knowledge | 059 | >0.05 | Normal |
| Score after being given mini poster knowledge education | 000 | >0.05 | Abnormal |
| Score before education mini poster attitude | 064 | >0.05 | Normal |
| Score after being given mini poster attitude education | 000 | >0.05 | Abnormal |

Based on Table 6, it is known that the pretest knowledge value is 0.59, posttest knowledge 0.00, and pretest attitude 0.64, posttest attitude 0.00. This shows that the knowledge pretest $\text{sig} > 0.05$ is normally distributed, the knowledge posttest $\text{sig} < 0.05$ is abnormally distributed and the attitude pretest $\text{sig} > 0.05$ is normally distributed, and the attitude posttest $\text{sig} < 0.05$ is distributed abnormally.

The results of the study showed the knowledge and attitudes of respondents who had toddlers aged 1-5 years who had been given the toddler nutrition mini poster intervention experienced an increase in knowledge and attitudes. So it can be concluded that knowledge and attitudes in reducing maternal knowledge and attitudes toward toddler nutrition in Batusari Village can increase if behavior is given using mini poster media.

- b. Bivariate Test

This study uses the Wilcoxon Signed Rank Test statistic for this bivariate test. Information

from the results of the Wilcoxon test is as follows:

Table 7. Distribution of mothers' knowledge and attitudes before and after being given mini poster education on toddler nutrition.

| Group | N | Z value | p-value |
|----------------------------|----|---------|---------|
| Pretest-posttest knowledge | 40 | -5,542 | 000 |
| Pretest-posttest attitude | 40 | -5,524 | 000 |

Based on the results of the Wilcoxon test in Table 7, in the pretest-posttest, mothers' knowledge and attitudes toward toddler nutrition obtained a p-value significance of 0.000 (< 0.05), and the hypothesis in this study H_a was accepted and H_o was rejected, which means there is an effect of mini poster education on toddler nutrition on mothers' knowledge and attitudes in Batusari Village, Sirampog District, Brebes Regency.

For research on the Effect of Toddler Nutrition Mini Poster Education on Mothers' Knowledge and Attitudes, where mini posters were given to respondents, the results of the research showed that there was an influence on mothers' knowledge and attitudes toward toddler nutrition. This research is in line with previous research (Nanlohy et al., 2021), namely the influence and attitudes toward posters and videos.

Intervention in obtaining maternal knowledge and attitudes after providing intervention with education about health is likely to be done through various types of media, one of which is media that combines elements of images and sound when conveying messages or information. The advantage of using this type of media is that it provides a clearer picture and effectively increases our ability to remember information because it is more interesting and easier to remember posters (Lestari & Sundayani, 2020).

The limitations of this research were that it was conducted door to door. Sometimes respondents are not at home or are doing other work. The researchers also had difficulty finding the address of each respondent. When taking photos for documentation, many respondents were embarrassed to be photographed or didn't even want to be photographed.

CONCLUSION

Based on the results of the studies and analyses that have been carried out, it can be concluded that the age characteristics of most of the respondents who were discussing of research on an educational mini poster are between 20-25 years old. Mothers' knowledge of toddler nutrition before being given a mini-poster education had a mean of 4.70 and the mean after being given a mini-poster education was 9.53. This means an increase of 4.83 in the average attitude of mothers toward toddler nutrition before being given a mini-poster education was 33.48 and the average after being given a mini-poster education was 47.75. The results show that providing intervention using mini-poster media is more effective in increasing the mother's knowledge and attitudes toward toddler nutrition compared to interventions not using mini-poster media as evidenced by the results of the Wilcoxon test.

REFERENCES

- Abiyoga, A. (2019). Hubungan Antara Keaktifan Ibu Dalam Kegiatan Posyandu Dengan Status Gizi Balita. *Jurnal Medika: Karya Ilmiah Kesehatan*, 4(1), 1-9.
- Al Amin, M. (2017). Klasifikasi kelompok umur manusia berdasarkan analisis dimensi fraktal box counting dari citra wajah dengan deteksi tepi canny. *MATHunesa: Jurnal Ilmiah Matematika*, 5(2).
- Alam, T. G. M. R. (2019). Comparative analysis between pre-test/post-test model and post-test-only model in achieving the learning outcomes. *Pakistan Journal of Ophthalmology*, 35(1).
- Balasundaram, P., & Avulakunta, I. D. (2021). *Human growth and development*.
- Cheng, E. R., Park, H., Wisk, L. E., Mandell, K. C., Wakeel, F., Litzelman, K., Chatterjee, D., & Witt, W. P. (2016). Examining the link between women's exposure to stressful life events prior to conception and infant and toddler health: the role of birth weight. *J Epidemiol Community Health*, 70(3), 245-252.

- Clark, C., Crumpler, C., & Notley, H. (2020). Evidence for environmental noise effects on health for the United Kingdom policy context: a systematic review of the effects of environmental noise on mental health, wellbeing, quality of life, cancer, dementia, birth, reproductive outcomes, and cognition. *International Journal of Environmental Research and Public Health*, 17(2), 393.
- Clifford, D., Ozier, A., Bundros, J., Moore, J., Kreiser, A., & Morris, M. N. (2015). Impact of non-diet approaches on attitudes, behaviors, and health outcomes: A systematic review. *Journal of Nutrition Education and Behavior*, 47(2), 143-155.
- Ferreira-Maia, A. P., Matijasevich, A., & Wang, Y.-P. (2016). Epidemiology of functional gastrointestinal disorders in infants and toddlers: a systematic review. *World Journal of Gastroenterology*, 22(28), 6547.
- Forth, G., Apprey, C., & Agyapong, N. A. F. (2022). Nutritional knowledge and practices of mothers/caregivers and its impact on the nutritional status of children 6-59 months in Sefwi Wiawso Municipality, Western-North Region, Ghana. *Heliyon*, 8(12).
- Hamulka, J., Wadolowska, L., Hoffmann, M., Kowalkowska, J., & Gutkowska, K. (2018). Effect of an education program on nutrition knowledge, attitudes toward nutrition, diet quality, lifestyle, and body composition in Polish teenagers. The ABC of healthy eating project: Design, protocol, and methodology. *Nutrients*, 10(10), 1439.
- Han, S., Zhang, A., Xie, Y., & Liu, Y. (2022). Construction of Family-School-Unity Mental Health Education Model for Students in Higher Vocational Colleges under the Background of "Internet+". *2022 3rd International Conference on Education, Knowledge and Information Management (ICEKIM)*, 75-78.
- Ironside, P. M., & Spurlock Jr, D. R. (2014). Getting serious about building nursing education science. In *Journal of Nursing Education* (Vol. 53, Issue 12, pp. 667-669). SLACK Incorporated Thorofare, NJ.
- Kusaka, M., Matsuzaki, M., Shiraishi, M., & Haruna, M. (2016). Immediate stress reduction effects of yoga during pregnancy: One group pre-post test. *Women and Birth*, 29(5), e82-e88.
- Lipsey, M. W., & Wilson, D. B. (2017). The efficacy of psychological, educational, and behavioral treatment: Confirmation from meta-analysis. *Quantitative Methods in Criminology*, 65-93.
- O'Brien, B. C., Harris, I. B., Beckman, T. J., Reed, D. A., & Cook, D. A. (2014). Standards for reporting qualitative research: a synthesis of recommendations. *Academic Medicine*, 89(9), 1245-1251.
- Patel, B., Parets, S., Akana, M., Kellogg, G., Jansen, M., Chang, C., Cai, Y., Fox, R., Niknazar, M., & Shraga, R. (2018). Comprehensive genetic testing for female and male infertility using next-generation sequencing. *Journal of Assisted Reproduction and Genetics*, 35(8), 1489-1496.
- Savage, J. S., Birch, L. L., Marini, M., Anzman-Frasca, S., & Paul, I. M. (2016). Effect of the INSIGHT responsive parenting intervention on rapid infant weight gain and overweight status at age 1 year: a randomized clinical trial. *JAMA Pediatrics*, 170(8), 742-749.
- Vardanjani, A. E., Reisi, M., Javadzade, H., Pour, Z. G., & Tavassoli, E. (2015). The Effect of nutrition education on knowledge, attitude, and performance about junk food consumption among students of female primary schools. *Journal of Education and Health Promotion*, 4(1), 53.
- Verhage, C. L., Gillebaart, M., van der Veek, S. M. C., & Vereijken, C. M. J. L. (2018). The relation between family meals and health of infants and toddlers: A review. *Appetite*, 127, 97-109.

Knowledge, Attitude, and Perception Towards Condom Use among Female Sex Workers in North Jakarta: A Mixed-Method Study

Achmad Kemal Harzif^{1,2)}, Raymond Surya¹⁾, Ariel Timy Chiprion¹⁾, Heidi Dewi Mutia²⁾, Aisyah Retno Puspawardani²⁾, Nafi'atul Ummah²⁾, Putri Nurbaeti²⁾, Atikah Sayogo Putri¹⁾, Budi Wiweko^{1,2)}

¹ Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia 10430

² Human Reproduction, Infertility, and Family Planning Research Center, Indonesian Medical Education and Research Institute, Jakarta, Indonesia 10430

✉ Email: kemal.achmad@gmail.com

ABSTRACT

Background: HIV/AIDS is a significant global health and social issue, particularly affecting sex workers, who are the second most common high-risk population. Efforts have been attempted to address the challenges, including promoting safer sex and increasing sex workers' awareness of condom use to reduce sexually transmitted disease (STDs) transmission. **Objectives:** This study aimed to examine the knowledge, attitude, and perception among FSWs in North Jakarta towards condom use to prevent HIV. **Method:** Using a validated WHO questionnaire, this cross-sectional community-based study was conducted in pubs and lounges in North Jakarta among 182 FSWs. The questionnaire was translated forward and backward to ensure accuracy. The data were analyzed using SPSS Statistics for Windows and transcription in MS Word for qualitative data. **Results:** The reliability test for knowledge and attitude were 0.427 and 0.456, respectively. The study found that most participants (75%) had good knowledge about the benefits of condom use, and most agreed that condoms are suitable for casual or established relationships. However, due to cultural barriers in Indonesia, most subjects (68.1%) felt embarrassed about buying condoms. **Conclusion:** The study found that FSWs possess a good knowledge and attitude regarding the utilization of condoms to avert STDs, particularly HIV/AIDS. Nonetheless, there is a need to enhance FSWs' attitudes towards condom use and perceptions of health services, particularly those related to STDs, given their classification as a population at high risk. **Keywords:** FSW, HIV/AIDS, Prevention of STD, Sexually transmitted disease.

INTRODUCTION

Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) is one of the world's major global public health issues, with a devastating impact on individuals, families, and communities worldwide. (WHO, 2023) In 2022, according to UNAIDS, around 39 million individuals were reportedly affected by HIV, out of which 1.3 million were newly infected globally. The data showed in the Asia Pacific region, nearly half of new HIV infections occurred among young people thus possessing them to a greater risk of transmission. In Indonesia, the prevalence of new HIV infection has decreased over the years, but the disease remains a significant public health concern, especially among high-risk groups like sex

workers. Sex workers are the second most common high-risk population after men who have sex with men (MSM), with estimated population counts of 277,600 cases. While the prevalence among sex workers is only 2.1% compared to 17.9% in MSM, 13.7% in injecting drug users (IDU), and 13.7% in transgender, the HIV testing and awareness among sex workers remains low (38.6%) compared to transgender people (65%), IDU (57.2%), and MSM (55.5%). Apart from that, the percentage of condom usage among sex workers is lower than among MSM and IDU populations. (UNAIDS, 2023).

Female sex workers (FSWs) are particularly vulnerable to HIV/AIDS due to their profession, which exposes them to a higher risk of infection, a staggering twenty one times higher than other women of reproductive age. (Atuhaire et al., 2020)

This heightened risk is a significant concern globally, as FSWs often engage in commercial sexual services that are illegal in many countries. In these illegal settings, FSWs typically work in karaoke bars, massage parlors, saunas, and hair and beauty salons, as well as on the street or in parks. These environments facilitate unlimited interaction between FSWs and members of the general population, making FSWs a key factor in the spread of HIV to the broader population (Abdella et al., 2022; Wanjiru et al., 2022).

However, the situation is particularly challenging for FSWs in Indonesia. They face numerous barriers, including stigma and discrimination related to sex work, which can significantly hinder their ability to access healthcare services and adhere to treatment regimens. Furthermore, the illegal nature of commercial sexual services in Indonesia means that FSWs often operate in the shadows, making it difficult for health educators and prevention programs to reach them effectively. (Andriyani et al., 2021; Hanifa et al., 2019).

Jakarta, the capital city, is at the forefront of confronting public health challenges, including HIV/AIDS. Reports indicate a concerning rise in HIV cases within the city, despite a national downward trend. In 2019, the city reported 5,743 HIV cases, a number which slightly increased to 5,982 by 2022, according to the Health Profile of DKI Jakarta for 2022 and 2019. (Dinas Kesehatan Provinsi DKI Jakarta, 2019, 2022) Further highlighting the city's struggle, Jakarta was ranked third in the number of reported AIDS cases across Indonesia in 2019, trailing only behind Central Java and East Java. (Kementrian Kesehatan RI, 2019) This escalating situation underscores the urgent need to address HIV/AIDS spread within the city.

North Jakarta, with its sprawling area of 146.66 km² and a population density of 12,358 per km² as of 2019. (Dinas Kesehatan Provinsi DKI Jakarta, 2019) The district, home to the primary inter-island and international gateway, Tanjung Priok Port, experiences heightened vulnerability to STD transmission. (Fajrunni'mah & Lestari, 2019) This susceptibility stems from the risky sexual behaviors among individuals frequenting the port, including sailors, fishermen, and port workers,

compounded by readily accessible sex services. (Fajrunni'mah & Lestari, 2019) The area was historically known for hosting "Kramat Tunggak," Jakarta's largest legal prostitution complex until its closure in 1999. Nonetheless, the cessation of this complex did not eradicate the practice; instead, it dispersed to various illegal zones including Pela-Pela, Kalibaru, Koja Utara, among others, perpetuating the facilitation of sex work in more concealed environments. (Suud, 2019; Tadie & Permanadeli, 2015) Based on the findings of the DKI Jakarta Social Services Department, North Jakarta has been identified as the area with the highest number of female sex workers, reaching a total of 154. (Badan Pusat Statistik Provinsi DKI Jakarta, 2019) This situation, combined with the lack of stringent regulatory measures and the enforcement of safety protocols, creates an environment ripe for the spread of STDs and HIV/AIDS.

Given the critical role that FSWs play in the transmission and spread of HIV/AIDS, it is essential to understand their knowledge, attitudes, and perceptions towards condom use among FSWs, especially in North Jakarta. This understanding is crucial for addressing appropriate promotive and preventive attempts and also guides the development of more effective targeted interventions and health education programs that focus on accurate information about HIV/AIDS, condom use, and other prevention methods. Ultimately, this will improve the health and well-being of FSWs in Indonesia, who are often marginalized and underserved in healthcare systems.

METHODS

Questionnaire translation

An existing questionnaire produced by the World Health Organization (WHO) in 2001, "Illustrative Questionnaire for Interview-Surveys with Young People," was translated to Indonesian by two independently certified medical translators whose first language was Indonesian. The Indonesian questionnaire was backward-translated to English by another medical translator to check the accuracy. The authors revised the initial translations from any ambiguous or mistranslated words. The authors only chose several sections in the translated questionnaire, including socioeconomic

and family characteristics, knowledge of HIV/AIDS and STDs, knowledge and attitudes about condom use, and perception of health services.

Questionnaire validation

For quantitative data, normality tests were performed using Kolmogorov-Smirnov. Descriptive analysis was presented in frequency, percentage, median, and minimum-maximum. A validity test with Pearson correlation (r arithmetic more than r table) and a reliability test with Cronbach's alpha (>0.5) were performed for questions about knowledge and attitude of condom use towards HIV/AIDS or STD prevention.

Sample and procedure

A cross-sectional community-based study using qualitative and quantitative data collection methods was conducted in November 2019. All FSWs working in 10 pubs and lounges in North Jakarta were included. Incomplete questionnaire was excluded from the study. The participants were asked for written informed consent. They obtained structured questionnaires to explore FSW's knowledge and attitude toward condom use concerning STDs and perception of the health service. In addition to quantitative data, qualitative data were collected from interviews with ten random FSWs who had completed the structured questionnaires. Participants gave verbal consent to participate in the qualitative component with several questions.

Data analysis

The data gathered from completed questionnaires were distributed by frequency and percentage. The analysis

used SPSS Statistics for Windows, version 23.0. Qualitative data were obtained through in-depth interviews with some respondents. The data were transcribed into MS Word for analysis. Similar questions were asked and discussed separately with each respondent.

Ethics

This study has been accepted by the Ethical Committee of Health Faculty of Medicine Universitas Indonesia under KET-248/UN2.F1/ETIK/PPM.00.02/2019.

RESULTS AND DISCUSSION

After performing forward and backward translations from the questionnaire produced by WHO, we recruited the first 30 respondents for the samples. Only 4/8 knowledge and 3/5 attitude questions regarding condoms were valid. All valid questions were processed into a reliability test, and the result was 0.427 and 0.456 for knowledge and attitude questions. Meanwhile, we did not conduct the perception questions for this test since it only asked for opinions.

212 FSWs filled in the questionnaire; however, only 182 participants answered all questions. Most FSWs were 21-24 years old (68.1%) and considered religion essential (96.7%). Most of them were smoking and habitual drinkers. Table 1 describes the characteristics and demographics of the respondents. Tables 2 and 3 show the knowledge and attitude toward condom use related to STDs. Meanwhile, Table 4 presents the perception of FSWs about health services.

Table 1. Characteristics demographic of respondents.

| Characteristics | N (%) |
|-----------------------------------|-------------|
| Age (years old) | |
| <20 | 26 (14.3%) |
| 21-24 | 124 (68.1%) |
| 25-29 | 27 (14.8%) |
| 30-34 | 3 (1.6%) |
| ≥35 | 2 (1.1%) |
| Religion | |
| Islam | 170 (93.4%) |
| Christian | 12 (6.6%) |
| Importance of the religion | |
| Very important | 176 (96.7%) |
| Important | 6 (3.3%) |
| Not important | 0 |
| Educational background | |
| Illiterate | 2 (1.1%) |
| Primary school | 14 (7.7%) |
| Secondary school | 78 (42.9%) |
| High school | 88 (48.4%) |



| | |
|----------------------------|-------------|
| Starting age as FSW | |
| ≤15 years old | 2 (1.1%) |
| 16 years old | 20 (11.0%) |
| 17 years old | 34 (18.7%) |
| 18 years old | 48 (26.4%) |
| 19 years old | 27 (14.8%) |
| ≥20 years old | 51 (28.0%) |
| Parents alive | |
| Yes | 142 (78%) |
| One of them | 36 (19.8%) |
| Orphan | 4 (2.2%) |
| Smoking | 139 (76.4%) |
| Alcohol | 160 (87.9%) |

FSW, Female Sex Worker

Table 2. Respondents' knowledge towards condom use related to sexual transmitted disease.

| Statement(s) | N (%) |
|---|-------------|
| Heard about HIV/AIDS - YES | 174 (95.6%) |
| Seen condom - YES | 182 (100%) |
| Condom is an effective method to prevent HIV/ AIDS - TRUE ^a | 166 (91.2%) |
| To determine HIV status, a person can perform a blood examination - TRUE | 161 (88.5%) |
| HIV/ AIDS can be cured - FALSE ^a | 121 (66.5%) |
| Condom is an effective method to avoid the unwanted pregnancy - TRUE ^a | 151 (83.0%) |
| Condom is safe for using more than once - FALSE | 144 (79.1%) |
| Condom is an effective method to prevent sexual transmitted disease - TRUE ^a | 144 (79.1%) |

HIV, Human Immunodeficiency Virus; AIDS, Acquired Immunodeficiency Syndrome ^aValid question

Table 3. Respondents' attitudes towards condom.

| Statement(s) | N (%) |
|---|-------------|
| Condoms are suitable for casual relationship - AGREE ^a | 148 (81.3%) |
| Condoms are suitable for steady, loving relationships - AGREE | 165 (90.7%) |
| It would be too embarrassing for someone like me to buy or obtain condoms - AGREE | 124 (68.1%) |
| Condoms reduce sexual pleasure - AGREE ^a | 58 (31.9%) |
| Condoms can slip off the man and disappear inside the woman's body - AGREE ^a | 79 (43.4%) |

^aValid question

Table 4. Respondents' perceptions of health services.

| Statement(s) | N (%) |
|--|-------------|
| Have you ever visited a health facility or doctor of any kind to receive services or information on contraception, pregnancy, sexual transmitted diseases? - YES | 182 (100%) |
| For the last twelve months, have you sought services or information from a doctor or a nurse for these services? - YES | 120 (65.9%) |
| When you last saw a doctor or a nurse, what was your reason for going? (can be answered more than one choice) | |
| 1. Contraception | 25 (12.6%) |
| 2. Sexual transmitted disease | 21 (10.6%) |
| 3. Obstetrical examination | 5 (2.5%) |
| 4. Pregnancy test | 6 (3.0%) |
| 5. Effort to perform abortion | 3 (1.5%) |
| 6. Routine gynecological examination | 116 (58.3%) |
| 7. Others | 23 (11.6%) |
| Did you feel comfortable enough to ask questions? | 156 (85.7%) |
| Were the questions you asked during the consultation answered adequately? | 157 (86.3%) |
| Was there enough confidentiality? | 144 (79.1%) |

Following the completion of the questionnaire, several random respondents had in-depth interviews. The first question was whether clients requested not to use condoms. Would they

agree? If so, what would be the reason? The most common answers were:

"I will refuse it regardless of any offer because whenever we get HIV

positive, we have to quit this job and go down to the street FSW."

However, several respondents would ask about the offer amount before accepting the request. The next question was about the monthly income and whether they were satisfied with the amount, which was mostly answered as follows:

"We get around six and ten million rupiahs every month, with which we are satisfied. Our income depends on the tipping from the clients for our service."

We also asked what the main reason for doing this job was, and if there is any offer with a similar income and leaving the current job, would they accept it?

"Regarding my educational background, this is the only job with an interesting income. However, I would like to leave it if there is any other 'halal' and prospective job."

Another question was about the social opinion of this job, to which the answer was:

"I always hide the job from my social group because they think that this job is related to sexually transmitted disease that they might judge and exclude us from the circle."

"I do not care about the social opinion because I run this job, which promises good income. I try to blend in the community."

Socio-demographic characteristics

In our study, most respondents were 21-24 years old, similar to the study conducted in Brazil.(Penha et al., 2015) Most of our respondents graduated from high school. Other studies reported variations in education level. A study in Ethiopia showed that most FSWs had completed primary school (grades 1-8) (Rameto et al., 2023) Meanwhile, a study in India showed that most FSWs were illiterate.(Giri et al., 2012) However, education level was not associated with condom use in the FSW population (Rameto et al., 2023; Yang et al., 2020).

Smoking and drinking habits were found in 76.4% and 87.9% of respondents, respectively. Study by Beksinska showed that FSWs with harmful use of alcohol were less likely to use condom at last sex with clients (Beksinska et al., 2022). In a meta-analysis conducted in low and middle income countries, harmful alcohol use among FSWs was shown to be significantly associated with inconsistent condom use, STDs, and use of drugs (Beksinska et al., 2023). Other study conducted in China showed that alcohol intake and regular smoking among adolescent sex worker are higher compared to general adolescent population (Zhang et al., 2020). Smoking and drinking were associated with drug use, which may increase the risks of HIV and STDs (Naghizadeh et al., 2023; Yeo et al., 2022; Zhang et al., 2020).

Knowledge and attitude

Most respondents answered questions about knowledge of HIV/AIDS correctly. Similar results were found regarding the knowledge about condoms. Nevertheless, some answers were false. This unawareness may render FSWs more susceptible to STDs.

The majority of the respondents agreed that condoms are suitable for casual relationships or established relationships. However, some believe that condoms may decrease sexual pleasure. Other studies also found that condoms may lessen sexual pleasure, especially for men (Huber-Krum et al., 2020; Spyrelis & Ibisomi, 2022).

Incorrect usage of condom and myths about taking a bath after condomless sex was also another problem faced, in one study, four out of 25 women suggested using more than one condom, due to fear of condoms slipping while having sex (Shewale & Sahay, 2022).

There was also a false belief that a condom may disappear inside a woman's body when it slips off (Kosugi et al., 2019; Ogolla & Ondia, 2019). The other challenge was that most respondents were too embarrassed to obtain condoms alone (68.1%). A study in Iran identified that women who were taunted when buying condoms tended not to use condoms (Mohammadi Gharehghani et al., 2020). Thus, those beliefs may lead sex workers to unprotected sex. Therefore, further promotive and preventive attempts against STDs, primarily HIV/AIDS, and the benefit of condom use among FSWs are imperative.

A qualitative study involving 35 FSWs in Bali and Malaysia identified stability and romantic relationships as the primary factors influencing their decision to forego condom use (Januraga, Mooney-somers, et al., 2020). Most respondents prefer to use condoms during sexual intercourse. However, some respondents agree to do unprotected sexual contact for extra income.

A study in China found that 33.6% of FSWs had sex without a condom if the customer paid extra money and looked clean. In Vietnam, a study conducted among FSWs also showed some consumers want to pay more for unprotected sex (Mohammadi Gharehghani et al., 2020). Inconsistent condom use (ICU) is identified as the risk factor for both acquiring and transmitting STD (Decker et al., 2020). In Indonesia, a study conducted in Bali showed that FSWs accepted to serve clients without condoms because they were offered big money and wanted to be financially successful workers (Januraga, Mooney-somers, et al., 2020). Study which also conducted in Bali 2020 found that newcomers who have few relations may not know the competition among seniors who get more money by providing unprotected sex to their clients. (Januraga, Gesesew, et al., 2020). Young sex worker compared to older FSWs are unlikely to negotiate with older male clients who have financial muscles and able to dictate terms of transaction, and they have limited negotiating power, vulnerability to intimidation, violence, and more likely to forego the use of condom if the clients pay more (Elmi et al., 2023; Motsoeneng, 2024). This indicates poor socio-economic status was why FSWs took their jobs and engage in risky sexual behavior. (Motsoeneng, 2024; Panneh et al., 2022; Wanjiru et al., 2022).

Another factor that justifies the reason for unsafe sex is the influence of alcohol. Study by Khumaidi et al, reported that FSWs who had a higher level alcohol consumption were 2.706 times to have high-risk sexual behavior such as condomless compared to those with low level alcohol consumption (Khumaidi et al., 2021). Alcoholism in this type of occupation has emerged as the cause of unintended condomless sex, as shared by the responders in the study conducted in India (Shewale & Sahay, 2022). It was not possible to use a condom properly when

the FSW was drunk. Maintaining the awareness to ensure that condoms are used and not breakage or slip is vital to control condom use. (Amogne et al., 2022).

Although most responders have good knowledge about HIV/AIDS and condom use, barriers to safe sex implementation are still encountered, necessitating interventions that can change behavior, such as a study conducted in Surakarta, which recommended a peer education program to promote female condom use among female sex workers (FSWs), following better motivation and self-efficacy regarding female condom use in the peer education group compared to the control group. Another study in China showed higher condom usage consistency in the intervention group compared to the control group (77% vs 70.5%, $P = 0.032$) (Dong et al., 2019). The importance of comprehensive preventive services is demonstrated by research in India, where FSWs receiving targeted interventions (TI) related to HIV/AIDS, such as condom distribution, proper condom use demonstrations, STD checkups and counseling, were more likely to use condoms during their last sexual activity and consistently use condoms over three months (Sahu et al., 2022). Care Support Education, an education and communication-based intervention, was conducted by Azinar et al. and showed that the intervention was effective in changing knowledge, attitudes, and perceptions of FSWs regarding HIV/AIDS prevention and transmission behaviors (Azinar et al., 2020). In an African study, family planning and HIV prevention workshops were conducted for FSWs, and the results showed that community empowerment-based interventions increased consistent condom use and reduced HIV infection rates (Beckham et al., 2021). Barriers are crucial in changing habits, and when individuals or communities believe in the benefits of new healthy habits or behaviors more than old ones, that is where a change in habits or behaviors towards a healthier direction will occur (Azinar et al., 2020; Garzon et al., 2020; Salve, 2023).

Qualitative study

Money was the main reason why FSWs were doing their job. A quote from Brucker said, "People enter the profession for various reasons, the most common being unemployment or a desire to improve their income." They saw

themselves as entrepreneurs and put a great effort into maximizing their income through the sex industry. Research for sex work stated that FSWs did their job because of money (Januraga, Mooney-somers, et al., 2020) It was appropriate in this interview with the clients.

Research performed in Den Haag, Amsterdam, Berlin, Krakow, Warsaw, London, and New York City interviewed sixteen women from various aspects of the sex industry. They reported “needing money” to enter this industry for specific circumstances such as everyday living expenses (including housing and food), college costs and credit card debt, travel, leisure, and luxury expenses (Januraga, Mooney-somers, et al., 2020) Financial issues were also essential to sustain the condom use of FSWs, besides the knowledge of condom use benefits. A study in India showed that the FSWs who had improved financial security had significant improvements in consistent condom use (Mahapatra et al., 2020).

Some studies showed that ICU is because of the lack of knowledge of FSWs. However, in this study, we revealed that even though FSWs knew about HIV and condoms, some FSWs agreed to forego the condom when offered extra money. In addition, some were still embarrassed to buy condoms and believed that condoms could decrease sexual pleasure, which could be a barrier.

CONCLUSION

Based on these findings, the knowledge and attitude of FSWs towards condom use to prevent STDs, especially HIV/AIDS, was good. The perception of FSWs about health services should be improved, especially for STDs, considering FSWs as a high-risk population.

REFERENCES

- Abdella, S., Demissie, M., Worku, A., Dheresa, M., & Berhane, Y. (2022). HIV prevalence and associated factors among female sex workers in Ethiopia, east Africa: A cross-sectional study using a respondent-driven sampling technique. *EClinicalMedicine*, 51, 101540. <https://doi.org/10.1016/j.eclinm.2022.101540>
- Amogne, M. D., Sanders, E. J., Belihu, W. B., Sundewall, J., & Agardh, A. (2022). Condom failure and pre-exposure prophylaxis use experience among female sex workers in Ethiopia: a qualitative study. *BMC Public Health*, 22(1), 1-10. <https://doi.org/10.1186/s12889-022-13468-3>
- Andriyani, L., Arina, Widiastuti, A., & Nugroho, A. (2021). Challenges and Support to HIV Care and Treatment of Female Sex Workers Living with HIV in Indonesia: A Mixed Method Study. *Unnes Journal of Public Health*, 10(2), 169-179. <https://doi.org/10.15294/ujph.v10i2.40037>
- Atuhaire, L., Adetokunboh, O., Shumba, C., & Nyasulu, P. S. (2020). Effect of female sex work-targeted community-based interventions along the HIV treatment cascade in sub-Saharan Africa: A systematic review protocol. *BMJ Open*, 10(10), 1-5. <https://doi.org/10.1136/bmjopen-2020-039495>
- Azinar, M., Fibriana, A. I., Matahari, R., Nisa, A. A., & Info, A. (2020). *Jurnal Kesehatan Masyarakat*. 16(1), 130-137.
- Badan Pusat Statistik Provinsi DKI Jakarta. (2019). *Jumlah Penyandang Masalah Kesejahteraan Sosial (PMKS) menurut Jenis dan Kabupaten/Kota Administrasi 2019-2021*.
- Beckham, S. W., Stockton, M., Galai, N., Davis, W., Mwambo, J., Likindikoki, S., & Kerrigan, D. (2021). *Family planning use and correlates among female sex workers in a community empowerment HIV prevention intervention in Iringa, Tanzania: a case for tailored programming*. 1-11.
- Beksinska, A., Karlsen, O., Gafos, M., & Beattie, T. S. (2023). Alcohol use and associated risk factors among female sex workers in low- and middle-income countries: A systematic review and meta-analysis. In *PLOS Global Public Health* (Vol. 3, Issue 6). <https://doi.org/10.1371/journal.pgph.0001216>
- Beksinska, A., Nyariki, E., Kabuti, R., Kungu, M., Babu, H., Shah, P., Nyabuto, C., Okumu, M., Mahero, A., Ngurukiri, P., Jama, Z., Irungu, E., Adhiambo, W., Muthoga, P., Kaul, R., Seeley, J., Weiss, H. A., Kimani, J., & Beattie, T. S. (2022). Harmful

- Alcohol and Drug Use Is Associated with Syndemic Risk Factors among Female Sex Workers in Nairobi, Kenya. *International Journal of Environmental Research and Public Health*, 19(12), 1-19. <https://doi.org/10.3390/ijerph19127294>
- Decker, M. R., Park, J. N., Allen, S. T., Silberzahn, B., Footer, K., Huettner, S., Galai, N., & Sherman, S. G. (2020). Inconsistent Condom Use Among Female Sex Workers: Partner-specific Influences of Substance Use, Violence, and Condom Coercion. *AIDS and Behavior*, 24(3), 762-774. <https://doi.org/10.1007/s10461-019-02569-7>
- Dinas Kesehatan Provinsi DKI Jakarta. (2019). *Profil Kesehatan Provinsi DKI Jakarta Tahun 2019*.
- Dinas Kesehatan Provinsi DKI Jakarta. (2022). *Profil Kesehatan Provinsi DKI Jakarta Tahun 2022*.
- Dong, W., Zhou, C., Rou, K. M., Wu, Z. Y., Chen, J., Scott, S. R., Jia, M. H., Zhou, Y. J., & Chen, X. (2019). A community-based comprehensive intervention to reduce syphilis infection among low-fee female sex workers in China: A matched-pair, community-based randomized study. *Infectious Diseases of Poverty*, 8(1), 1-10. <https://doi.org/10.1186/s40249-019-0611-z>
- Elmi, N., Marquez, N. G., Rucinski, K., Lyons, C., Turpin, G., & Ba, I. (2023). *Meeting the reproductive health needs of female sex workers in Côte d'Ivoire: protecting the human right to dignified health*. 1-10. <https://doi.org/10.1186/s12978-023-01659-z>
- Fajrunni'mah, R., & Lestari, D. (2019). Dominant Risk Factors of Sexually Transmitted Infections (STI) for HIV at Ships Crew. *Asian Journal of Applied Sciences*, 07(05), 618-623.
- Garzon, S., Laganà, A. S., Sardo, A. D. S., Pacheco, L. A., Haimovich, S., Carugno, J., Vitale, S. G., Casarin, J., Raffaelli, R., Andrisani, A., Zizolfi, B., Cromi, A., Ghezzi, F., Franchi, M., & Vitagliano, A. (2020). Hysteroscopic Metroplasty for T-Shaped Uterus: A Systematic Review and Meta-analysis of Reproductive Outcomes. *Obstetrical and Gynecological Survey*, 75(7), 431-444.
- Giri, P., Hiremath, R., & Kasbe, A. (2012). Sexual behaviour, knowledge, attitude and practices regarding HIV/AIDS amongst female sex workers (FSWs) in red light area of Mumbai city. *International Journal of Medical Science and Public Health*, 1(2), 132. <https://doi.org/10.5455/ijmsph.2012.132-137>
- Hanifa, A., Probandari, A., & Pamungkasari, E. P. (2019). Effect Of Condom Utilization On Sexually Transmitted Infection Effect of Condom Use on Sexually Transmitted Infection in Female Sex Workers in Tulungagung District , Pengaruh Penggunaan Kondom terhadap Kejadian Infeksi Menular Seksual. *Kesmas: National Public Health Journal*, 13(3), 150-156. <https://doi.org/10.21109/kesmas.v13i3.2255>
- Huber-Krum, S., Karandikar, S., & Gezinski, L. (2020). "A condom is compulsory": A qualitative study of condom use and negotiation strategies among female sex workers in Nepal. *Women and Health*, 60(8), 872-886. <https://doi.org/10.1080/03630242.2020.1766641>
- Januraga, P. P., Gesesew, H. A., & Ward, P. R. (2020). Trust as a Determinant Factor for Condom Use among Female Sex Workers in Bali, Indonesia. *Tropical Medicine and Infectious Disease*, 5(3), 1-11. <https://doi.org/10.3390/tropicalme5030131>
- Januraga, P. P., Mooney-somers, J., Gesesew, H. A., & Ward, P. R. (2020). The logic of condom use in female sex workers in Bali, Indonesia. *International Journal of Environmental Research and Public Health*, 17(5), 1-11. <https://doi.org/10.3390/ijerph17051627>
- Kementrian Kesehatan RI. (2019). *InfoDATIN Pusat Data dan Informasi Kementrian Kesehatan RI*.
- Khumaidi, Yona, S., & Waluyo, A. (2021). Condom-use negotiation, alcohol consumption, and hiv-risk sexual behavior among female sex workers in kupang, east nusa tenggara, indonesia: A cross-sectional study.

- Journal of Public Health Research*, 10(s1), 32-36. <https://doi.org/10.4081/jphr.2021.2334>
- Kosugi, H., Shibnuma, A., Kiriya, J., Wafula, S. W., & Jimba, M. (2019). Consistent condom use among highly effective contraceptive users in an HIV-endemic area in rural Kenya. *PLoS ONE*, 14(5), 1-16. <https://doi.org/10.1371/JOURNAL.PONE.0216208>
- Mahapatra, B., Walia, M., Patel, S. K., Battala, M., Mukherjee, S., Patel, P., Subramaniam, B., Atmavilas, Y., & Saggurti, N. (2020). Sustaining consistent condom use among female sex workers by addressing their vulnerabilities and strengthening community-led organizations in India. *PLoS ONE*, 15(7), 1-17. <https://doi.org/10.1371/journal.pone.0235094>
- Mohammadi Gharehghani, M. A., Khosravi, B., Irandoost, S. F., Soofizad, G., & Lebni, J. Y. (2020). Barriers to condom use among female sex workers in tehran, iran: A qualitative study. *International Journal of Women's Health*, 12, 681-689. <https://doi.org/10.2147/IJWH.S260481>
- Motsoeneng, M. (2024). Factors influencing female sex workers to engage in risky sexual behaviour with clients. *Pakistan Journal of Psychological Research*, 39(1), 111-122. <https://doi.org/10.33824/pjpr.2024.39.1.07>
- Naghizadeh, S., Faramarzi, E., Akbari, H., Jafari, N., Sarbakhsh, P., & Mohammadpooras, A. (2023). Prevalence of smoking, alcohol consumption, and drug abuse in Iranian adults: Results of Azar Cohort Study. *Health Promotion Perspectives*, 13(2), 99-104. <https://doi.org/10.34172/hpp.2023.12>
- Ogolla, M. A., & Ondia, M. (2019). Assessment of the implementation of comprehensive sexuality education in Kenya. *African Journal of Reproductive Health*, 23(2), 110-120. <https://doi.org/10.29063/ajrh2019/v23i2.11>
- Panneh, M., Gafos, M., Nyariki, E., Liku, J., Shah, P., Wanjiru, R., Wanjiru, M., Beksinska, A., Pollock, J., Gwala, D., Oside, D., Kamene, R., Watata, A., Atieno, A., Njau, F., Njeri, E., Orobi, E., Lwingi, I., Jama, Z., ... Beattie, T. (2022). Mental health challenges and perceived risks among female sex Workers in Nairobi, Kenya. *BMC Public Health*, 22(1), 1-14. <https://doi.org/10.1186/s12889-022-14527-5>
- Penha, J. C. orrê. da, Aquino, C. B. atist. de Q., Neri, É. de A. R. odrigue., Reis, T. G. O. liveir. Dos, Aquino, P. de S., & Pinheiro, A. K. arin. B. (2015). Risk factors for sexually transmitted diseases among sex workers in the interior of Piauí, Brazil. *Revista Gaúcha de Enfermagem / EENFURGS*, 36(2), 63-69. <https://doi.org/10.1590/1983-1447.2015.02.52089>
- Rameto, M. A., Abdella, S., Ayalew, J., Tessema, M., Bulti, J., Bati, F., & Lulseged, S. (2023). Prevalence and factors associated with inconsistent condom use among female sex workers in Ethiopia: findings from the national biobehavioral survey, 2020. *BMC Public Health*, 23(1), 1-12. <https://doi.org/10.1186/s12889-023-17253-8>
- Sahu, D., Ranjan, V., Chandra, N., Nair, S., Kumar, A., Arumugam, E., Camara, B., & Rao, M. V. V. (2022). Impact of TI Programmes Intervention under National AIDS Control Programme among Female Sex Workers in India: Evidence from Integrated Biological and Behavioural Survey, 2014-15. *World Journal of AIDS*, 12(02), 83-96. <https://doi.org/10.4236/wja.2022.122007>
- Salve, M. A. (2023). Knowledge, Attitudes, and Practices of Women Engaged in Sex Work: An Evaluation of Source of Interventions Mark Anthony Salve. *SILLIMAN JOURNAL*, 4(2), 73-100.
- Shewale, S., & Sahay, S. (2022). Barriers and facilitators for access and utilization of reproductive and sexual health services among Female Sex Workers in urban and rural Maharashtra, India. *Frontiers in Public Health*, 10. <https://doi.org/10.3389/fpubh.2022.1030914>
- Spyrelis, A., & Ibisomi, L. (2022). "It is just a lot to deal with": A qualitative study exploring the sexual and reproductive health needs of a

- sample of female sex workers in six locations in Southern Africa. *African Journal of Reproductive Health*, 26(5), 72-80. <https://doi.org/10.29063/ajrh2022/v26i5.8>
- Suud, M. (2019). The Existing Policy on Prostitution in Indonesia: A Retrospective Evaluation. *Journal of Urban Sociology*, 2(1).
- Tadie, J., & Permanadeli, R. (2015). Night and the City: Clubs, Brothels and Politics in Jakarta Night and the city: Clubs, brothels and politics in Jakarta. *SAGE*, 52(3), 471-485. <https://doi.org/10.1177/0042098014537692>
- UNAIDS. (2023). *The path that ends AIDS: UNAIDS Global AIDS Update 2023*.
- Wanjiru, R., Nyariki, E., Babu, H., Lwingi, I., Liku, J., Jama, Z., Kung'u, M., Ngurukiri, P., Osido, D., Atieno, A., Watata, A., Gwala, D., Kamene, R., Akinyi, M., Njau, F., Nyamweya, C., Shah, P., Okumu, M., Weiss, H., ... Njeri, E. (2022). Beaten but not down! Exploring resilience among female sex workers (FSWs) in Nairobi, Kenya. *BMC Public Health*, 22(1), 1-12. <https://doi.org/10.1186/s12889-022-13387-3>
- WHO. (2023). *HIV and AIDS*.
- Yang, F., Ketende, S., Jennings Mayo-Wilson, L., Lyons, C. E., Liestman, B., Diouf, D., Drame, F. M., Coly, K., Turpin, G., Mboup, S., Toure-Kane, C., Castor, D., Cheng, A., Diop-Ndiaye, H., Leye-Diouf, N., Kennedy, C., & Baral, S. (2020). Associations Between Economic Factors and Condom Use Behavior Among Female Sex Workers in Dakar and Mbour, Senegal. *AIDS and Behavior*, 24(10), 2829-2841. <https://doi.org/10.1007/s10461-020-02832-2>
- Yeo, E. J., Hlongwane, K., Otjombe, K., Hopkins, K. L., Variava, E., Martinson, N., Strathdee, S. A., Coetzee, J., & Milovanovic, M. (2022). Key risk factors for substance use among female sex workers in Soweto and Klerksdorp, South Africa: A cross-sectional study. *PLoS ONE*, 17(1 January), 1-18. <https://doi.org/10.1371/journal.pone.0261855>
- Zhang, X. D., Zhang, J., Xie, R. S., & Zhang, W. H. (2020). Sexual and reproductive health correlates of polysubstance use among female adolescents who sell sex in the southwest of China. *Substance Abuse: Treatment, Prevention, and Policy*, 15(1), 1-15. <https://doi.org/10.1186/s13011-020-00302-5>

The Phenomenon of Premarital Sex among Adolescents (Study in the Working Area of the Mamboro Health Center)

Aprillia Nurhayati¹✉, Ira Nurmala², Shrimarti Rukmini Devy², Arwan³

¹ Master of Public Health Student, Faculty of Public Health, Universitas Airlangga Surabaya, Surabaya, East Java, Indonesia 60115

² Faculty of Public Health, Universitas Airlangga Surabaya, Surabaya, East Java, Indonesia 60115

³ Faculty of Public Health, Universitas Tadulako, Palu, Central Sulawesi, Indonesia 94118

✉Email: aprillia.nurhayati-2023@fkm.unair.com

ABSTRACT

Background: Over time, adolescents in Indonesia are increasingly at risk of changing their lifestyles, as evidenced by the curiosity of adolescents for information that can cause the emergence of premarital sex behavior. This behavior is perilous, it may cause imminent harm, especially to adolescent girls. Based on data from the Palu City Health Office, there were 171 cases of adolescents who had premarital sex in 2018-2021. The results of the midwife interview found that five adolescents were pregnant before marriage within the Mamboro Health Center working area in 2022. **Objectives:** to explore predisposing factors (knowledge and attitude), supporting factors (media influence), and driving factors (influence of health workers, family and peers) in adolescent premarital sexual behavior. **Method:** a qualitative study with a case study design. There were 10 informants; 1 key informant, 6 main informants, and 3 supporting informants selected by purposive sampling techniques. **Results:** 4 out of 6 main informants had engaged in premarital sexual behavior, while 2 others admitted they had kissed. **Conclusion:** Regarding the predisposing factors, knowledge related to the definition, forms, factors, and the impact of premarital sex was clearly stated by adolescents. As for attitudes, adolescents had a positive attitude or abstinence towards premarital intercourse. It was found that in the supporting factors, media influenced the adolescents in form of pornographic photos and videos. As in the driving factors, health workers, family, and peers have the influence related to information, communication, and motivation among adolescents. However, adolescents prefer to tell reproductive problems to their friends.

Keywords: Adolescent, Behavior, Premarital sex.

INTRODUCTION

Adolescence covers the period between childhood and adulthood, from the age of 10 to 19. It is a unique phase of development to humans which has an important role in forming a strong foundation of health. During adolescence, individuals experience rapid growth in terms of physical, cognitive, psychosocial, and also sexual maturation. This phenomenon affects the perception, thinking, decision-making, and interaction of adolescents with their surrounding environment (Kemenkes, 2022; Organization, 2024). Menarche is an indication of fertility which a person is sexually active and the period of sexual maturity later affect the patterns of social and sexual behavior such as dating and sex (Statistik, 2020).

Premarital sexual behavior has negative effects on adolescents including

the risk of adolescent pregnancy, feelings of distress, anxiety, profound concern for bearing the burden of fatherhood and motherhood, feelings of shame and guilt, societal exclusion, quarrels or abandonment by the father of the conceived child, abortion, and having sexually transmitted diseases (Burhanudin et al., 2022).

The latest Global School-based Student Health Survey (GSHS) data from 69 countries that have conducted at least one survey between 2003 and 2017 to measure the prevalence of sexual behavior among adolescents aged 12 to 15 years. Specifically, the overall rate of adolescents who ever had sexual intercourse was 6.9%. The overall rates of having multiple sexual partners and condom use at last sex were 52.0% and 58.1%, respectively (Jing et al., 2023).

Changing sexual partners and having unprotected sex with irregular partners are

some risky sexual behaviors (Mesele et al., 2023). The three main factors that cause premarital sexual behavior in adolescents are predisposing factors in the form of knowledge and attitudes, supporting factors in the form of health facilities and infrastructure including how adolescents get information about reproductive health and driving factors in the form of the influence of attitudes and behavior of family, peers, and health workers (Wahyuni et al., 2023).

Premarital sexual behavior among students is associated with exposure to internet access. Adolescents who frequently access internet have a 5.8-fold risk of engaging in premarital sexual behavior compared to adolescents who rarely access internet media (Kusumawardani et al., 2024).

The population in Central Sulawesi aged 10-19 years consists of 277,395 males and 268,903 females. According to the report, there were 29 cases of HIV in male adolescents while in females only 8 cases. In the age group of 20-24 years, as many as 151 people (133 men and 18 women) have HIV (Aulia et al., 2022).

A total of 14 Puskesmas (health center) that have been trained for Youth Care Health Services (PKPR), only 9 Puskesmas have implemented PKPR management in their working areas during 2020. A total of 6,456 PKPR services were provided covering menstrual disorders, premarital sex, adolescent pregnancy, adolescent childbirth, anemia, CED, smoking, STIs, and mental health problems. The annual report of the family health section of the Palu City Health Office regarding the PKPR service found 100 cases of adolescent premarital sex in 2018 within 4 Puskesmas, 2 cases in 7 Puskesmas reported in 2019, and 4 cases in 9 Puskesmas in 2020 (Palu, 2020).

Based on the preliminary study of researchers at the Mambo Health Center and interviews with the manager of the Posyandu activities for adolescents, there were 5 pregnant adolescents, these adolescents had their reproductive health checked after they were found to be pregnant. Youth empowerment activities (Posyandu remaja) at the Mambo Health Center began in December 2021 in Mambo Induk, West Mambo, and Taipa Villages.

Based on the problems that have been described, premarital sex in

adolescents is considered as complicated and might negatively affect adolescent reproductive health. Therefore, this study aimed to explore the predisposing factors (knowledge and attitude), supporting factors (media influence), and driving factors (influence of health workers, family, and peers) regarding premarital sex in adolescents, so that the results obtained acts as the basis of interventions for adolescents in the working area of the Mambo Health Center in order to avoid reproductive health problems that may harm the future of adolescents.

METHODS

Study Design

This research is a qualitative study with case study design carried out intensively using various sources of evidence on the problem of premarital sex in adolescents. This research was conducted in the working area of the Mambo Health Center, North Palu District, Palu City from May to June 2022.

Research Sample

The informant was determined by purposive sampling. The key informants in this study were health workers who manage Posyandu remaja programs at the Mambo Health Center. Main informants are those who know technically and in detail about the problem of premarital sex and media use in adolescents and supporting informants in this study are family and peers of adolescents.

Data Analysis

This study conducted by in-depth interview using unstructured, open-ended interview. The interview guidelines used are in the form of outlines of the problems to be asked. Data were analyzed use content analysis approach with matrix techniques where the information obtained is processed in a table including numbers, variables studied, informant codes, emic, etic, and conclusions.

Ethical Clearance

The research was conducted based on the research recommendation of Palu City Government, National Unity and Political Agency number: 071/184.23/Bakabangpol.

RESULTS AND DISCUSSION

Informants Characteristics

The informants in this study were 10 people consisting of 6 main informants: adolescents aged 10-18 years and domiciled in the working area of Mamboro Health Center, then supplemented by 1 key informant: the officer holding the Posyandu remaja program, as well as 3 supporting informants: 2 families and 1 peer of the main informant.

Table 1. Characteristics of informants.

| Initial | Sex | Age | Occupation |
|---------|--------|-----|------------|
| Y | Female | 29 | Midwife |
| MR | Female | 17 | Housewife |
| SA | Female | 17 | Housewife |
| AS | Female | 17 | Housewife |
| AN | Male | 18 | Student |
| AI | Male | 16 | Student |
| R | Male | 17 | Student |
| A | Female | 56 | Housewife |
| RS | Female | 41 | Housewife |
| S | Female | 17 | Student |

Source: Primary Data 2022

Knowledge

From the interviews conducted with the main informants to find out the level of knowledge of informants about what sex is, the answers are as follows:

"Sex is like intercourse, yes, sexual intercourse hmm" (MR 17 years old, May 28, 2022).

"Engaging in conjugal intercourse" (SA 17 years old, May 29, 2022).

"Having a relationship with the opposite sex to the point of doing negative things, kissing, hugging, grobing and getting pregnant" (AS 17 years old, May 31, 2022).

"Sex is like having a relationship between people of the opposite sex, such as having intercourse" (AN 18 years old, June 8, 2022).

"Sex is also related to hormone levels and the shape of the reproductive organs, the occurrence of sperm cells and eggs until they become fertilized because they do not use safety and vice versa, if they use safety it does not become fertilized" (AI 16 years old, June 19, 2022).

"Sex is promiscuity isn't it, intercourse isn't it (the informant asked the researcher), intercourse, sex is intercourse that's all" (R 17 years old, June 19, 2022).

In-depth interviews were conducted with main informants to find out about the forms of sex and whether they had ever practiced it, and the following answers were obtained:

"Like kissing, hugging, well that's all I know, yes I have, like kissing, having sex" (MR 17 years old, May 28, 2022).

"Forms of sex between men and women, I have, because we both want to, kissing, hugging, to the point, having intercourse" (SA 17 years old, May 29, 2022).

"Ehh kissing, sleeping together, holding hands, have slept together, holding hands, kissing" (AS 17 years old, May 31, 2022).

"Forms of sex are hugging, kissing, ee hand holding that's all I know, I have held hands, hugging, that's all" (AN 18 years old, June 8, 2022).

"Ee sexual intercourse is kissing, intercourse, ee especially kissing ee hehe that's all, yes once, just kissing, that's all, never anything other than that" (AI 16 years old, June 19, 2022).

"Sex, kissing, intercourse, that's all, kissing, intercourse once" (R 17 years old, June 19, 2022).

Based on the results of interviews conducted by researchers to adolescents regarding what adolescents know about sex, it was found that all adolescents knew what sex was. Adolescents said sex is having intercourse, conjugal intercourse, kissing, reproductive organs, and promiscuity. In-depth interviews were also conducted with adolescents related to knowledge questions regarding what adolescents know about forms of sex, it was found that all adolescents knew what forms of sex very well, including kissing and having sexual intercourse, which is in line with research conducted by Hanifah (2022) that sexual activity is a way for someone to express and fulfill their sexual desires and urges that are hidden in their minds and carried out through sexual intercourse with the opposite sex.

In-depth interviews were conducted with main informants to find out the factors of premarital sex in adolescents, and the following answers were obtained:

"Factors such as temptation" (MR 17 years old, May 28, 2022).

"Lust, love" (SA 17 years old, May 29, 2022).

"Pregnant, pregnant at an early age, lust" (AS 17 years old, May 31, 2022).
"Because of lust, because of watching porn videos, seeing photos, photos (laughing) like people not wearing clothes" (AN 18 years old, June 8, 2022).
"Ee because of the environment, economic factors, socialization too, ee that's all" (AI 16 years old, June 19, 2022).
"Being alone somewhere, especially that's probably all" (R 17 years old, June 19, 2022).

In-depth interviews were conducted with adolescents related to knowledge questions regarding what adolescents know about the factors of premarital sex, the results showed that all adolescents knew the factors of premarital sex very well, including lust, love, watching pornographic videos, the environment, and being alone, which is in line with research conducted by Firdaus (2023) which stated adolescents have sexual intercourse before marriage spontaneously without careful planning and because of love.

In-depth interviews were conducted with main informants to find out the impact of premarital sex, and the following answers were obtained:

"Anything like getting pregnant, sometimes slow menstruation hmm iyah well that's it just those two" (MR 17 years old, May 28, 2022)
"Getting pregnant" (SA 17 years old, May 29, 2022)
"Getting pregnant, abortion, infectious diseases" (AS 17 years old, May 31, 2022)
"Pregnancy outside of marriage is just that, because both of them want to" (AN 18 years old, June 8, 2022)
"Pregnancy, conception happened because not using safety" (AI 16 years old, June 19, 2022)
"What happens is marriage out of wedlock, especially aa I don't know what all, that's all maybe, em dropping out of school, that's especially one a premature ejaculation, that's all there is again" (R 17 years old, June 19, 2022).

In-depth interviews were conducted with main informants to find

out about reproductive health diseases that will arise if they engage in premarital sex, and the following answers were obtained:

"Hmmm the impact? hmmm no, because he only had sex with me" (MR 17 years old, May 28, 2022)
"No, because he only did it with one woman not more than that, yes, only with me" (SA 17 years old, May 29, 2022)
"Yeah, because I didn't use safety, umm because of using a condom, for example HIV" (AS 17 years old, May 31, 2022)
"Affected, because many people use that woman, and then I had sex with her, so I get syphilis, gonorrhea, bloody urine that's all" (AN 18 years old, June 8, 2022)
"Well, because of frequent change of partners, sexual intercourse, emm what else a that's all, HIV AIDS ee then that, that's all" (AI 16 years old, June 19, 2022)
"It depends, how clean the woman is or not, it especially depends on whether her body is clean on a long scale or not, that's all maybe, syphilis, HIV, what else a, those two are all" (R 17 years old, June 19, 2022).

In-depth interviews conducted with adolescents related to knowledge questions about the impact of premarital sex, the results showed that all adolescents knew the impact of premarital sex well, including pregnancy, sexually transmitted diseases and abortion, dropping out of school, and premature ejaculation.

In-depth interviews were also conducted with adolescents regarding questions of knowledge about sexually transmitted diseases, the results showed that most adolescents were well aware that adolescents who have sex before marriage can contract sexually transmitted diseases, including HIV/AIDS and syphilis, which is in line with research conducted by Rahmawati (2023) that the impact of premarital sexual behavior is depression, low self-esteem, reproductive organ disorders and sexually transmitted diseases, extramarital pregnancy, sex addiction, regret, decreased academic performance, social sanctions and sexual deviations among adolescents.

Attitude

In-depth interviews were conducted with the main informants to find out the informants' attitudes towards premarital sex, and the following answers were obtained:

"Hmm actually hmmm no hehehe not good, because it's ee still underage, yes still underage" (MR 17 years old, May 28, 2022).

"Sinful, because he is not yet mahram (Islamic term of someone we can have sex with), because I have been harmed" (SA 17 years old, May 29, 2022).

"Actually it's not allowed, it's prohibited by religion, parents, hmm" (AS 17 years old, May 31, 2022).

"It's not good, because it's sinful, it's prohibited by religion that's all" (AN 18 years old, June 8, 2022).

"My opinion is what a, what is my opinion a e getting rumors or a bad reputation, feeling less confident and losing trust and feeling emotional effects that's all, it's not good, don't do that, because it's e what in religion is not good and also it's not legal, it's not legal in religion and in what is it, like that" (AI 16 years old, June 19, 2022).

"Opinion about (the respondent asked the researcher), no, it's not good actually, it can cause early marriage by ruining the future that's all" (R 17 years old, June 19, 2022).

Based on the results of interviews conducted by researchers to adolescents regarding adolescents' attitudes towards premarital sex, the results show that all adolescents have a positive attitude or attitude that rejects premarital sexual intercourse. Adolescents say that adolescents who have sex before marriage are bad things, sinful, prohibited by parents, and prohibited by religion. Adolescents initially refused when invited to have sexual intercourse and then became willing when they were invited several times on the grounds of mutual love, which is not in line with research conducted by Utami (2023) which stated that there is a correlation between adolescents' attitudes towards premarital sex and how they do it. The permissive view of adolescents has a very bad effect on themselves. The more adolescents who show a permissive attitude, the higher their risk of engaging in premarital sexual behavior.

Media Influence

In-depth interviews were conducted with main informants to find out the use of media (social and internet) for sex information, and the following answers were obtained:

"Yes, hmm what for, to know so e, cellphone, information like hmm like seeing kissing, hugging, having sex like that, it's like being shown by other people like that, the video is sent via WhatsApp, hmm like a friend sends it and then sends it again like that, Facebook and WhatsApp only" (MR 17 years old, May 28, 2022).

"No, because I don't use a cellphone, from my own boyfriend, it is mutual love, he did it, immediately had intercourse" (SA 17 years old, May 29, 2022).

"No, but I have seen like the movies that usually appear on cellphones, ee Korean movies, such as kissing, hugging, Tiktok, Instagram, Facebook, and Twitter, eehh entertainment hmm, from other people, boyfriends, and the media" (AS 17 years old, May 31, 2022).

"Once, out of curiosity, turbo VPN media, VPN master, opera mini, google chrome, Tiktok, WA, IG, with Youtube, once Youtube, I got information from Youtube such as videos, photos, movies of naked people, by kissing, hugging, by having sex, from other people, friends, through Facebook, videos, photos, WhatsApp, the form of links, Youtube type links" (AN 18 years old, June 8, 2022).

"Once, to find out so as not to do so, like having sexual intercourse so, so that I know, I tell people too so that people don't do so, Google, ee Instagram, Facebook, TikTok, many benefits, to know so as not to do so, oohh I'm looking for e what is HIV AIDS, e how to not concede conception so, e then that so as not to have sexual intercourse so that's all, look for yourself by getting it from other people, forms of media, photos images ee writing so that's all" (AI 16 years old, June 19, 2022).

"Once, because of hahahahaha a friend, he googled, Youtube blue Yandex yes that's it, about free sex, various styles oh my god haha, from friends, at first it was like he said this information was good, let's watch it, there is a good"

style, I want to try it, I was innocent before" (R 17 years old, June 19, 2022).

In-depth interviews were also conducted with main, key and supporting informants to find out the relationship of media (social and internet) to adolescents' premarital sexual behavior, and the following answers were obtained:

"There is, I want to try it" (MR 17 years old, May 28, 2022).

"Yes, Twitter media, because I have a boyfriend showing me" (SA 17 years old, May 29, 2022).

"There is, em because I've seen doing it" (AS 17 years old, May 31, 2022).

"There is, the reason is because I opened it, I opened it on google chrome, I opened it out of curiosity I've never seen anything like that" (AN 18 years, June 8, 2022).

"Eee there is, like taking pictures like that, like selling yourself on social media like that, that's all" (AI 16 years old, June 19, 2022).

"There is, because I want to try new things, then what e I don't know, I get dizzy being asked if this is like this" (R 17 years old, June 19, 2022).

"Yes, there must be, ee because in the media there must be pornographic videos that can only be seen by 18 plus there must be, ee TikTok, Facebook, Instagram, ee even WhatsApp" (Y 29 years old, June 22, 2022).

"No, there is no cellphone, that I don't use a cellphone" (A 56 years old, June 25, 2022).

"Oh yes there is, because what's the name, they usually send videos that are not good, like perverted videos like that, videos that what e videos I don't know how to explain (laughing) like videos that are already husband and wife and like porn videos so, through WhatsApp, because many of my friends have become pregnant outside of marriage, many have, more than 5 I think" (S 17 years old, June 25, 2022).

"Maybe there is, because he is hiding, maybe so until I don't know, maybe there is, but I don't know because my son has a cellphone too, so I don't understand that" (RS 41 years old, June 28, 2022).

In-depth interviews were conducted with main informants to find out the shortcomings of the media (social and

internet), and the following answers were obtained:

"Like being able to watch pornographic videos, from watching the video you can have sex" (MR 17 years old, May 28, 2022).

"I don't know, because I was immediately given a video, the impact is that the lust increases" (SA 17 years old, May 29, 2022).

"Nothing, I'm normal" (AS 17 years old, May 31, 2022).

"The drawback is paused, the video is closed, the impact is, the impact if I watch it happens like that, like hugging, holding hands, kissing" (AN 18 years old, June 8, 2022).

"The disadvantages of using the media, the disadvantages are that many people misuse, misuse social media for personal needs, that's all I think, ee like looking for photos, videos that are about sex, the video then they spread it, like editing to change people's photos, they spread it so that people are like how is it, it's dirty so aaa" (AI 16 years old, June 19, 2022).

"The disadvantages may be that now it has been blocked, the site used to be easy to open, the negative impact is because, because of trying media I can do new things" (R 17 years old, June 19, 2022).

Based on the results of interviews conducted by researchers to adolescents regarding whether or not they have used the media (social and internet) as a source for sex information, the results showed that all adolescents have used the media to find out how to kiss, have sex, see pornographic photos and videos, how to prevent pregnancy, and watch Korean movies that have kissing scenes. Adolescents get this information from friends, girlfriends/boyfriends, and through WhatsApp, Facebook, TikTok, Instagram, Twitter, Turbo VPN, VPN Master, Opera Mini, Google Chrome, Youtube, Youtube Blue Yandex and links.

In-depth interviews were also conducted with health workers, families, and peers of adolescents regarding the link between media and adolescent premarital sexual behavior, the results showed that most said there was an association between media to adolescent premarital sexual behavior because the media may influence adolescents to try what they see

because of excessive curiosity, intention to 'sell' themselves on social media, pornographic videos, and pornographic links sharing to each other.

In-depth interviews were also conducted with adolescents regarding questions about the shortcomings of the media. Adolescents said that with the media, they can watch pornographic videos, increased lust due to watching porn, misuse social media for negative reasons, and pornographic sites are easy to access which is in line with research conducted by Winahyu (2016) that adolescents' great curiosity encourages many adolescents to open social media, especially media that focuses on pornographic content because it makes it easy to access.

Health Worker Influence

In-depth interviews were conducted with main informants to find out the presence and absence of Posyandu remaja at Mamboro health center, and the following answers were obtained:

"Hmm nothing, yes indeed nothing" (MR 17 years old, May 28, 2022).

"There is, from Posyandu, I didn't participate because I was embarrassed, because I covered up the pregnancy" (SA 17 years old, May 29, 2022).

"No, in the media or with people" (AS 17 years old, May 31, 2022).

"There is, activity like gathering is all I know, I don't participate because I don't want to, I don't want to" (AN 18 years old, June 8, 2022).

"I Never find out, ee to the Puskesmas, see like, the information notices at the Puskesmas, that's all" (AI 16 years old, June 19, 2022).

"Never, I am usually only given information by my grandmother, because my grandmother is often also at the Puskesmas, BKKBN people, so far there is none" (R 17 years old, June 19, 2022).

In-depth interviews were also conducted with key informant to find out whether or not the Puskesmas remaja activities at Mamboro health center had educated about sex, and the following answers were obtained:

"Hmm never, ee usually only measure height, weight, with blood pressure for the time being" (Y 29 years old, June 22, 2022).

Based on the results of interviews conducted by researchers to adolescents regarding whether or not they have heard that there are Posyandu remaja programs at the Mamboro Health Center, the results show that most adolescents have never heard about the program. The other adolescents answered that they had heard that there are Posyandu remaja in Mamboro health center and got the information from Posyandu, friends, and family. Adolescents said they did not participate in the activities because they were ashamed of being pregnant before marriage and did not have the desire and from the health worker's statement that the Posyandu remaja program at Mamboro health center have never educated about sex.

Health workers explained that adolescents who participated in Posyandu remaja at the Mamboro Health Center only received services for measuring height, weight, and checking blood pressure. Information on Posyandu remaja activities is only carried out through the loudspeakers of mosques in the working area of Mamboro health center, this affects adolescents in accessing information on these activities. These results are in line with research conducted by Maesaroh & Iryadi (2020) that the factors that play a role in youth empowerment include the role of health center. Health workers are expected to have a significant role in youth empowerment activities, especially in monitoring and facilitating youth activities. Health workers can measure the implementation of empowerment programs by tracking the number of targets interested in attending each activity, tracking the frequency of attendance of adolescent target groups at each activity and increasing the ease of program implementation to attract adolescents to participate in empowerment activities.

Family Influence

An in-depth interview was conducted with the main informants to find out whether or not their family had provided an understanding of what sex is, and the following answers were obtained:

"Yes, hm related to not being too excessive in dating, just casual dating, no sexual intercourse" (MR 17 years old, May 28, 2022).

"Nothing, I only know from my boyfriend" (SA 17 years old, May 29, 2022).

"Once, prohibition, making it, prohibition of having sex" (AS 17 years old, May 31, 2022).

"Never, I just ask friends" (AN 18 years old, June 8, 2022).

"Never, ee find out on social media, ee like what sex is, why do people have sex, what are the factors e that's all" (AI 16 years old, June 19, 2022).

"Once, it is not allowed to approach adultery like that and to be alone by ourself, it's just that it has happened what else can it be" (R 17 years old, June 19, 2022).

In-depth interviews were conducted with supporting informants to find out whether or not they had provided information on what sex is to their children, and the following answers were obtained:

"Never, because she is not old enough" (A 56 years old, June 25, 2022).

"No, I haven't, she is still a child, underage" (RS 41 years old, June 28, 2022).

Based on the results of interviews conducted by researchers to adolescents regarding whether or not the family has provided an understanding of sex, the results showed that some adolescents have received an understanding of what sex is from their families. Adolescents said that the family prohibited excessive dating, sex before marriage, and approaching adultery. Other adolescents did not get an understanding of sex from their families. Adolescents stated they learned about sex from boyfriends, friends, and social media. The existence of family influence in adolescents' premarital sexual behavior is supported by statements from adolescents' families that they have never provided sex information, because they feel that their children are not old enough to get an understanding of sex.

These results are in line with research conducted by Muslim & Ichwan (2020) that parents are the main educators who educate sex to children, so it is very important for them to understand what will be taught to children. According to parents' understanding, sex education is the relationship between men and women. If children ask questions about sex to

others, parents are more accepting of such questions from their children than asking them to others. This is because the answers given by the child may not match their needs and preferences. Parents are the first and foremost people to teach sex education to young children at home, as they are the closest to the child and have the greatest influence on their child's growth and future.

In-depth interviews were conducted with main informants to find out whether or not they had ever shared reproductive health problems that were being experienced with their families, and the following answers were obtained:

"Never, because I'm afraid" (MR 17 years old, May 28, 2022).

"No, I'm afraid that my parents will be angry with my boyfriend" (SA 17 years old, May 29, 2022).

"No, because I don't feel anything" (AS 17 years old, May 31, 2022).

"Never, because I am afraid my parents would find out, if they found out, they would beat me" (AN 18 years old, June 8, 2022).

"Never, because I don't feel anything" (AI 16 years old, June 19, 2022).

"Never, because I have never had a disease, there is no disease in my reproductive organs, I know because I am healthy I think, if I am not healthy I think then I know I am sick (answer while laughing)" (R 17 years old, June 19, 2022).

In-depth interviews were also conducted with supporting informants to find out whether or not they have provided solutions to reproductive health problems that their children are experiencing, and the following answers were obtained:

"Once, getting married" (A 56 years old, June 25, 2022).

"Once, I told her to keep clean, if she was on her period to keep clean, everything need to be cleaned" (RS 41 years old, June 28, 2022).

In-depth interviews were conducted with adolescents regarding whether or not they had ever told their families about their reproductive health problems. The results showed that all adolescents never told their families about their reproductive health problems because of the fear of the parents will be angry, the feeling that they do not have reproductive health problems,

and fear of being beaten by their parents. Adolescents prefer to tell their reproductive health problems to their girlfriend/boyfriend rather than their parents, so they get inaccurate information related to the sexual problems they experience, while statements from families about solutions to reproductive health problems that their children are experiencing by telling them to get married and maintain hygiene during menstruation.

These results are in line with research conducted by Thaha (2021) that in reality many adolescents are reluctant to talk about their reproductive health problems with their parents, because they feel embarrassed, afraid of being scolded or punished. In addition, many adolescents do not know that they suffer from reproductive health diseases, but still refuse or check them at health facilities, therefore, there is a need for appropriate information to be given to adolescents about reproductive health.

In-depth interviews were conducted with the main informants to find out whether or not they had dated, and the answers were as follows:

"I did, but my parents didn't allow it, because one of them was like afraid that in the end, dating would lead to temptation, pregnancy, like being given advice that dating must be good, don't overdo it" (MR 17 years old, May 28, 2022).

"Well, parents allow it, they say just be careful, don't go too far" (SA 17 years old, May 29, 2022).

"Once, because parents didn't tell me, uh actually it's not forbidden, but it's not the time yet, school first and then its okay" (AS 17 years old, May 31, 2022).

"Yes, they allowed it, because there is a family connection, the reason is because my parents like my girlfriend too" (AN 18 years old, June 8, 2022).

"Yes, it's normal" (AI 16 years old, June 19, 2022).

"Once, if I didn't date, I wouldn't have my child, my parents allowed it with my ex-wife then, they said it's okay to date, as long as you don't go out of home" (R 17 years old, June 19, 2022).

In-depth interviews were also conducted with supporting informants to find out whether there was a prohibition

on their children having a special relationship (boyfriend or girlfriend), and the following answers were obtained:

"No, the reason is that they like each other, my children because they like each other, including the family, my nephew" (A, 56 years old June 25, 2022).

"No, because maybe he already knows himself a little, takes care of himself, I can't press him, so that he knows how to take care of himself, so that he knows what is allowed and what is not allowed" (RS 41 years old, June 28, 2022).

In-depth interviews were conducted with adolescents regarding whether or not they had dated, and the results showed that all adolescents had dated because they received permission from their parents, received trust from their parents, had a family relationship with their boyfriend or girlfriend, and their parents liked their boyfriend or girlfriend. This is influential in adolescent sexual behavior, which is supported by statements from the parents that they allow their children to date because their children like their boyfriend or girlfriend, have family connection, and the feeling that children are able to take care of themselves. These results are not in line with research conducted by Widyanti (2023) that parents become guardians in adolescent behavior when they are involved in activities or relationships outside the home. Parents supervise and control their children so that they are not involved in promiscuity.

Peer Influence

In-depth interviews were conducted with main informants to find out whether or not they had discussed sex with friends, and the following answers were obtained:

"Yes, like a friend said try it, e one of them kissing with intercourse" (MR 17 years old, May 28, 2022).

"No, information from my boyfriend only, like we meet here, ee don't bring friends, we have intercourse, have sex" (SA 17 years old, May 29, 2022).

"Once, it was about the relationship that was done" (AS 17 years old, May 31, 2022).

"Never, ee like kissing, hugging, having sex, holding hands that's all" (AN 18 years old, June 8, 2022).

"Never, find out with friends usually, we discuss sex like how in school, not

like how we find out it we are like learning together, told by health workers, they tell what HIV AIDS is, all kinds of things, how to avoid it e how to cure it" (Al 16 years old, June 19, 2022).

"Never, often in fact, I have a friend in black clothes (while pointing to his friend), as have iver had sex, usually stated I had, how long has it been going out (while laughing)" (R 17 years old, June 19, 2022).

In-depth interviews were also conducted with supporting informant to find out whether or not they had discussed sex with friends, and the following answers were obtained:

"I have, like about viral videos (laughs), usually when using WhatsApp it is common to send things that are not good, like porn videos" (S 17 years old, June 25, 2022).

Based on the results of interviews conducted by researchers to informants regarding whether or not they have discussed what sex is with friends, the results showed that all informants have discussed what sex is with their peers. Informants said their discussions such as trying to kiss and have sex and how to prevent and cure reproductive diseases, which can affect adolescent sexual behavior and are supported by statements from supporting informants that they have discussed what sex is with their friends. Informants said they discussed watching videos containing pornographic elements that they got from links shared on WhatsApp.

These results are in line with research conducted by Maryanti (2021) that adolescents prefer to talk about sexual issues such as kissing and premarital sex with their friends rather than with their parents or teachers, even if they know that the information provided is not always correct. It is concerned that adolescents will be influenced by friendships in their social environment and even follow the deviant behavior of their peers.

In-depth interviews were conducted with the main informants to find out whether or not they had ever shared reproductive health problems that were being experienced with friends, the answers were obtained as follows:

"Never, with boyrfriend, it's only with my boufriend, if it's with a friend, it will definitely be exposed like that" (MR 17 years old, May 28, 2022).

"No, if I tell my friends, it will be revealed to everyone, only to my boyfriend, stress, dizziness, then after that he told his parents, came to my house with my parents to talk about pregnancy and marriage" (SA 17 years old, May 29, 2022).

"No, not to anyone, to my boyfriend, because only he can be trusted" (AS 17 years old, May 31, 2022).

"Yes, genitals, hugging before marriage and holding hands" (AN 18 years old, June 8, 2022).

"Never, I don't talk about it to anyone, I'm embarrassed, because it's privacy, because I'm embarrassed to talk to my friends" (Al 16 years old, June 19, 2022).

"I told my friends first and then my mom, I have pain, like when I urinate" (R 17 years old, June 19, 2022).

In-depth interviews were also conducted with supporting informant to find out whether or not their friends had ever told them about reproductive health problems they experienced, and the following answers were obtained:

"Yes, once it was like a normal slow period, she had her period with abdominal pain, back pain, ohh yes, she once dated and then she told me she had sex like that, kissing, like inappropriate things" (S 17 years old, June 25, 2022).

In-depth interviews were also conducted with adolescents regarding whether or not they had ever told their friends about the reproductive health problems they were experiencing. The results showed that as many as one adolescent had never told their peers about the reproductive health problems they were experiencing because they felt embarrassed and considered it a matter of privacy. The majority of other adolescents have shared reproductive health problems that are being experienced with their peers and partners, such as pregnancy and reproductive organ problems that affect adolescent sexual behavior and are supported by statements from supporting informants that their friends have shared reproductive health problems that are

being experienced with them such as menstrual problems and premarital sexual acts.

These results are in line with research conducted by Sari (2020) that if someone has had premarital sex, they will tell it to close friends. His friend's story makes adolescents curious to do it too with his girlfriend. As a result, this information spreads to other friends who can then have premarital sex without their parents knowing.

CONCLUSION

This study concludes that knowledge in premarital sex behavior of adolescents in the working area of Mamboro health center in terms of understanding, forms, factors, and the impact of premarital sex can be well-mentioned by adolescents.

The attitude in premarital sexual behavior of adolescents towards premarital sex is a positive attitude or a refusal to premarital sexual intercourse. Adolescents initially refused when invited to have sexual intercourse and then became willing when they were invited several times on the grounds of mutual love. The ease of accessing media causes adolescents to indirectly access pornographic images and videos that lead them to have sexual intercourse before marriage.

The role of health workers in the working area of Mamboro health center in terms of information on youth empowerment activities is still lacking, resulting in a decrease in adolescent visits to Posyandu remaja activities and the absence of motivation from health workers impact the adolescents' motivation to consult and examine reproductive health.

Insufficiency of family role in the working area of Mamboro health center on adolescents getting an understanding of sex from the family, lack of communication with the family, the family gives freedom in dating, and the lack of parental concern for reproductive health resulting on adolescents do not get the right sexual information.

The role of peers indicated that adolescents prefer to share reproductive problems that are being experienced with friends, and accept solutions from their friends even if they know that the information is not always correct.

This research was only carried out in one place, namely in the working area of

the Mamboro Health Center, so the results could not be generalized to other areas. To improve reliability, future research could be conducted in several different places to compare the results. The development of adolescent reproductive health education programs as a form of implementation of the PKPR program at the Mamboro Health Center needs to be implemented.

REFERENCES

- Aulia, S., Handayani, F., Sulistiana, R., & Lintin, G. B. R. (2022). Perbandingan Luaran Klinis Pasien Stroke Hemoragik dengan Hipertensi dan Non Hipertensi di UPT RSUD Undata Provinsi Sulawesi Tengah Periode Maret 2020-Maret 2022. *INSOLOGI: Jurnal Sains Dan Teknologi*, 1(6), 827-834.
- Burhanudin, B., Siti, B., & Tri, U. (2022). *Pendidikan Seksual Komprehensif untuk Pencegahan Perilaku Seksual pada Remaja*. CV. MEDIA SAINS INDONESIA.
- Firdaus, A. R., Saraswati, D., & Gustaman, R. A. (2023). Analisis Kualitatif Faktor Perilaku Seksual Pranikah Remaja Berdasarkan Teori Perilaku Lawrence Green (Studi Kasus di Wilayah Kerja Puskesmas Cilembang Kota Tasikmalaya). *Jurnal Kesehatan Komunitas Indonesia*, 19(2), 75-92.
- Hanifah, S. D., Nurwati, R. N., & Santoso, M. B. (2022). Seksualitas dan Seks Bebas Remaja. *Jurnal Penelitian Dan Pengabdian Kepada Masyarakat (JPPM)*, 3(1), 57.
- Jing, Z., Li, J., Wang, Y., & Zhou, C. (2023). Prevalence and trends of sexual behaviors among young adolescents aged 12 years to 15 years in low and middle-income countries: population-based study. *JMIR Public Health and Surveillance*, 9(1), e45236.
- Kemenkes, R. I. (2022). Kesehatan Reproduksi Remaja: Permasalahan dan Upaya Pencegahan. *Direktorat Jendral Pelayanan Kesehatan*.
- Kusumawardani, N., Ramani, A., & Cahyaningrat, D. B. (2024). *Internet Media Exposure to Premarital Sexual Behavior in Students at SMAN 1 Dringu, Probolinggo Regency 2023*.
- Maesaroh, M., & Iryadi, R. (2020). Pengaruh Empat Faktor Terhadap Pemberdayaan Remaja Dalam Upaya

- Pencegahan Seks Bebas Pada Program PKPR. *Syntax Literate; Jurnal Ilmiah Indonesia*, 5(4), 92-109.
- Maryanti, S. (2021). Faktor-Faktor yang Mempengaruhi Perilaku Seksual pada Remaja Putri Kelas XII di SMA Negeri 1 Unaaha Kabupaten Konawe. *Jurnal Kebidanan Vokasional*, 6(1), 24-33.
- Mesele, J., Alemayehu, A., Demisse, A., Yusuf, M., Abubeker, F., Ahmed, M., & Jemal, A. (2023). Level and determinants of knowledge, attitude, and practice of risky sexual behavior among adolescents in Harar, Ethiopia. *SAGE Open Medicine*, 11, 20503121221145540.
- Muslim, M., & Ichwan, I. (2020). Peran Orang Tua Dalam Pendidikan Seks Pada Anak Usia Dini. *Pelangi: Jurnal Pemikiran Dan Penelitian Pendidikan Islam Anak Usia Dini*, 2(1), 60-73.
- Organization, W. H. (2024). *The adolescent health indicators recommended by the Global Action for Measurement of Adolescent health: guidance for monitoring adolescent health at country, regional and global levels*. World Health Organization.
- Palu, D. K. (2020). *Profil Kesehatan Kota Palu*. Palu.
- Sari, L. Y., Umami, D. A., & Darmawansyah, D. (2020). Dampak Pernikahan Dini Pada Kesehatan Reproduksi Dan Mental Perempuan (Studi Kasus Di Kecamatan Ilir Talo Kabupaten Seluma Provinsi Bengkulu). *Jurnal Bidang Ilmu Kesehatan*, 10(1), 54-65.
- Setyowati, I., Rohaya, & Rahmawati, E. (2023). *Factors Associated With Exclusive Breastfeeding Practice*. 9(2), 214-219.
- Statistik, B. P. (2020). *Penduduk Indonesia Hasil Long Form Sensus Penduduk 2020*.
- Thaha, R. Y., Riswan, R., & Yani, R. (2021). Factors Affecting Adolescent Knowledge About Reproductive Health at SMPN 1 Buntao, North Toraja Regency. *Jurnal Komunitas Kesehatan Masyarakat*, 3(2), 52-74.
- Utami, S. R., Krisnatuti, D., & Yulianti, L. N. (2023). DETERMINAN PERILAKU BERISIKO PADA REMAJA DARI PERSPEKTIF EKOLOGI. *Jurnal Ilmu Keluarga & Konsumen*, 16(3), 261-273.
- Wahyuni, Y. F., Fitriani, A., & Mawarni, S. (2023). Hubungan Pengetahuan dan Sikap Remaja dengan Perilaku Seks Pranikah di Desa Kampung Jawa Lama Kota Lhokseumawe. *Media Informasi*, 19(1), 90-96.
- Widyanti, Y. E., & Jatiningsih, O. (2023). Peran Orang Tua dalam Mencegah Pergaulan Bebas Anaknya Desa Sudimoro Kecamatan Tulangan Kabupaten Sidoarjo. *Kajian Moral Dan Kewarganegaraan*, 11(1), 32-48.
- Winahyu, L., Husodo, B. T., & Indraswari, R. (2016). Faktor-faktor yang berhubungan dengan perilaku seksual berisiko pada trucker di Pelabuhan Tanjung Emas Semarang. *Jurnal Kesehatan Masyarakat*, 4(5), 330-338.

Eating Less to Impress? The Influence of Cross-Gender Presence and Impression Management on Portion Sizes among Undergraduate Students

Gracia Pramudita✉¹⁾, Anna Undarwati¹⁾

¹ Psychology Study Program, Faculty of Education and Psychology, Universitas Negeri Semarang, Semarang, Central Java, Indonesia 50229

✉Email: pramuditagracia@gmail.com

ABSTRACT

Background: Data from the RISKESDAS year 2018 indicates an increasing prevalence of overweight among adults. This increase is in line with the increase in portion sizes, where the presence of people of different gender and impression management are suspected to influence portion sizes. Hence, further study on portion sizes is needed to aid in developing effective policies to promote healthy eating behaviors. **Objectives:** To investigate the influence of cross-gender presence and impression management on portion sizes during lunch. **Method:** This study employed a quasi-experimental design consisting of control and experimental groups. The experiment involved a confederate as a dining companion for participants in the experimental group whose gender differs from the participants. We analyzed data from 227 participants, with an expected effect size of $d = 0.25$, significance level (α) of 0.05, and power of 0.95. Participant criteria included being students of Universitas Negeri Semarang (UNNES), not currently on a diet, having no allergies, and not being vegan or vegetarian. Impression management was measured using items from Turnley & Bolino (1999), while portion sizes were measured using the Fake Food Buffet (FFB) developed by Bucher et al. (2011). **Results:** Participants with high impression management tended to have larger portion sizes when dining with individuals of the opposite gender than when dining alone. Impression management positively influenced portion sizes. Without the influence of impression management, when dining with individuals of the opposite gender, participants tended to choose smaller portion sizes compared to when dining alone. **Conclusion:** The community must be aware of the significant influence of high impression management and the presence of individuals of the opposite gender on meal portions. Individuals with high impression management may consider avoiding social eating situations if they want to reduce their portion sizes.

Keywords: Eating behavior, Impression management, Portion size, Social context.

INTRODUCTION

The prevalence of overweight and obesity worldwide continues to rise annually. The World Health Organization reported that by 2016, the global prevalence of obesity reached 13.1%, ranging from 4.7% in Southeast Asia region to 28.6% in America (WHO, 2022). In Indonesia, based on data from RISKESDAS year 2018, the prevalence of overweight (Body Mass Index/BMI ≥ 25) among adults aged 18 and above increased by 5% from 2007 to 2018, while obesity (BMI ≥ 27) increased by 11.3% (Kementerian Kesehatan Republik Indonesia, 2018).

Obesity and overweight lead to non-communicable diseases that pose life-threatening risks. It is known that increasing BMI raises the risk of diseases such as coronary heart disease, ischemic

stroke, and type 2 diabetes (Dale et al., 2017). Moreover, obesity has adverse metabolic effects on insulin resistance, blood pressure, cholesterol, and triglyceride (Czech, 2017; Do Carmo et al., 2016; Mc Auley, 2020; Nur & Warganegara, 2016). WHO reported, out of 56.9 million deaths worldwide, 40.5 million or 71% of deaths were attributed to non-communicable diseases such as heart disease and stroke (World Health Organization, 2018).

Large portion sizes contribute to the risk of obesity and overweight (Livingstone & Pourshahidi, 2014). Portion size refers to the quantity of food consumed at one time, such as how much food is on an individual's plate during lunch (Benton, 2015). Portion size preferences can vary based on factors such as gender, age, hunger, and BMI (Duszka, Hechenberger,

Dolak, Kobiljak, & König, 2022). Over the past few decades, portion sizes of various types of food have increased, in line with the rising rates of obesity (Almiron-Roig, Navas-Carretero, Emery, & Martínez, 2018). Studies show that larger-than-necessary portion sizes can lead to increased energy intake, exceeding daily energy needs, and, if sustained over time, can result in weight gain (Rolls, 2014; Higgins *et al.*, 2019; Robinson, Patel, and Jones, 2023). Reducing portion sizes can be an effective strategy to decrease energy intake and help address the obesity epidemic (Marteau, Hollands, Shemilt, & Jebb, 2015). Therefore, understanding the reasons behind portion sizes will aid in developing effective policies to promote healthy eating behaviors and prevent obesity and overweight (Wongprawmas *et al.*, 2021).

Social contexts are believed to influence portion size (Higgs *et al.*, 2018; Ruddock, Brunstrom, Vartanian, & Higgs, 2019; Suwalska & Bogdański, 2021). Individuals socialize while eating, a phenomenon known as social eating (Ruddock, Brunstrom, & Higgs, 2021). Social eating is thought to trigger large portions of food as attention to how much they eat is distracted, and it triggers arousal, which can increase hunger or dominant responses (Herman, 2017). According to a study conducted by Ruddock (2021) when individuals know they will be socialized at meals, they anticipate taking larger portions than when they are told they will eat alone. In an experiment measuring participants' food consumption, both when eating alone and with friends in a laboratory setting, was found that social eating led people to consume more food than when eating alone (Hetherington, Anderson, Norton, & Newson, 2006). Both studies indicate that individuals tend to eat more when dining together compared to eating alone.

Eating with friends of the same and opposite gender is suspected to influence portion size. When dining with individuals of the opposite gender, individuals tend to adjust their eating behaviors to create certain impressions (Dibb-Smith & Brindal, 2015). This is related to the concept of impression management, which when individuals adjust their behavior as a mean to create a certain impression of themselves (or self-presentation). Impression management involves

strategies individuals used to influence how they are seen by others. For example, women tend to eat lightly with men, as eating in small quantities give the impression of femininity (Ruddock *et al.*, 2019). According to Jones and Pittman, impression management consists of 5 factors: self-promotion, ingratiation, exemplification, intimidation, and supplication (Bolino & Turnley, 1999). Self-promotion presents individuals who aim to appear competent, thus showcasing their abilities or accomplishments. Ingratiation presents individuals who give flattery or assistance to gain favor from observers. Exemplification presents individuals who willingly to go above and beyond their duties to gain recognition for their dedication. Intimidation presents individuals who display their potential or power to appear threatening. Supplication presents individuals who display their shortcomings or weaknesses to gain the impression of being in need.

Research by Cavazza (2017) found that when dining with a partner, individuals adjust the type and amount of foods they eat to express their gender identity and impression management needs. In other words, individuals tend to use quantity as a form of conveying their gender identity. These findings align with Baker *et al.* (2019) who found that single (uncoupled) individuals tend to consume fewer calories when eating with an attractive member of the opposite gender (Baker *et al.*, 2019). In contrast to these studies, the results of an imaginary meals scenario study stated that impression management was positively associated with the number of foods ordered (Dibb-Smith & Brindal, 2015). Previous research indicates inconsistency in its findings and a limited number of studies which directly stating the relationship between portion sizes and impression management. Therefore, this study aims to understand how social contexts influence portion sizes through the presence of dining companion of different gender and impression management, which to the best of the researcher's knowledge were less explored in Indonesia.

In previous studies, researchers also identified several weaknesses, where data collection methods involved false scenario (Dibb-Smith & Brindal, 2015). These shortcomings provide the basis for improvement and development of this

research. In this study, the implementation of social eating is made as realistic as possible by directly involving participants and dining partners. It is hoped that this method will enhance validity, reduce information biases, and contribute more to the understanding of the phenomenon under investigation. Based on the above elaboration, this study hypothesized that the social context, including dining companions and impression management, influences portion sizes.

METHODS

This study employed a quasi-experimental design consisting of control and experimental groups. This design was chosen to allow researchers to compare the outcomes between groups. The experimental group in this study received an intervention involving the presence of a confederate to carry out specific instructions, while the control group did not receive any intervention.

Participant

The subjects in this study were undergraduate students from UNNES (Universitas Negeri Semarang). The minimum targeted number of participants was 210, obtained through calculations using G*power, with an expected effect size of $d = 0.25$, a significance level (α) of 0.05, and a power of 0.95. Purposive sampling was used as the sampling technique with inclusion criteria: undergraduate students, not vegan, not vegetarian, not currently on a diet, never been involved in similar research (eating behavior), and have no allergies. In total, 227 participants were recruited in this study through direct recruitment and distribution of pamphlets via WhatsApp, Twitter, and Instagram. To become participants, prospective participants first registered themselves via the link provided in the pamphlet and were then directed to the WhatsApp group. In this WhatsApp group, participants were given a schedule of attendance times, and they were allowed to choose a suitable attendance schedule according to their availability.

Confederate

Confederate is an individual who appeared to be a participant but was part of the research team. The confederate in this study was a dining companion of the opposite gender; if the participant was

male, the confederate was female, and vice versa. Therefore, before this experiment, researchers recruited 2 confederates of different genders through the distribution of pamphlets on WhatsApp, with age criteria of around 20-24 years. One of the confederates was an undergraduate student, so there was a possibility that some participants knew or had met the confederate.

Procedure

The procedure involved inviting students to participate in this study in the laboratory. Initially, participants were randomly allocated to either the experimental group or the control group. Afterward, researchers provided an information sheet to the participants which contained the research's general purpose (the real purpose will only be informed during the debrief), procedures, potential risks, data confidentiality, and overall benefits without disclosing specific aims to avoid bias in participants behaviors. They were assured of their right to withdraw from the study at any time without penalty. Then, participants completed a consent form, demographic data (age, gender, weight, and height), and an impression management scale. Afterward, participants were directed to the fake food buffet. Participants were instructed to serve the food they wanted to eat at that moment from the buffet. Participants were provided with utensils for serving food (such as plates, forks, spoons, large trays, and small trays). For the experimental group, researchers assigned a confederate. Participants in the experimental group would serve their food accompanied by the confederate. Meanwhile, participants in the control group would serve their food alone without the presence of a confederate. Subsequently, researchers photographed the food served by participants. After completing the instructions, participants received a reward and debriefing.

During the debriefing, the researchers explained the actual purpose of the study, provided additional context about the research, and addressed any questions or concerns. The information given during the debriefing was consistent with what was outlined in the information sheet but included more detailed explanations about the study aims and methodology. Additionally, researchers requested that participants refrain from

sharing information or discussing the study procedures with individuals who had not yet participated to avoid bias in this study.

Material and Measurement

a. Portion size

To measure portion size, the study used the number of food choices chosen by participants from the Fake Food Buffet (FFB). Fake Food Buffet is a replica of food served buffet-style (Bucher, Van der Horst, & Siegrist, 2012). The researchers decided to use the Fake Food Buffet as a research instrument because its measurement is objective, resulting in more accurate data. The use of Fake Food Buffet is also more practical and efficient as it is more durable and can be reused multiple times. Additionally, the accuracy and consistency of the Fake Food Buffet have been proven through its validity of 0.76 - 0.87 and reliability of 0.77 - 0.89 (Bucher et al., 2012). In this study, the Fake Food Buffet was arranged based on 24 menu items, including grilled chicken, boiled meatballs, steamed rice, boiled potatoes, boiled carrots, boiled cauliflower, apples, bananas, plain tea, plain coffee, mineral water, juice, fried chicken, fried sausages, fried rice, crackers, fried carrots, fried cauliflower, cakes, chips, sweet tea, sweet coffee, soda, and Sprite. Measurements were made by totaling the number of items chosen by participants.



Figure 1. Fake food buffet.

b. Impression Management

The five factors of impression management were measured using items from Bolino & Turnley, structured according to the Jones and Pittman impression management taxonomy (Bolino & Turnley, 1999). There were 22 items comprising 5 factors as follows: self-promotion, ingratiation, exemplification, intimidation, and supplication. Each item was rated on a Likert scale from 1 to 5, and

was favorable in nature. The accuracy and consistency of the impression management

scale have been proven, with validity ranging from 0.46 to 0.78 and reliability ranging from 0.75 to 0.88 (Bolino & Turnley, 1999).

Statistical Analysis

The collected data were analyzed using a General Linear Model (GLM) Univariate to examine the effects of confederate presence and impression management on the dependent variable, which is portion size. All analyses were conducted at a significance level of 0.05, with a confidence interval of 95%. The analysis was conducted with the assistance of IBM SPSS 20 software.

Research ethic

The implementation of this research has obtained approval from the Research Ethics Committee of Universitas Negeri Semarang with research ethics number 407/KEPK/EC/2023.

RESULTS AND DISCUSSION

In total, 227 participants were registered for the study. All of them followed through the procedure from start to finish. There were no prospective participants who dropped out before or during the intervention.

Table 1. Participant Characteristics.

| Characteristics | Control | | Experiment | | Total | (%) |
|-------------------------------|---------|------|------------|------|-------|------|
| | N | % | N | % | | |
| Gender | | | | | | |
| Female | 70 | 61.4 | 73 | 64.6 | 143 | 63 |
| Male | 44 | 38.6 | 40 | 35.4 | 84 | 37 |
| Age | | | | | | |
| 17-20 years | 86 | 75.4 | 49 | 43.4 | 135 | 59.5 |
| 21-25 years | 28 | 24.6 | 64 | 56.6 | 92 | 40.5 |
| BMI | | | | | | |
| Underweight | 27 | 23.7 | 30 | 26.5 | 57 | 25.1 |
| Ideal | 73 | 64 | 61 | 54 | 134 | 59 |
| Overweight | 12 | 10.5 | 15 | 13.3 | 27 | 11.9 |
| Obesity | 2 | 1.8 | 7 | 6.2 | 9 | 4 |
| Hunger Level | | | | | | |
| Not hungry to slightly hungry | 58 | 50.9 | 56 | 49.6 | 114 | 50.2 |
| Moderate | 38 | 33.3 | 29 | 25.7 | 67 | 39.5 |

Hungry to very hungry 18 15.8 28 24.8 46 19.3

Note: Control= Taking meals alone; Experiment= Taking meals with individuals of a different gender.

The study exhibited specific characteristics of participants, as shown in Table 1. Based on gender, females constituted the majority of participants contributing to this study, accounting for 63% of the total sample, while the remaining 37% were males. Regarding age, 59.5% of participants were aged between 17 and 20 years, while 40.5% were aged between 21 and 25 years. Based on BMI, the majority of participants fell into the ideal category, comprising 59%, followed by the underweight category (25.1%) and the overweight category (11.9%). Cases of obesity among participants were the least prevalent, representing only 4% of the sample. Another characteristic examined was the level of hunger among participants at the time of data collection. Hunger levels were divided into three categories: not hungry to slightly hungry, which was the condition for the majority of participants, moderate hunger (39.5%), and hungry to very hungry (19.3%).

Table 2. Percentage (SD) of Portion Sizes Based on The Presence of Dining Companions of a Different Gender.

| Group | N | M(SD)% |
|---|-----|--------------|
| Taking meals alone | 114 | 11.33 (4.06) |
| Taking meals with individuals of a different gender | 113 | 9.34 (3.80) |

The results of the descriptive analysis revealed that the average portion size in the control group ($M=11.33$, $SD=4.06$) was larger than that in the experimental group ($M=9.34$, $SD=3.80$), as shown in Table 2. This indicates that participants who served themselves had larger portions compared to participants who were accompanied by individuals of a different gender.

Table 3. Univariate General Linear Model Analysis.

| Variable | Sig | Partial Eta Square | B |
|---|------|--------------------|--------|
| The presence of individuals of different gender | .007 | .032 | -7.378 |
| Impression Management | .001 | .067 | .117 |
| The presence of individuals of different genders* | .041 | .019 | .090 |
| Impression Management | | | |

Note: (*) = interaction between two independent variables

Table 3 presents the results of the analysis using an univariate general linear model, demonstrating a significant difference in portion size between participants in the control and experimental groups ($F(1,223)= 7.48$, $p<0.05$, $\eta_p^2= 0.32$). This implies that the presence of individuals of a different gender leads individuals to consume less compared to when they are alone. As a moderator, impression management shows a significant main effect on portion sizes ($F(1,223)= 10.95$, $p<0.05$, $\eta_p^2= 0.067$), indicating that the higher the impression management in participants, the larger their portion sizes, regardless of whether they eat alone or with a companion of a different gender. The interaction effect of the social eating group and impression management significantly influence portion sizes ($F(1,223) = 4.245$, $p<0.05$, $\eta_p^2= 0.019$). In the control group, lower impression management is associated with larger portion sizes, while conversely, in the experimental group, higher impression management leads to larger portion sizes.

This research examines the effect of cross-gender presence and impression management on portion sizes. The results of statistical analysis show evidence that gender differences within dining groups and high impression management stimulate larger portion sizes. This aligns with previous research indicating that individuals tend to consume larger portions when dining in social situations compared to when dining alone (Björnwall, Mattsson Sydner, Koochek, & Neuman, 2021). However, previous studies did not consider the gender composition of dining groups, whereas the presence of individuals of the

opposite gender may trigger adaptive eating behaviors (Higgs et al., 2018). Therefore, in this study, we structured the gender composition of dining groups consisted of two individuals with different genders, providing evidence that the gender of dining companion plays a role in food selection. Additionally, the results of this study also highlight an increase in portion sizes among participants with high impression management. Thus far, research directly asserting a positive relationship between impression management and portion sizes remains limited, thus these findings offer new insights into the relationship between impression management and portion sizes. Another interesting finding emerged when the factor of the presence of individuals of the opposite gender without the influence of impression management was analyzed; the results showed smaller portion sizes compared to participants dining alone.

The interaction between cross-gender presence and impression management plays a significant role in influencing portion sizes. When dining with individuals of the opposite gender, impression management strategies may be employed by participants to appear attractive (Gasiorowska, Folwarczny, Tan, & Otterbring, 2023). Considering that appearing attractive to individuals of the opposite gender is deemed more crucial by most individuals than when among individuals of the same gender, as it relates to survival and reproduction. Previous studies indicate that, for men, the appearance of their potential partners is highly important in selecting mates, while women tend to prioritize the financial capabilities of their partners (Chen, Wang, & Ordabayeva, 2023; Hou, Shu, & Fang, 2020; Islam, 2021). Consequently, when dining with individuals of the opposite gender, women tend to opt for smaller portions to attract their partners, as it reflects their beauty and femininity (Duszka et al., 2022). Conversely, men demonstrate their status and masculinity with larger portion sizes. However, in this study, high impression management not only led men to choose larger portion sizes in the presence of individuals of the opposite gender but women as well. These findings are quite intriguing considering the social pressures, especially on women, typically resulting in decreased consumption (Dibb-Smith &

Brindal, 2015). This situation might occurred because femininity does not always yield a positive image as femininity often reflects low status. Therefore, to appear attractive to their dining partners, participants manage their impressions by selecting larger portions. Participants may believe that larger portion sizes are more attractive to individuals of the opposite gender as they are perceived to have high wealth or social status (Folwarczny, Otterbring, & Ares, 2023; Haslam, Taylor, Herbert, & Bucher, 2020). Individuals with good financial resources are considered able to purchase more food than they need (Mathieu-Bolh & Wendner, 2020; Were et al., 2023).

This research demonstrates that impression management significantly influences eating contexts, both when dining alone and with individuals of the opposite gender. The higher the impression management in individuals, the larger their portion sizes (Edeh et al., 2023). This may be because of the health management but rather an effort to appear pleasant and jovial. Without the influence of impression management, participants consume less in the presence of individuals of the opposite gender. This suggests that smaller portion sizes in the presence of individuals of the opposite gender are not always caused by impression management but may be due to a sense of alienation, given that the level of alienation between men and women is higher. Additionally, a study found that men and women tend to eat less in front of opposite-sex strangers compared to same-sex individuals (Rostovtseva, Butovskaya, Mezentseva, & Weissing, 2023).

CONCLUSION

The results of this study indicate that social context significantly influences portion size through the presence of individuals of the opposite gender and impression management. Through the presence of individuals of the opposite gender, individuals consume smaller portions compared to when dining alone. Furthermore, the influence of high impression management leads to larger portion sizes for individuals. This holds both when they dine alone and in social eating group situations. When these two factors interact, individuals with higher impression management consume larger

portions when dining with individuals of the opposite gender.

To address the increase in portion sizes, effective interventions can be implemented through various practical solutions. An initial approach that may be effective in addressing this issue is through education and awareness of the impact of high impression management and the presence of individuals of the opposite gender on portion sizes. By providing information related to the findings of this research (increased portion sizes in social eating group situations), individuals become more conscious and control the extent to which impression management influences their portion sizes. Additionally, creating environments that support healthy eating choices should also be considered. For example, by considering spatial arrangements or dining tables that provide privacy for individuals intend to reduce their portion sizes.

Overall, this study provides evidence that the presence of individuals of the opposite gender and impression management influence how much individuals consume certain foods, which can offer valuable insights for further understanding eating behavior in social contexts. This research may be limited in encompassing cultural or social background variations that could affect responses to the presence of individuals of the opposite gender and impression management. Investigating the impact of these variables can provide a more comprehensive understanding of the complexity of factors influencing eating behaviors.

REFERENCES

- Almiron-Roig, E., Navas-Carretero, S., Emery, P., & Martínez, J. A. (2018). Research into food portion size: methodological aspects and applications. *Food & Function*, 9(2), 715-739.
- Baker, M., Strickland, A., & Fox, N. D. (2019). Choosing a meal to increase your appeal: How relationship status, sexual orientation, dining partner sex, and attractiveness impact nutritional choices in social dining scenarios. *Appetite*, 133, 262-269.
- Benton, D. (2015). Portion size: what we know and what we need to know. *Critical Reviews in Food Science and Nutrition*, 55(7), 988-1004.
- Björnwall, A., Mattsson Sydner, Y., Koochek, A., & Neuman, N. (2021). Eating alone or together among community-living older people—a scoping review. *International Journal of Environmental Research and Public Health*, 18(7), 3495.
- Bolino, M. C., & Turnley, W. H. (1999). Measuring impression management in organizations: A scale development based on the Jones and Pittman taxonomy. *Organizational Research Methods*, 2(2), 187-206.
- Bucher, T., Van der Horst, K., & Siegrist, M. (2012). The fake food buffet—a new method in nutrition behaviour research. *British Journal of Nutrition*, 107(10), 1553-1560.
- Cavazza, N., Guidetti, M., & Butera, F. (2017). Portion size tells who I am, food type tells who you are: Specific functions of amount and type of food in same-and opposite-sex dyadic eating contexts. *Appetite*, 112, 96-101.
- Chen, Q., Wang, Y., & Ordabayeva, N. (2023). The mate screening motive: How women use luxury consumption to signal to men. *Journal of Consumer Research*, 50(2), 303-321.
- Czech, M. P. (2017). Insulin action and resistance in obesity and type 2 diabetes. *Nature Medicine*, 23(7), 804-814.
- Dale, C. E., Fatemifar, G., Palmer, T. M., White, J., Prieto-Merino, D., Zabaneh, D., ... Warren, H. R. (2017). Causal associations of adiposity and body fat distribution with coronary heart disease, stroke subtypes, and type 2 diabetes mellitus: a Mendelian randomization analysis. *Circulation*, 135(24), 2373-2388.
- Dibb-Smith, A., & Brindal, E. (2015). Table for two: The effects of familiarity, sex and gender on food choice in imaginary dining scenarios. *Appetite*, 95, 492-499.
- Do Carmo, J. M., Da Silva, A. A., Wang, Z., Fang, T., Aberdein, N., de Lara Rodriguez, C. E. P., & Hall, J. E. (2016). Obesity-induced hypertension: brain signaling pathways. *Current Hypertension Reports*, 18, 1-9.
- Duszka, K., Hechenberger, M., Dolak, I., Kobiljak, D., & König, J. (2022). Gender, age, hunger, and body mass

- index as factors influencing portion size estimation and ideal portion sizes. *Frontiers in Psychology*, 13, 873835.
- Edeh, F. O., Zayed, N. M., Darwish, S., Nitsenko, V., Hanechko, I., & Islam, K. M. A. (2023). Impression management and employee contextual performance in service organizations (enterprises). *Emerging Science Journal*, 7(2), 366-384.
- Folwarczny, M., Otterbring, T., & Ares, G. (2023). Sustainable food choices as an impression management strategy. *Current Opinion in Food Science*, 49, 100969.
- Gasiorowska, A., Folwarczny, M., Tan, L. K. L., & Otterbring, T. (2023). Delicate dining with a date and burger binging with buddies: impression management across social settings and consumers' preferences for masculine or feminine foods. *Frontiers in Nutrition*, 10, 1127409.
- Haslam, R. L., Taylor, R., Herbert, J., & Bucher, T. (2020). Nutrients for Money: The Relationship between Portion Size, Nutrient Density and Consumer Choices. *The Health Benefits of Foods-Current Knowledge and Further Development*.
- Herman, C. P. (2017). The social facilitation of eating or the facilitation of social eating? *Journal of Eating Disorders*, 5, 1-5.
- Hetherington, M. M., Anderson, A. S., Norton, G. N. M., & Newson, L. (2006). Situational effects on meal intake: A comparison of eating alone and eating with others. *Physiology & Behavior*, 88(4-5), 498-505.
- Higgins, K., Hudson, J., Mattes, R., Gunaratna, N., McGowan, B., Hunter, S., ... Wang, Y. (2019). Systematic Review and Meta-analysis of the Effect of Portion Size and Ingestive Frequency on Energy Intake and Body Weight Among Adults in Randomized Controlled Trials (P08-007-19). *Current Developments in Nutrition*, 3, nzz044-P08.
- Higgs, A., McGrath, B. A., Goddard, C., Rangasami, J., Suntharalingam, G., Gale, R., ... Society, D. A. (2018). Guidelines for the management of tracheal intubation in critically ill adults. *British Journal of Anaesthesia*, 120(2), 323-352.
- Hou, J., Shu, T., & Fang, X. (2020). RETRACTED: Influence of Resources on Cue Preferences in Mate Selection. *Frontiers in Psychology*, 11, 574168.
- Islam, M. N. (2021). Gender differences in mate selection criteria among university students in Bangladesh: A study from the social homogeneity perspective. *Heliyon*, 7(6).
- Kementerian Kesehatan Republik Indonesia. (2018). Laporan Nasional Riset Kesehatan Dasar. In *Kementrian kesehatan RI*.
- Marteau, T. M., Hollands, G. J., Shemilt, I., & Jebb, S. A. (2015). Downsizing: policy options to reduce portion sizes to help tackle obesity. *Bmj*, 351.
- Mathieu-Bolh, N., & Wendner, R. (2020). We are what we eat: obesity, income, and social comparisons. *European Economic Review*, 128, 103495.
- Mc Auley, M. T. (2020). Effects of obesity on cholesterol metabolism and its implications for healthy ageing. *Nutrition Research Reviews*, 33(1), 121-133.
- Nur, N. N., & Warganegara, E. (2016). Faktor risiko perilaku penyakit tidak menular. *Medical Journal of Lampung University [MAJORITY]*, 5(2), 88-94.
- Robinson, E., Patel, Z., & Jones, A. (2023). Downsizing food: a systematic review and meta-analysis examining the effect of reducing served food portion sizes on daily energy intake and body weight. *British Journal of Nutrition*, 129(5), 888-903.
- Rolls, B. J. (2014). What is the role of portion control in weight management? *International Journal of Obesity*, 38(1), S1-S8.
- Rostovtseva, V. V., Butovskaya, M. L., Mezentsseva, A. A., & Weissing, F. J. (2023). Effects of sex and sex-related facial traits on trust and trustworthiness: An experimental study. *Frontiers in Psychology*, 13, 925601.
- Ruddock, H. K., Brunstrom, J. M., & Higgs, S. (2021). The social facilitation of eating: why does the mere presence of others cause an increase in energy intake? *Physiology & Behavior*, 240, 113539.
- Ruddock, H. K., Brunstrom, J. M., Vartanian, L. R., & Higgs, S. (2019). A systematic review and meta-analysis of the social facilitation of eating. *The American Journal of Clinical*

- Nutrition*, 110(4), 842-861.
- Suwalska, J., & Bogdański, P. (2021). Social modeling and eating behavior—a narrative review. *Nutrients*, 13(4), 1209.
- Were, V., Foley, L., Musuva, R., Pearce, M., Wadende, P., Lwanga, C., ... Obonyo, C. (2023). Socioeconomic inequalities in food purchasing practices and expenditure patterns: Results from a cross-sectional household survey in western Kenya. *Frontiers in Public Health*, 11, 943523.
- Wongprawmas, R., Mora, C., Pellegrini, N., Guiné, R. P. F., Carini, E., Sogari, G., & Vittadini, E. (2021). Food choice determinants and perceptions of a healthy diet among Italian consumers. *Foods*, 10(2), 318.
- World Health Organization. (2018). *WHO Recommendations: Intrapartum Care for a Positive Childbirth Experience*. Geneva: World Health Organization.

The Effectiveness of the HEY Website for Increasing Adolescents' Reproductive Health Knowledge

Ira Nurmala^{✉1)}, Lutfi Agus Salim¹⁾, Muthmainnah Muthmainnah¹⁾, Asma Nadia¹⁾,
Suria Zainuddin^{1,2)}, Sandra Pérez^{1,3)}

¹ Department of Epidemiology, Biostatistics, Population Studies, and Health Promotion, Faculty of Public Health, Universitas Airlangga Surabaya, Surabaya, East Java, Indonesia 60115

² Universiti Malaya, Kuala Lumpur, Malaysia 50603

³ Department of Geography, Faculty of Society and Environment, University of Nice Cote d'Azur, Nice, South Region, France 06204

✉Email: iranurmala@fkm.unair.ac.id

ABSTRACT

Background: Conventional health promotion media such as leaflets are considered not to meet the needs of patients for health information. Ineffective health promotion media can contribute to the occurrence of a health problem. The HEY Website is a health promotion media that is aligned with the current situation which is the digital era. **Objectives:** This study was conducted to analyze the increase in knowledge of high school students who have received edutainment interventions from the HEY Website. **Methods:** This research was quantitative research with a quasi-experimental research design in the form of peer educator training using the HEY website. The respondents of this study were 50 high school students at SMAN 1 Turen in Malang Regency with the inclusion criteria being grade X and XI and active in student organizations as they may bring better influence among peers. **Results:** There was an increase in knowledge, as shown by the average pretest score of 64.5. After the training, the post-test score showed an average number of 86.2. Statistical analysis also showed significant results in knowledge differences before and after the intervention ($P=0,000$). **Conclusion:** The HEY website as a digital-based adolescent health promotion media proved significant in increasing student knowledge about adolescent health.

Keywords: Adolescent, Edutainment, Health promotion, Well-being.

INTRODUCTION

As the world continues to experience technological advancement, so does health promotion as one of the efforts to improve society's well-being. Conventional health promotion media that exist today such as leaflets are less effective than video or audiovisual media (Halim, 2021). Other conventional media such as posters are also considered less effective as health promotion media although they are still widely used to reach older audiences in large numbers for a long period (Barik et al., 2019; Hasanica et al., 2020). This phenomenon needs to be studied so that effective and attractive health promotion media are obtained, especially for adolescents.

Adolescents are an age group that is vulnerable to risky behavior usually defined as the TRIAD Kesehatan Reproduksi Remaja (KRR)/Adolescent Reproductive

Health), which is three adolescent reproductive health risks related to sexuality (unwanted pregnancy, abortion and infection with sexually transmitted diseases), drug abuse, and HIV AIDS (DP3KB Kabupaten Brebes, 2018). The rate of early marriage in Indonesia is ranked eighth in the world with 1,459,000 cases which means 11.2% of children in Indonesia are married under the age of 18 years and 0.5% marry when they are 15 years old (UNICEF, 2023). The results of the National Socioeconomic Survey (SUSENAS), as many as 10.85% of women in East Java are married between the ages of 7-15 years, making it the third place on the list of 10 provinces with the highest rate of early marriage in Indonesia (Kusnandar, 2020).

Malang Regency is the highest contributor to the number of early marriages in East Java Province with a high rate of marriage dispensation (Departemen Bimbingan dan Konseling Fakultas Ilmu

Pendidikan Universitas Negeri Malang, 2023). According to data from the Religious Court (PA), in 2023 in Malang Regency, there will be an early marriage rate with a high number of 1,009 cases of marriage dispensation due to unwanted pregnancies (Dyampri, 2024). This event can occur as a result of irresponsible dating relationships where which has the potential for adolescents exposed to HIV / AIDS (Petroni et al., 2019). Drug abuse cases are also a problem for adolescents in Malang Regency where in 2022 between January and August 196 cases were found with 2 children as dealers with the perpetrators being teenagers aged 15-17 years (Sampurno, 2022).

Ineffective health promotion media can contribute to the occurrence of a health problem. Following the development of the current era is very close to technology, a digital-based health media is designed as an effort to improve adolescent health both physically, mentally, and socially. The Health Educator for Youth (HEY) website is a health promotion media designed based on previous research that shows the needs and interests of adolescents in the form of health information sources in the form of websites with material that continues to be updated every year under the development of adolescent health problems (Nurmala, 2020). Health information is delivered by the edutainment method, which is a combination of education and entertainment (entertainment) which has been proven in previous research as an educational method that is more effective in adolescents and stimulates creativity than the lecture method (Nusair et al., 2015). The HEY website is also designed for teenagers to become *peer educators*, which means teenagers become peer tutors and role models for their friends. This is an effective way to form healthy behaviors in adolescents considering the characteristics of adolescents who are very affected by the surrounding environment (Nurmala et al., 2019; Nurmala et al., 2021; Nurmala et al., 2021). The development of this website is also an effort to help the BKKBN program in reducing the number of early marriages in Malang Regency, so the research was conducted at the Sekolah Siaga Kependudukan (SSK)/the Population-

Focused School which is one of the BKKBN programs for adolescents.

In previous studies, edutainment methods with different applications or media have proven effective in increasing adolescent knowledge (Bramastya et al., 2022; Muthmainnah, Nurmala, et al., 2021a; Nadia et al., 2022; Siswantara et al., 2019). The HEY Website was developed based on previous research which stated that teenagers prefer websites as a suitable media for health information sources because it is more compact, do not use up a lot of data plan or phone storage, and are easy to access (I. Nurmala, 2020a). Therefore, this study was conducted to analyze the increase in knowledge, attitudes, and behavior of high school students who have received edutainment interventions from the HEY Website as a source of adolescent health information.

METHODS

Study Design

This research was quantitative research with a quasi-experimental research design in the form of *peer educator training* using the HEY website media. This study was conducted for one month with three meetings. The first meeting (offline) was the website introduction stage and account registration on the HEY website. After the first meeting, students were asked to access the 8 materials available on the website individually within two weeks. The scheme was for each material before students receive health education, students need to complete a pre-test to measure their knowledge before the intervention, then watch the educational video that has been provided. After accessing the educational material (intervention), students must complete the post-test to measure their knowledge after the intervention. The second meeting was held *online* to discuss the obstacles encountered by students when completing educational materials. The third meeting was conducted *offline* to deliver *Life Skills* and adolescent communication material and also evaluation.

Sampling

The HEY training was attended by 50 students from the Population-Focused School (SSK), namely SMAN 1 Turen in Malang Regency who were selected with purposive sampling techniques with inclusion criteria, namely grade X or XI

students to become peer educators for next year class and were active in school organizations as they may act as a role model to their peers and have more impact.

Data Analysis

Student knowledge data collected through pre and post-tests will be analyzed by different test analyses to see if there is a difference between before and after intervention.

Ethics

This research has been accepted by the Ethics Committee of the Faculty of Nursing, Universitas Airlangga with the number KEPK 2976.

RESULTS AND DISCUSSION

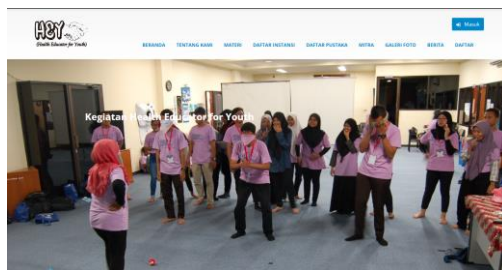


Figure 1. HEY Website.

The HEY website (<http://hey.fkm.unair.ac.id>) is one type of edutainment-based health promotion media that supports adolescents to be healthy physically, mentally, and socially. Through this website, researchers and stakeholders can find out the problems that occur in adolescents. This website consists of 8 materials and 1 E-book:

1. Characteristics of adolescents
2. The ideal teenage body
3. Physical activity of healthy adolescents
4. Body shaming, nutrition, and teen diet
5. Adolescent reproductive health and love management
6. Dare to say no!
7. Confusion, stress, and coping mechanisms
8. Adolescent time management
9. Realizing healthy adolescents physically, mentally, and socially (e-book)

Table 1. Characteristics of Respondents by Sex.

| Characteristic | n | % |
|----------------|---|---|
| Sex | | |

| | | |
|--------|----|----|
| Male | 16 | 32 |
| Female | 34 | 68 |

Based on Table 1, the characteristics of the study respondents were more female students, namely 34 people (68%) and 16 male students (32%).

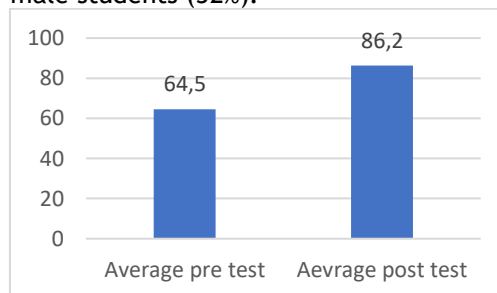
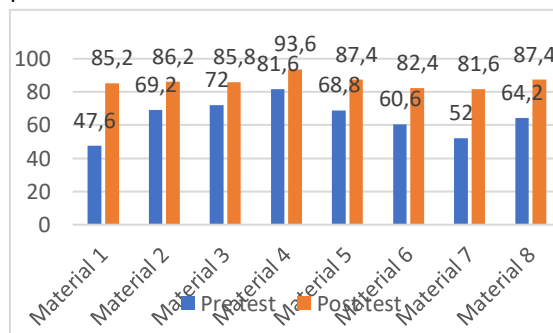


Figure 2. Participant's Knowledge score.

Based on the pretest and posttest result data shown in Figure 2, the average pretest before education is 64.5. After the training, the posttest score showed an average number of 86.2. This shows an increase in average knowledge after training. Respondents are assessed as passing if they reach the benchmark post-test score of 80.

Figure 3. Increased Knowledge of Participants per Material.



In Figure 3 it can be seen that the average increase in knowledge per material is assessed from the pretest and posttest that have been done. Seen in material 4, namely body shaming, nutrition and adolescent diet, the average pre-test score is above 80 which shows that adolescents' knowledge of the material is good enough. Then, during the post-test, the average score rose to 93.6 and became the highest average posttest score among other materials. Then, material 1, namely material about adolescent characteristics, is the material with the highest difference in pre-test and posttest scores. Material 7, namely material about confusion, stress, and coping mechanisms, has a high

average difference between pretest and posttest, but the posttest value of material 7 is the lowest among other posttest material values. This shows that teenagers' knowledge of these two materials is still lacking and needs to be improved.

The first material: The Characteristics of Adolescents, explains the characteristics of adolescents, physically (biologically), mentally, and socially so that adolescents understand more about their characteristics where this is related to adolescent self-awareness which is useful in determining problems (Kreibich et al., 2020). Adolescents with high self-awareness will be more likely to identify problems around them and use these skills on a personal level or when they help others (Akmalovna, 2022). High self-awareness in adolescents will have an impact on adolescents' willingness to achieve their goals (Le et al., 2023).

The second, third, and fourth materials discussed a healthy adolescent body, which is related to the adolescent lifestyle and its implications. Adolescence is a golden period where many diseases can be prevented early. Previous research has shown that there was a decrease in physical activity in teenagers aged 16-17 years compared to when they were 11-12 years old (Marques et al., 2020). This is associated with a higher risk of depressive symptoms at age 18 (Kandola et al., 2020). Adolescents stated many barrier factors to their involvement in a healthy lifestyle, one of the most important factors was individual's attitude, knowledge and understanding (Martins et al., 2021). Therefore, this material provides education to adolescents about a healthy body and how to maintain it. This is also related to adolescent characteristics: a period of self-discovery. So, the perspective of themselves is very important, including the perspective of their bodies. The rise of social media use in adolescents creates a misleading understanding of a healthy body for adolescents because they are influenced by someone, they follow on social media (Jiotsa et al., 2021). Adolescents are prone to decreased self-esteem and confidence due to exposure to social media (Rodgers & Rousseau, 2022) and there is a tendency, especially among adolescent girls, to

change their appearance and get validation on social media (Jiotsa et al., 2021). This is an indication that the health of adolescents is threatened both physically, mentally, and socially.

The fifth material discussed adolescent reproductive health where this theme not only discussed biological and sexual characteristics but also love management. Indonesia is still a country with a fairly high rate of early marriage, based on data from the Indonesian Central Statistics Agency as many as 21.5% of Indonesian youth recorded their first marriage age at the age of ≤ 18 years (BPS, 2022). Early marriage may occur due to low knowledge of reproductive health (I. Nurmala et al., 2020) which can have an impact on the dating behavior and sexual behavior of adolescents (Najib & Nugroho, 2020) which can further lead to unwanted pregnancies (Kosasih et al., 2021; Yusran et al., 2024) and become a contributing factor in early marriage in Indonesia.

Furthermore, the sixth, seventh, and eighth materials focus more on adolescent mental health issues. Peer pressure and peer influence among adolescents are essential, many adolescent behaviors, both bad and good, are influenced by their peers (I. Nurmala, 2020b; I. Nurmala et al., 2019; I. Nurmala, Rachmayanti, et al., 2021). By daring to say no, adolescents are expected to have good self-efficacy thus preventing them from risky behaviors (Wong & Yang, 2021) such as risky dating behavior (Shaluhiah et al., 2020), drug abuse (I. Nurmala et al., 2022), etc. A good coping mechanism for a problem also supports adolescents in forming self-efficacy (Freire et al., 2020). Good time management is a form of good self-regulatory behavior that supports adolescents in achieving their goals (Wolters & Brady, 2021).

Based on Table 2, based on the results of the Wilcoxon test, the significance value is 0.000 ($p < 0.005$) which means that there is a significant difference between the knowledge value before the intervention and after the intervention. This shows that the use of the HEY website has a positive effect on increasing adolescent knowledge, where the average increase is 25.50.

Table 2. Pre-test-Post test Knowledge Analysis.

| | Pretest Post-test |
|-----------------------|-------------------|
| Z | -6,158 |
| Asymp. Sig (2-tailed) | 0,000 |

Based on the results of the study above, it is known that there is an increase in knowledge among adolescents (students) from before the intervention, namely health education using the edutainment method and after the intervention. The results of the difference test show that there is a significant difference.

Previous research that applies peer education methods as an effort to prevent HIV in high-risk adolescents also shows that this method is an effective method that has a long-term impact on changing adolescent behavior (He et al., 2020). Other studies using the edutainment method show results where edutainment is more accessible to all groups because it is packaged using technology and there are opportunities for respondents to discuss educational materials delivered to parents, companions, and experts (Kyegombe et al., 2022). In this day and age, which is the era of technology, it means that almost all circles of society have been exposed to technology or the internet. Data shows that the internet penetration rate in Indonesia in 2024 has reached 79%, where Java is the area with the highest internet penetration rate of 83.64%. The internet penetration rate among adolescents in Indonesia has also reached 99.16%, so the application of digital-based edutainment should be more widely applied in Indonesia.

Other studies examining community edutainment have also shown positive results (Le Port et al., 2022). Community edutainment from the perspective of this study, can be interpreted as edutainment carried out together with peers. This is similar to what is done when conducting research and determining inclusion criteria. Research respondents who can take part in this research are organizational students so that it has its own attraction for other students. The influence of peers increases students' interest in attending health education activities (I. Nurmala, Muthmainnah, et al., 2021; I. Nurmala, Rachmayanti, et al., 2021).

Other studies that show increased knowledge after intervention using edutainment methods are also shown by several studies conducted by (Bramastya et al., 2022; Muthmainnah, Nurmala, et al., 2021b; Muthmainnah, Salim, et al., 2021; Nadia et al., 2022; Ir. Nurmala et al., 2020; Siswantara et al., 2019). The HEY website has edutainment characteristics that allow subjects to be creative, interactive, flexible, and easy to reach and is an innovation that provides convenience for users so that it is easy to accept (Nuraini et al., 2020; Siswantara et al., 2021).

CONCLUSION

The HEY website as a digital-based adolescent health promotion media can significantly increase students' knowledge of physical, mental, and social health. Increased knowledge can further encourage changes in adolescent behavior to prevent risky behavior.

REFERENCES

- Akmalovna, U. S. (2022). Psychological Features of Self-Awareness in Early Adolescence. *Zien Journal of Social Sciences and Humanities*, 6, 114-116.
- Barik, A. L., Purwaningtyas, R. A., & Astuti, D. (2019). The Effectiveness of Traditional Media (Leaflet and Poster) to Promote Health in a Community Setting in the Digital Era: A Systematic Review. *Jurnal Ners*, 14(3), 76-80. <https://doi.org/10.20473/jn.v14i3.16988>
- BPS. (2022). *Mayoritas Pemuda di Indonesia Menikah Muda*.
- Bramastya, A. H., Muthmainnah, & Salim, L. A. (2022). EFEKTIVITAS APLIKASI KONCO SREGEK DALAM PENINGKATAN MOTIVASI PEER EDUCATOR SEKOLAH SIAGA KEPENDUDUKAN. *Kontribusi Ilmu-Ilmu Sosial, Pendidikan Dan Hukum Dalam Mewujudkan Masyarakat Madani di Era Global*.
- Departemen Bimbingan dan Konseling Fakultas Ilmu Pendidikan Universitas Negeri Malang. (2023). *TEKAN ANGKA NIKAH DINI DI KABUPATEN MALANG DOSEN BIMBINGAN DAN KONSELING FIP UM ADAKAN PELATIHAN*.
- DP3KB Kabupaten Brebes. (2018). *MATERI TRIAD KKR*. DP3KB Kabupaten Brebes.

- Dyampr. (2024). *Tingginya Pernikahan Dini di Kabupaten Malang Pada Tahun 2023, Umumnya Karena Hamil Dulu*.
- Freire, C., Ferradás, M. del M., Regueiro, B., Rodríguez, S., Valle, A., & Núñez, J. C. (2020). Coping Strategies and Self-Efficacy in University Students: A Person-Centered Approach. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.00841>
- Halim, E. M. (2021). Effectiveness of various health education media on behavior changes of Indonesian teenagers: Literature Review. *The 8th UGM Public Health Symposium Proceedings Vol 37 No. 11 Suppl.*
- Hasanica, N., Catak, A., Mujezinovic, A., Begagic, S., Galijasevic, K., & Oruc, M. (2020). The Effectiveness of Leaflets and Posters as a Health Education Method. *Materia Socio Medica*, 32(2), 135. <https://doi.org/10.5455/msm.2020.32.135-139>
- He, J., Wang, Y., Du, Z., Liao, J., He, N., & Hao, Y. (2020). Peer education for HIV prevention among high-risk groups: a systematic review and meta-analysis. *BMC Infectious Diseases*, 20(1), 338. <https://doi.org/10.1186/s12879-020-05003-9>
- Jiotsa, B., Naccache, B., Duval, M., Rocher, B., & Grall-Bronnec, M. (2021). Social Media Use and Body Image Disorders: Association between Frequency of Comparing One's Own Physical Appearance to That of People Being Followed on Social Media and Body Dissatisfaction and Drive for Thinness. *International Journal of Environmental Research and Public Health*, 18(6), 2880. <https://doi.org/10.3390/ijerph18062880>
- Kandola, A., Lewis, G., Osborn, D. P. J., Stubbs, B., & Hayes, J. F. (2020). Depressive symptoms and objectively measured physical activity and sedentary behaviour throughout adolescence: a prospective cohort study. *The Lancet Psychiatry*, 7(3), 262-271. [https://doi.org/10.1016/S2215-0366\(20\)30034-1](https://doi.org/10.1016/S2215-0366(20)30034-1)
- Kosasih, C. E., Solehati, T., Utomo, W., Heru, H., & Sholihah, A. R. (2021). Determinants Factors of High-risk Sexual Behavior Pregnancy among Adolescent in Indonesia. *Open Access Macedonian Journal of Medical Sciences*, 9(T6), 69-79. <https://doi.org/10.3889/oamjms.2021.7338>
- Kreibich, A., Hennecke, M., & Brandstätter, V. (2020). The Effect of Self-Awareness on the Identification of Goal-Related Obstacles. *European Journal of Personality*, 34(2), 215-233. <https://doi.org/10.1002/per.2234>
- Kusnandar, V. B. (2020). *10 Provinsi dengan Pernikahan Perempuan Usia Dini Tertinggi pada 2020*.
- Kyegombe, N., Zuma, T., Hlongwane, S., Nhlenyama, M., Chimbindi, N., Birdthistle, I., Floyd, S., Seeley, J., & Shahmanesh, M. (2022). A qualitative exploration of the salience of MTV-Shuga, an edutainment programme, and adolescents' engagement with sexual and reproductive health information in rural KwaZulu-Natal, South Africa. *Sexual and Reproductive Health Matters*, 30(1). <https://doi.org/10.1080/26410397.2022.2083809>
- Le, H. T. T., Phan, L. T., Vu, T. V., & Vu, H. T. T. (2023). Self-Awareness and Expectations for the Future of Adolescents in Juvenile Detention Centres. *Pegem Journal of Education and Instruction*, 13(02). <https://doi.org/10.47750/pegegog.13.02.28>
- Le Port, A., Seye, M., Heckert, J., Peterman, A., Nganya Tchamwa, A., Dione, M., Fall, A. S., & Hidrobo, M. (2022). A community edutainment intervention for gender-based violence, sexual and reproductive health, and maternal and child health in rural Senegal: a process evaluation. *BMC Public Health*, 22(1), 1165. <https://doi.org/10.1186/s12889-022-13570-6>
- Marques, A., Henriques-Neto, D., Peralta, M., Martins, J., Demetriou, Y., Schönbach, D. M. I., & Gaspar de Matos, M. (2020). Prevalence of Physical Activity among Adolescents from 105 Low, Middle, and High-Income Countries. *International Journal of Environmental Research and Public Health*, 17(9), 3145.



- <https://doi.org/10.3390/ijerph17093145>
- Martins, J., Costa, J., Sarmiento, H., Marques, A., Farias, C., Onofre, M., & Valeiro, M. G. (2021). Adolescents' Perspectives on the Barriers and Facilitators of Physical Activity: An Updated Systematic Review of Qualitative Studies. *International Journal of Environmental Research and Public Health*, 18(9), 4954. <https://doi.org/10.3390/ijerph18094954>
- Muthmainnah, Nurmala, I., Siswantara, P., Rachmayanti, R. D., & Devi, Y. P. (2021a). Implementation of Adolescent Health Programs at Public Schools and Religion-Based Schools in Indonesia. *Journal of Public Health Research*, 10(4), jphr.2021.1954. <https://doi.org/10.4081/jphr.2021.1954>
- Muthmainnah, Nurmala, I., Siswantara, P., Rachmayanti, R. D., & Devi, Y. P. (2021b). Implementation of adolescent health programs at public schools and religion-based schools in Indonesia. *Journal of Public Health Research*, 10(4), 625-632. <https://doi.org/10.4081/jphr.2021.1954>
- Muthmainnah, Salim, L. A., Devi, Y. P., & Khoiriyah, I. E. (2021). Efektivitas Media Edutainment Sebagai Strategi Penguatan Program Genre Era Pandemi Covid-19 Di Kabupaten Malang. *Perguruan Tinggi Mengabdikan Berkarya Dan Berinovasi Untuk Membangun Masyarakat Semakin Tangguh Di Masa Pandemi*, 175-184.
- Nadia, A., Muthmainnah, Salim, L. A., & Nurmala, I. (2022). EFEKTIVITAS APLIKASI KONCO SREGEP DALAM PENINGKATAN PENGETAHUAN KESEHATAN REMAJA DI ERA PANDEMI COVID-19 . *Penguatan Ketahanan Keluarga: Menjawab Tantangan Pembangunan SDM Indonesia Unggul*, 951-958.
- Najib, N., & Nugroho, E. (2020). Effect of Demographic, Social and Economic Factors on Adolescent Dating and Sexual Behavior in Indonesia. *Proceedings of the 5th International Seminar of Public Health and Education, ISPHE 2020, 22 July 2020, Universitas Negeri Semarang, Semarang, Indonesia*.
- <https://doi.org/10.4108/eai.22-7-2020.2300298>
- Nuraini, N. L. S., Cholifah, P. S., Mahanani, P., Oktiningrum, W., & Meidina, A. M. (2020). Optimizing the Learning Process in Classroom Using Edutainment. *Proceedings of the 1 St International Conference on Information Technology and Education (ICITE 2020)*. <https://doi.org/10.2991/assehr.k.201214.316>
- Nurmala, I. (2020a). *Mewujudkan Remaja Sehat Fisik, Mental dan Sosial: (Model Intervensi Health Educator for Youth)*. Airlangga University Press.
- Nurmala, I. (2020b). *Mewujudkan Remaja Sehat Fisik, Mental dan Sosial: (Model Intervensi Health Educator for Youth)*. Airlangga University Press.
- Nurmala, I., Ahiyanasari, C. E., Muthmainnah, Wulandari, A., Devi, Y. P., Pathak, R., & Pathak, Y. V. (2020). Emerging Premarital Sexual Behavior among Adolescent in Indonesia: The impact of Knowledge, Experience, and Media Use to Attitudes. *Indian Journal of Forensic Medicine & Toxicology*, 14(4), 2975-2981. <https://doi.org/10.37506/IJFMT.V14I4.12043>
- Nurmala, I., Li, C. Y., Pertiwi, E. D., Devi, Y. P., Muthmainnah, M., & Rachmayanti, R. D. (2022). The Correlation between Self-Efficacy, Grade, and Sex on the Intention to Participate in Peer-Education Activities in Drug Abuse Prevention. *Iranian Journal of Public Health*, 51(3), 702-704. <https://doi.org/10.18502/ijph.v51i3.8951>
- Nurmala, I., Muthmainnah, Hariastuti, I., Devi, Y. P., & Ruwandasari, N. (2021). The Role of Knowledge, Attitude, Gender, and School Grades in Preventing Drugs Use: Findings on Students' Intentions to Participate in Peer Education Program. *Journal of Public Health Research*, 10(3), jphr.2021.1972. <https://doi.org/10.4081/jphr.2021.1972>
- Nurmala, I., Muthmainnah, M., R, R. D., & P, E. D. (2019). Gender and norms related to an intention for participating in counseling sessions by peer educator. *Masyarakat, Kebudayaan Dan Politik*, 32(1), 105.



- <https://doi.org/10.20473/mkp.V32I1.2019.105-113>
- Nurmala, I., Rachmayanti, R. D., Pertiwi, E. D., & Devi, Y. P. (2021). The intention of Indonesian high school students to participate in drug abuse prevention through peer education activities. *Elementary Education Online*, 20(1), 750-756.
- Nurmala, I., Hargono, R., Siswantara, P., Muthmainnah, Harris, N., Wiseman, N., Roche, E., Rachmayanti, R. D., Devi, Y. P., A., K. D. N., & Fitriani, H. U. (2020). The Effectiveness of Adolescent Reproductive Health Media in Hey (Health Educator for Youth) Activities for High School Students in Indonesia. *International Journal of Innovation, Creativity and Change*, 11(10).
- Nusair, S., Sharma, B., & Khan, G. (2015). *Edutainment for an Enhanced Learning Experience (ELE)*.
- Petroni, S., Yates, R., Siddiqi, M., Luo, C., Finnie, A., Walker, D., Welbourn, A., Langevin-Falcon, C., Cappa, C., Palermo, T., Ngo, T. D., Baird, S., Makokha, J., Singh, S., Paul, M., Ndlovu, P., Mannikko, R., Raj, A., Ameyan, W., ... Chandra-Mouli, V. (2019). Understanding the Relationships Between HIV and Child Marriage: Conclusions From an Expert Consultation. *Journal of Adolescent Health*, 64(6), 694-696. <https://doi.org/10.1016/j.jadohealt.2019.02.001>
- Rodgers, R. F., & Rousseau, A. (2022). Social media and body image: Modulating effects of social identities and user characteristics. *Body Image*, 41, 284-291. <https://doi.org/10.1016/j.bodyim.2022.02.009>
- Sampurno, M. (2022). *Masih Banyak Kasus Narkoba Anak*. Jawa Pos Radar Malang.
- Shaluhayah, Z., Musthofa, S. B., Indraswari, R., & Kusumawati, A. (2020). Health Risk Behaviors: Smoking, Alcohol, Drugs, and Dating among Youths in Rural Central Java. *Kesmas: National Public Health Journal*, 15(1), 17. <https://doi.org/10.21109/kesmas.v15i1.286>
- Siswantara, P., Rachmayanti, R. D., Muthmainnah, & Setiawati, A. M. (2021). What Influences Youth Decision on Using "Remaja Sehat" Application? *Malaysian Journal of Medicine and Health Sciences*, 17(12), 12-16.
- Siswantara, P., Riris Diana, R., & Muthmainnah. (2019). The smart adolescent reproductive health promotion strategy based on android. *Opcion*, 35(SpecialEdition24), 1170-1184.
- UNICEF. (2023). *Child Marriage*.
- Wolters, C. A., & Brady, A. C. (2021). College Students' Time Management: a Self-Regulated Learning Perspective. *Educational Psychology Review*, 33(4), 1319-1351. <https://doi.org/10.1007/s10648-020-09519-z>
- Wong, J. C. S., & Yang, J. Z. (2021). Seeing is believing: examining self-efficacy and trait hope as moderators of youths' positive risk-taking intention. *Journal of Risk Research*, 24(7), 819-832. <https://doi.org/10.1080/13669877.2020.1750463>
- Yusran, S., Permata Sari, C., & Zainuddin, A. (2024). Determinants of Unwanted Pregnancy in Indonesia in 2022. *International Journal of Current Science Research and Review*, 07(05). <https://doi.org/10.47191/ijcsrr/V7-i5-44>

A Qualitative Analysis of Smoking Behavior from a Gender Perspective in Indonesia

Nurul Kodriati¹⁾, Rizanna Rosemary^{2,3)}

¹ Faculty of Public Health, University of Ahmad Dahlan Yogyakarta, D.I. Yogyakarta, Indonesia 55166

² Department of Communication Studies, Faculty of Social and Political Science, University of Syiah Kuala, Aceh, Indonesia 23111

³ Pusat Riset Ilmu Sosial dan Budaya, University of Syiah Kuala, Aceh, Indonesia 23111

✉Email: rizanna.rosemary@usk.ac.id

ABSTRACT

Background: In Indonesia, smoking is very prevalent, mainly among men, causing a high prevalence of smoking-related diseases. In this country, smoking is linked to social construction rooted in how to become men and women. Male smoking is acceptable; otherwise, the social stigma associated with female smokers drives them to conceal their habits, making intervention difficult. **Objective:** The paper examined the gender aspect of smoking and communication in promoting health within a sensitive issue and context—smoking and gender in Indonesia. **Method:** This paper employed a thematic analysis of two doctoral theses on gender and smoking, each thesis representing either male or female aspects, to explore the relationship between gender values and smoking. Mutual factors contributing to men's and women's smoking behaviors were gender values related to smoking, the importance of different life stages, and children as an entry point for adult smoking cessation. **Results:** Tobacco control interventions may be hampered if these influences are undermined. **Conclusion:** It can be concluded, smoking-related health communication must consider gender variations and empower gender values.

Keywords: Gender, Indonesia, Masculinity, Smoking, Stigma.

INTRODUCTION

There are actually increasing numbers of Tobacco Control (TC) regulation take place in Indonesia (Septiono et al., 2020). The Smoke Free Area (SFA) restriction is an example, the regulation prohibiting smoking in public place become compulsory for every province and districts. Even though the implementation varies from 45% in Bogor, a city close to the capital, to 17% in Jayapura, a province far from the center of government (Sulistiadi et al., 2020; Wahyuti et al., 2019).

The improvement from tobacco policy as above still has not reflected reduction in smoking prevalence among men. Unfortunately, the number of male smokers still tend to increase even though the most recent WHO report highlighted reduction in smoking prevalence prediction up to year 2025 (World Health Organization, 2019). Indonesia is in the extreme example of much higher prevalence among male population compared to female's (Collaborators et

al., 2017). When smoking among men is too prevalent and socially acceptable (Kodriati et al., 2018) making it hard for smoking control and intervention. At the same time, a steady increase of smoking prevalence among female adults as they grow older were observed in the country even though numbers of female smokers is relatively low (World Health Organization, 2019). Furthermore, women are also more prominent to be stigmatized when they are smoking compared to men's (Rosemary & Werder, 2023). Ultimately, female smokers are difficult to reach out and get the help they need may be hindered (Rosemary, 2020).

Thus, further inquiry should be made related to whether the establishment of TC regulations applicable in society and whether they are relevant to people's needs and circumstances or not. From the perspective of gender, both men and women try to be fit with certain gender values as expected by the society (Meeussen et al., 2020; Morrow & Barraclough, 2010). Boys, for example, want to prove that they have physical

resilience to the harms of smoking or minimize its risk (East et al., 2021), associating smoking with masculine characteristics different from feminine traits and accepting that engaging in smoking depicts them as being separate from girls (Kodriati et al., 2018).

Meanwhile, the smoking stigma towards women is a result of social construction that is shared among the community to discredit, devalue, and disregard others when identified as different or involved in deviant behaviors. Some women smokers said they had no choice and were compelled to accept and adapt to the social norm. They negotiated the social stigma by accepting it and concealing their smoking from public view (Triandafilidis et al., 2016). Thus, women who smoke are culturally labeled as inappropriate smokers, placing them in a more vulnerable position rather than overcoming their health-related problems (Evans-Polce et al., 2015a).

In light of gender influence as above, anti-smoking messages should be framed should consider the influence of gender and risk perceptions associated with (Gu, 2023). Certain messages are easy to understand and accepted for each gender. Messages that translate difficult epidemiological facts with their daily experiences. Such messages may offer an opportunity to be, at least, not defensive

towards smoking regulations and consider a smoking-free lifestyle. The paper examined a balanced gender perspective as a sensitive issue and context of smoking, as well as its communication aspects in Indonesia.

METHODS

This study reviewed and analyzed two doctoral theses on gender and smoking, each thesis representing either male or female aspects. The first thesis was about women's interpretation of anti-smoking advertising (Rosemary, 2020). The thesis not only talks about how women perceived the existing anti-smoking ads but also explains what motivates women to smoke and how they perceive the smoking issues in the country. Meanwhile, the second thesis talked about how masculinities or the values of being men shaped men's smoking behavior (Kodriati, 2021). This thesis explored how men exercised their manhood as early as school age.

Each author read both theses and conducted a thematic coding analysis of the findings. Thematic analysis was employed to extract the commonalities' themes between the two theses.

RESULTS AND DISCUSSION

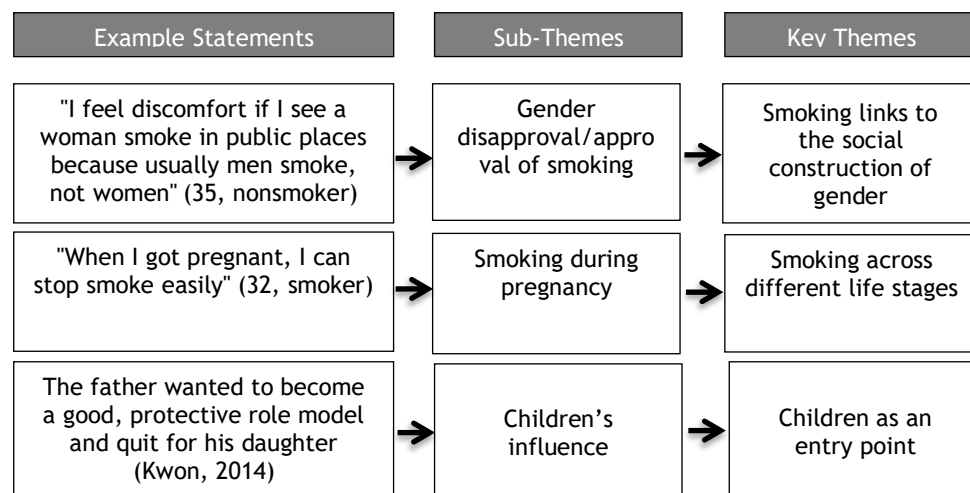


Figure 1. Themes and Sub-Themes from Related Statements.

Analysis of the two theses found that both men and women associated their smoking behaviors with certain gender

social constructions of smoking. There were three main findings to be highlighted for this study. Those three themes were

Smoking links to the social construction of gender, Smoking across different life stages, and children as entry points for effective TC campaigns. Each key theme corresponds to one sub-theme of gender disapproval/approval of smoking, smoking during pregnancy, and children's influence, respectively. Furthermore, each theme and subtheme was established from men's and women's data in each thesis.

Smoking Links to the Social Construction of Gender

The first theme presented how both genders perceive smoking-related issues in the community. In general, smoking among men is normalized, and some men undermine the hazards of smoking "Smoking hazards were not an important issue, mostly because male smoking is socially acceptable". This kind of value may be underpinned by their understanding of becoming men who have to be strong and in control of their health(Kodriati, 2021). In their study that was included in the review paper, boys were described as tending to conform to their peers and in a manly manner that is different from girls "If we don't follow our peers and smoke, they will call us feminine".

Otherwise, for women, social stigma to women smokers (mostly in Aceh) made them choose smoking in private (hidden smokers), which also explains, the increased trend of female smokers in the country, which is maybe much more than what was displayed in the previous data. The stigma was represented by the quote, "I don't know, I feel discomfort if I see a woman smoke in public spaces because usually, men smoke, not women".

The first thesis found both external and internal factors. The majority of female participants she interviewed, both smokers and nonsmokers, had significant male others, such as husbands, fathers, or partners, who had started smoking at a young age (between the ages of 9 and 12).

Participants were asked to explain the factors that influenced their smoking habits. Outside factors such as peer pressure, family members, friends, colleagues, and respected agency control were the primary reasons (85%). Surprisingly, the majority of the pressure came from men. For example, a nonchalant attitude of women's health practitioners (male general practitioners)

who neither minded nor discouraged their smoking behavior. 'My ob-gyn is a smoker; he has no issues with my smoking during pregnancy.' He even persuaded me that smoking isn't the only source of illness' (WR, 36, smoker). Another smoker shared her story about how her father's smoking habit influenced her decision to start smoking.

My late father smoked and used to leave cigarette packs all over the house. I've always wondered why he seemed to enjoy smoking so much. When I was in sixth grade, I tried my first cigarette. We tried an abandoned cigarette left on the table one day with my brother. I've been enjoying it since the first inhale, but my brother hasn't. I began smoking in high school and became an active smoker in year 12 senior high school. (RN, 37, smoker).

Another participant stated that the loss of a loved one, as well as the subsequent feelings of grief, sadness, and distress, was the catalyst for her smoking. When my father died, I began smoking. I was very sad, especially the night before Dad's body was cremated later that morning. When I asked my husband if he smoked, he replied, 'Yes, but not too much.' So, even though I was breastfeeding, I smoked the entire night (ED, 49, smoker). Outside, mostly male forces are said to be the most difficult obstacles to quitting smoking, especially when they come from friends and colleagues. In other words, smoking hazards were not a major concern, owing to the fact that male smoking is socially acceptable. Female smoking, on the other hand, is considered harmful. Instead of being a health issue, smoking women is bad for society. While women are culturally protected from smoking, they are more likely to be stigmatized when they smoke. Finally, female smokers may find it difficult to reach out and receive the assistance they require.

Smoking Across Different Life Stages

The second theme showed that both men and women have different experience of smoking according to their life stages. One of the most important life stages starts when they have their own family by getting married and having children. The findings showed that both men and women tend to perceive this stage of life as the time when they need to adjust their smoking behavior to the better.

In the first thesis, female youth smokers are seen as smoking to show off and rebel, but more mature females, are aware of smoking as harmful and commit to quitting smoking if they get married or pregnant, suggesting that single smoking women have the intention to quit smoking if they move to their next stage of life that is having a family. Being a caretaker and caregiver are mostly assigned to women when they get married and have children. Women smokers perceived smoking women as bad behavior, particularly those who are considered vulnerable, regardless of their age or circumstances, such as adolescents, married women, and pregnant women. Although this perception may not apply to all ages, the findings suggest that there is a specific lifestyle preference regarding tobacco use, with adult smokers perceiving themselves as more mature than young people. The concept of maturity corresponds to the idea that adult smokers are more likely to start smoking than their younger counterparts. Furthermore, within the smoking group, young female smokers who are new to smoking may have unconsciously justified and reinforced the social stigma against female smokers.

This resonates with findings of a previous study showing that social influences, people's quitting smoking—and women in particular are mostly influenced by two social norms, subjective quitting norm (significant others' expectations that one should quit) and descriptive quitting norm (significant others' quitting behavior) (East et al., 2021).

For males, boys tend to believe that their health is indestructible and that they are in control of their health. According to a qualitative study based in Canada, this tendency may improve when a man becomes a father because he wants to learn how to be a good protector, which includes protecting his family from the dangers of tobacco. However, such findings could not be verified from a national masculinity survey (Kodriati et al., 2020). Given the fact that Indonesian men have different cultural contexts which leads to different experiences, they have less opportunity to take care of the baby and less time to reconsider their smoking behavior. Simultaneously, married men's smoking behavior was tolerated by their spouses, despite the fact that smoking is harmful (Ayuningtyas et al., 2021).

Children as an Entry Point for Smoking Cessation

The third theme was that children have the potential to be an important entry point for men and women to reduce their smoking behavior. Even though women tend to dominate childcare, men who have the opportunity to be close to children, particularly babies, may reap some benefits by becoming good protectors and role models for their children (Walrave et al., 2023). Doing health for others, especially loved ones, is one of the important messages found in this study which can be used to develop anti-smoking messages targeting men (Gu, 2023). Despite admitting inability to quit smoking, a small number of female smokers stated that quitting was not difficult. Even though she was highly motivated, one participant had tried to quit several times without success.

I can't stop smoking, but I like knowing if my pack is still full or half-full. I told my friends that if I got married and wore a veil, I would stop smoking because I want healthy children. I don't mind if my husband smokes, but I will no longer smoke. (CM, 35, smoker)

Likewise, the women were aware of the dangers of smoking to pregnant women and newborn babies. As a result, they desired healthy children. Married women and mothers were also aware of the dangers of smoking to children. 'When I became pregnant, I was able to quit smoking easily' (CH, 48, smoker). Furthermore, both female smokers and nonsmokers disapproved of smoking by adolescent females, married women with children, and pregnant women. Women distinguished between 'good' female smokers and 'bad' female smokers. In Banda Aceh and Jakarta, both mature smokers and nonsmokers disapproved of young female smokers, reflecting the stereotyped perception of younger women's motivations for smoking. Participants who smoked stated that, unlike 'real women' smokers, young females (often adolescents) smoked as a lifestyle choice. In this case, men may be expected to change their smoking habits for the sake of their children.

Gender is an important identity that was shaped and developed during adolescence. Both men and women

perform specific behaviors to fit with the expectations of society. About smoking, several qualitative studies have highlighted how people's attitudes toward smoking were based on their understanding of their gender. The perspective of each gender will be discussed separately, starting with men, in this section.

Men are disadvantaged by the masculine social construction, which encourages them to possess and exhibit traits such as strength, toughness, and heroism (Gough & Novikova, 2020). These are well-known characteristics of hegemonic masculinity (Connell, 2020), a type of masculinity commonly used to study men's smoking habits (Kodriati et al., 2018). To show others, and themselves, that they possess such masculine traits and physical resilience, some men welcome risks and challenges in their lives including the risks of smoking. Thus, such characteristics frequently lead to risky and unhealthy behaviors in men, such as smoking and alcoholism (Mursa et al., 2022) especially at a young age. However, men's smoking behaviors and perceptions may change throughout their life. As young men grow older, their belief in their physical resilience to the harmful effects of smoking leads to more moderate smoking behavior.

There are two prominent gender theories to be used to understand the above findings: hegemonic masculinity, as above, and 'doing gender' (Gough & Novikova, 2020; Morris, 2011). Hegemonic masculinity was used to exert power over women or other masculinities, whereas 'doing gender' refers only to gender difference, which we do continuously rather than being influenced. Gender, according to the latter viewpoint, is a dynamic characteristic that people constantly exhibit through their social interactions. It is reproduced and performed rather than being deeply rooted in society and its people.

'Doing gender' positions men as active agents, allowing men to be reproduced indefinitely. Whether boys smoke to demonstrate their masculinity and strength (Mursa et al., 2022). 'Doing gender' positions men as active agents, allowing men to be reproduced indefinitely. Whether boys smoke to demonstrate strong and masculine characteristics or to conform to their

environment and maintain social harmony, men do so under their gender prescription. Unfortunately, some men smoked to cope with stress at their different stages of life (East et al., 2021) and fit into the social construction of men, who are expected to be strong (not to seek help from others), have less complaints, and be emotionally stable. These characteristics are more prominent among young men.

In addition to the above gender prescription, in Indonesia, the main narrative of becoming a (adult) man is, mainly, how to be a reliable provider and who are attentive to the needs of their family (wives and children). Using this logic, the 'heroic' sense of becoming a man for fathers may motivate some men to alter their smoking habits for the sake of their children in order to protect them from the dangers of smoking. Smoking behavior changes may not result in an immediate cessation of smoking, but they may reduce the number of cigarettes smoked per day (CPD) or choose locations away from their family. An Indonesian masculinity survey support such premise only when fathers are not the only breadwinner of the family, either shared their income with their wife or with their parents (Kodriati, 2021; Kodriati et al., 2020). Unfortunately, the primary roles men are expected to play are that of a dependable 'breadwinner' worker and provider for their family (Walrave et al., 2023) shared financial responsibility means less stress for men. When men use smoking to cope with stress throughout their lives, men may be able to reduce their CPD.

An investigation on young women's perceptions of smoking from the standpoint of social identity (Davey & Zhao, 2020). The study was designed using a qualitative approach that included 13 focus group discussions (FGD) and six intercept interviews with Australian women aged 16 to 28 years old, including young women smokers, ex-smokers, and non-smokers. These women were gathered using a variety of methods, including promotional materials and snowball techniques. The FGDs had 2 to 7 participants, with some groups including both smokers and nonsmokers who were recruited based on friendship groups and other circumstances. The authors persuaded the group members not to jeopardize the discussion, and the questions were given to smokers and

nonsmokers separately to record their specific responses to the given questions (Davey & Zhao, 2020). The study discovered that women's smoking habits are influenced by their social identities.

During data collection, three social identities emerged: the cool smoker identity, the considerate smoker identity, and the good mother identity. Young women who became regular smokers are referred to as "cool smokers." These smokers perceived smoking as a 'cool' behavior, which influenced their smoking initiation; thus, while nonsmokers perceived smoking among women as a symbol of 'outgoing and rebellious behavior,' they were more likely to perceive smokers as disreputable people who are easily influenced. The second identity, the "considerate smoker," refers to young women, the majority of whom are smokers, who regard smoking in public places as unacceptable behavior. This considerate group also divided female smokers into "considerate smokers" and "inconsiderate smokers." "Considerate smokers" were those who understood that smoking is a personal choice but were considerate of nonsmokers, such as children. In contrast, "considerate smokers" were those who tended to affect others with their smoking behavior, such as mothers who smoke around their children or pregnant women. Finally, the "good mother" identity refers to young mothers and pregnant women who have attempted to quit smoking during their pregnancy due to health risks, for example. This group can also be classified as "considerate smokers." (Davey & Zhao, 2020).

Furthermore, McDermott et al examined young women's perceptions of cigarette smoking across life transitions and discovered that social role has a significant influence on women's tobacco consumption. The study found that women's perceptions of smoking changed from the time they started smoking, i.e. adolescence, to early adulthood, when they enter their other phase of life as mothers, for example (Stacey et al., 2022). The women's attitudes toward smoking appeared to discourage conditions that would improve the family's health and could become an impediment to smoking cessation. As a result, raising awareness among women about the harmful effects of smoking will significantly reduce tobacco use among the next generation. According

to Lennon, this different perception of smoking aids in identifying approaches for smoking cessation interventions, particularly at the social level.

Many studies have highlighted The adoption of accurate and neutral language when referring to individuals who smoke can help mitigate the stigma associated with smoking and improve the precision of scientific discourse (Williamson et al., 2020). These studies found that condemning smoking behavior helped to reduce smoking practices. While our paper endorses other studies that have shown the downsides of utilizing 'stigma' in tobacco control intervention (Evans-Polce et al., 2015b; Triandafilidis et al., 2016), these studies affirmed that smoking-related stigma tends to agree that stigmatization strategies in public health (e.g. tobacco control) are not effective and could lead to negative consequences (Williamson et al., 2020). Future research needs to explore other methods to mitigate the stigma into a more positive tone/message to make women rethink their risky behavior.

While the research findings indicated that there are likely to be changes in how women smoke throughout their lives, it is assumed that as they get older, they will be more likely to quit smoking (Jackson et al., 2024); however, this finding is likely to ignore the tendency of growth in the smoking rate among young people (teenage girls) who continue to smoke during their early adulthood stage with no guarantee that they will be more likely to quit smoking. While the societal expectation towards women is to care for and nurture their family as above, some women tended to place a greater emphasis on the harm that their stress would cause the fetus, justifying their decision to continue smoking while denying the direct negative effects of smoking on the fetus. The smoking phenomenon among pregnant women demanded a thorough examination. Even if they were aware of the health risks of smoking to their fetus, women may face several other obstacles to quitting, including willpower, the meaning of smoking, a lack of cessation support, factual knowledge, changes in smell and taste, etc.

At the same time, it is difficult to imagine how women can help educate their children and family members about the dangers of smoking if they are not



involved in discussions about the issue from a female perspective. The ro thesis also discovered that some smokers in the study are aware that smoking is harmful and intend to quit. The single female participants were unwilling to give up smoking until they married. Women place a high value on raising a healthy family. They are aware of the risks of smoking for pregnant women and newborn babies, and they want to have healthy children. Married women and mothers are also aware that smoking is harmful to children. These findings are consistent with previous research that found children are more influenced by anti-smoking messages than older people (Nicolini & Cassia, 2022). In the absence of anti-smoking messages aimed specifically at female smokers, study participants expressed a desire for more engaging testimonial anti-smoking messages delivered by women and children.

Since only reflects on two dissertations, this paper may not be

adequate to capture and provide a concrete pattern of smoking-based gender. Nevertheless, the paper provides different insights to understand future interventions necessary to reduce smoking prevalence in the country, that is through the lens of the smokers itself (Rosemary et al., 2022). For instance, the widespread exposure to tobacco advertisements that promote smoking as a symbol of freedom, body-weight control, and social identity is likely to put these young women in a more vulnerable position. More comprehensive strategies are required in this case, such as restricting advertising that promotes positive images of women smoking, such as "freedom, independence, and beauty," and reinforcing social groups that address the health risks of tobacco to smokers and nonsmokers (second-hand smoke). The role of non-governmental organizations (NGOs) and women's leadership that focus on women and the tobacco issue from a gender perspective is critical.

CONCLUSION

Given the long history of cigarettes in Indonesia, especially among men, tobacco control regulation should integrate a comprehensive gender knowledge that gender could accept. Redefinition of gender in smoking issue; empowering instead of gender labeling. There is a slight difference between gender labelling and empowering which will give the impact will be huge. People's views on what constitutes appropriate gender behavior influence their smoking decisions. The dynamics of this relationship operate in specific contexts. This emphasizes the importance of supportive environments in enhancing and promoting aspects of gender that are protective against smoking throughout their lives. In other words, consciously or unconsciously, gender still plays the main driver of our behavior. The cultural protection against smoking among women could have a negative effect which makes the smoking stigma stronger. At the same time, the general acceptance of smoking among men could serve as a big obstacle to smoking cessation and reduction. This issue requires to be addressed carefully and equally for both women and men.

Learning from the themes of this study, smoking can be associated with the construction of gender, both male and female. Still, the form of the relationship between gender and smoking is different. Tobacco control in general needs to consider how gender influences smoking behaviors. The high burden of smoking among men should lead us to develop different alternative ways of delivering anti-tobacco messages since some men undermine the messages. Then, tobacco control needs to implement different strategies and concepts of anti-smoking messages for each gender in different life stages and to disassociate smoking from any gender. For example, positive messages that contained information of the benefits they might have for not smoking and developing positive masculinity and femininity values at different stages of life might complement the information of the harms of smoking.

REFERENCES

- Ayuningtyas, D., Tuinman, M., Prabandari, Y. S., & Hagedoorn, M. (2021). Smoking-Related Social Control in Indonesian Single-Smoker Couples. *International Journal of Behavioral Medicine*, 28(4).

- <https://doi.org/10.1007/s12529-020-09935-z>
- Collaborators, G. B. D. 2015 T., Reitsma, M. B., Fullman, N., Ng, M., Salama, J. S., Abajobir, A., Abate, K. H., Abbafati, C., Abera, S. F., Abraham, B., Abyu, G. Y., Adebisi, A. O., Al-Aly, Z., Aleman, A. V., Raghbi, A., Alkerwi, A. 'a Al, Allebeck, P., Al-Raddadi, R. M., Amare, A. T., ... E., G. (2017). Smoking prevalence and attributable disease burden in 195 countries and territories, 1990-2015: a systematic analysis from the Global Burden of Disease Study 2015. *The Lancet*.
- Connell, R. W. (2020). *Masculinities*. Routledge.
- Davey, G., & Zhao, X. (2020). Turning Points to Becoming a Tobacco Smoker: Smoking Initiation and Identity Change among Chinese Youth. *Symbolic Interaction*, 43(2), 308-331. <https://doi.org/https://doi.org/10.1002/symb.442>
- East, K., McNeill, A., Thrasher, J. F., & Hitchman, S. C. (2021). Social norms as a predictor of smoking uptake among youth: a systematic review, meta-analysis and meta-regression of prospective cohort studies. *Addiction*, 116(11), 2953-2967. <https://doi.org/https://doi.org/10.1111/add.15427>
- Evans-Polce, R. J., Castaldelli-Maia, J. M., Schomerus, G., & Evans-Lacko, S. E. (2015a). The downside of tobacco control? Smoking and self-stigma: A systematic review. In *Social Science and Medicine*. <https://doi.org/10.1016/j.socscimed.2015.09.026>
- Evans-Polce, R. J., Castaldelli-Maia, J. M., Schomerus, G., & Evans-Lacko, S. E. (2015b). The downside of tobacco control? Smoking and self-stigma: A systematic review. *Social Science & Medicine*, 145, 26-34. <https://doi.org/https://doi.org/10.1016/j.socscimed.2015.09.026>
- Gough, B., & Novikova, I. (2020). *Mental health, men and culture: how do sociocultural constructions of masculinities relate to men's mental health help-seeking behaviour in the WHO European Region?*
- Gu, R. (2023). *The influence of the dynamic change of fear: how gender-specific messages affect anti-smoking intentions* [Nanyang Technological University]. <https://doi.org/10.32657/10356/169400>
- Jackson, S. E., Brown, J., Notley, C., Shahab, L., & Cox, S. (2024). Characterising smoking and nicotine use behaviours among women of reproductive age: a 10-year population study in England. *BMC Medicine*, 22(1), 99. <https://doi.org/10.1186/s12916-024-03311-4>
- Kodriati, N. (2021). *The role of masculinities in shaping male smoking behaviour: A life-course perspective*. National University of Ireland Galway.
- Kodriati, N., Hayati, E. N., Santosa, A., & Pursell, L. (2020). Fatherhood and Smoking Problems in Indonesia: Exploration of Potential Protective Factors for Men Aged 18-49 Years from the United Nations Multi-Country Study on Men and Violence. *International Journal of Environmental Research and Public Health*, 17(19), 6965. <https://doi.org/10.3390/ijerph17196965>
- Kodriati, N., Pursell, L., & Hayati, E. N. (2018). A scoping review of men, masculinities, and smoking behavior: The importance of settings. *Global Health Action*, 11(sup3). <https://doi.org/10.1080/16549716.2019.1589763>
- Meeussen, L., Van Laar, C., & Van Grootel, S. (2020). How to Foster Male Engagement in Traditionally Female Communal Roles and Occupations: Insights from Research on Gender Norms and Precarious Manhood. *Social Issues and Policy Review*, 14(1), 297-328. <https://doi.org/https://doi.org/10.1111/sipr.12060>
- Morris, E. W. (2011). Bridging the Gap: 'Doing Gender', 'Hegemonic Masculinity', and the Educational Troubles of Boys. *Sociology Compass*, 5(1), 92-103. <https://doi.org/https://doi.org/10.1111/j.1751-9020.2010.00351.x>
- Morrow, M., & Barraclough, S. (2010). Gender equity and tobacco control: bringing masculinity into focus. *Glob Health Promot*, 17(1 Suppl), 21-28. <https://doi.org/10.1177/1757975909358349>



- Mursa, R., Patterson, C., & Halcomb, E. (2022). Men's help-seeking and engagement with general practice: An integrative review. *Journal of Advanced Nursing*, 78(7), 1938-1953. <https://doi.org/https://doi.org/10.1111/jan.15240>
- Nicolini, V., & Cassia, F. (2022). Fear vs humor appeals: a comparative study of children's responses to anti-smoking advertisements. *Asia-Pacific Journal of Business Administration*, 14(2), 166-184. <https://doi.org/10.1108/APJBA-04-2021-0134>
- Rosemary, R. (2020). *Women's interpretation of anti-smoking messages in Indonesia: An audience analysis*. University of Sydney.
- Rosemary, R., Azman, Z., & Irma, A. (2022). Why Audiences' Voice on Developing Anti-Smoking Messages Matters. *Jurnal Komunikasi: Malaysian Journal of Communication*, 38(2), 72-86. <https://doi.org/10.17576/JKMJC-2022-3802-05>
- Rosemary, R., & Werder, O. (2023). 'To smoke or not to smoke': Indonesian women contesting and negotiating the taboo. *Journal of Substance Use*, 1-7. <https://doi.org/10.1080/14659891.2023.2202743>
- Septiono, W., Kuipers, M. A. G., Ng, N., & Kunst, A. E. (2020). The impact of local smoke-free policies on smoking behaviour among adults in Indonesia: a quasi-experimental national study. *Addiction*, 115(12). <https://doi.org/10.1111/add.15110>
- Stacey, T., Samples, J., Leadley, C., Akester, L., & Jenney, A. (2022). 'I don't need you to criticise me, I need you to support me'. A qualitative study of women's experiences of and attitudes to smoking cessation during pregnancy. *Women and Birth*, 35(6), e549-e555. <https://doi.org/https://doi.org/10.1016/j.wombi.2022.01.010>
- Sulistiadi, W., Veruswati, M., Asyary, A., Herawati, M. H., Wulandari, R. A., & Haryanto, B. (2020). Smoke-free zone in indonesia: Who is doing what now. *Open Access Macedonian Journal of Medical Sciences*, 8(E). <https://doi.org/10.3889/oamjms.2020.4091>
- Triandafilidis, Z., Ussher, J. M., Perz, J., & Huppatz, K. (2016). An Intersectional Analysis of Women's Experiences of Smoking-Related Stigma. *Qualitative Health Research*, 27(10), 1445-1460. <https://doi.org/10.1177/1049732316672645>
- Wahyuti, W., Hasairin, S. K., Mamoribo, S. N., Ahsan, A., & Kusuma, D. (2019). Monitoring compliance and examining challenges of a smoke-free policy in Jayapura, Indonesia. *Journal of Preventive Medicine and Public Health*, 52(6). <https://doi.org/10.3961/jpmph.19.240>
- Walrave, M., Robbé, S., Staes, L., & Hallam, L. (2023). Mindful sharenting: how millennial parents balance between sharing and protecting. *Frontiers in Psychology*, 14. <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2023.1171611>
- Williamson, T. J., Riley, K. E., Carter-Harris, L., & Ostroff, J. S. (2020). Changing the Language of How We Measure and Report Smoking Status: Implications for Reducing Stigma, Restoring Dignity, and Improving the Precision of Scientific Communication. *Nicotine & Tobacco Research*, 22(12), 2280-2282. <https://doi.org/10.1093/ntr/ntaa14>
- World Health Organization. (2019). *WHO global report on trends in prevalence of tobacco use 2000-2025*.

A Scoping Review: Comparison of Cigarette Consumption among Adolescents in Asia

Sella Puspita Sari✉¹⁾, Made Adhyatma Prawira Natha Kusuma²⁾, Syamsulhuda Budi Musthofa¹⁾, Nurjazuli¹⁾

¹ Department of Health Promotion, Diponegoro University, Semarang, Central Java, Indonesia 50275

² Department of Occupational Health and Safety, Bali International University, Denpasar, Indonesia 80234

✉Email: sellapuspitasari@students.undip.ac.id

ABSTRACT

Background: Adolescent smoking has a significant impact on public health. Adolescent smoking is a global health problem that requires serious attention since it causes long-term public health impacts, including an increased risk of chronic diseases. **Objectives:** This review aims to examine the comparisons and factors affecting adolescent cigarette consumption in Asian countries. **Methods:** This study used a scoping review method to explore and understand the level of cigarette consumption among youth in various Asian countries. This study used various sources from PubMed, Google Scholar, and Springer Link databases. The keywords used in this article include youth cigarette consumption, Asia, Factors, Prevalence, and Comparison. This review was conducted on 400 articles that were screened and analyzed into 10 articles. The selected articles were free and full text in English, within five years between 2019 and 2023. The selected articles covered various fields namely medicine, health, healthcare, environmental science, and social science. The selected articles provided data from Malaysia, Japan, China, Taiwan, Indonesia, and East Timor. **Results:** The results are used to detail a comparison of youth cigarette consumption in Asia countries, thereby supporting more effective and contextualized public health. **Conclusion:** We identified that personal, environmental, and societal factors are the main causes of youth cigarette consumption in Asia.

Keywords: Adolescent cigarette consumption, Asia, Comparison, Factors, Prevalence.

INTRODUCTION

Smoking among adolescents in Asia is an issue that requires serious attention, given its negative impact on the health and development of the younger generation. Asia, as a continent with diverse geography and culture, presents challenges in understanding the factors influencing smoking behavior among adolescents (TCSC, 2018).

Efforts to address this issue require a profound understanding of smoking consumption trends and variables involved in various Asian countries. This research aims to explore and comprehend the levels of cigarette consumption among adolescents in different Asian countries. Smoking habits among adolescents have significant impacts on public health and constitute a global health issue that requires serious attention. Asia, with its diverse cultural and demographic landscape, offers a rich context for understanding smoking consumption

patterns among adolescents (Masturoh, 2019).

This research tries to understand the differences and similarities in cigarette consumption among adolescents in various Asian countries. This research will also identify factors that influence the level of cigarette consumption in adolescents (Gafur, 2021).

Smoking during adolescence can have long-term impacts on public health, including an increased risk of chronic diseases later in life. Understanding the levels of cigarette consumption in Asia can aid in designing more effective public health interventions (Putri, 2021).

This research builds upon previous studies using the scoping review method by comparing cigarette consumption among Asian adolescents. In the context of globalization, comparative objectives can provide a more comprehensive insight into smoking trends among Asian adolescents. The selection of this title is based on the urgency to address the issue of cigarette

consumption among adolescents, which is a severe challenge in Asia. Through this research, it is hoped that differences in factors driving adolescents to start smoking will be revealed. Preventive measures and more effective interventions can be formulated to protect the younger generation from the adverse effects of smoking. This research is relevant as it contributes to the global understanding of this pressing public health issue.

Research on the comparison of cigarette consumption among teenagers in Asia requires a strong theoretical framework to understand the factors influencing smoking behavior. One theory that can be applied is the theory of planned behavior (TPB). According to TPB, an individual's behavior is influenced by three main factors: attitude toward the behavior, subjective norms, and perceived behavioral control. Attitude toward smoking encompasses an individual's evaluation of the positive and negative consequences of that behavior. Subjective norms reflect individuals' perceptions of support or disapproval from those around them regarding smoking behavior. Perceived behavioral control includes individuals' perceptions of their ability to control smoking behavior (Ajzen, 1991).

Research employing TPB in the context of cigarette consumption among teenagers in Asia can examine how attitudes toward smoking vary among teenagers from different Asian countries, influenced by cultural, social, and economic factors. Additionally, subjective norms affecting acceptance or rejection of smoking can also be studied, whether from peers, family, or other social environments. The influence of behavioral control factors such as cigarette availability, pricing, and regulation is also important to consider in this comparative analysis. By understanding the psychological and social factors influencing smoking behavior among teenagers in various Asian countries, this research can provide valuable insights into the development of more effective interventions to reduce smoking prevalence and promote healthy lifestyles among teenagers.

METHODS

The research design used in this research is a scoping review. The subject

of this research is international journals related to the Comparison of Cigarette Consumption among Adolescents in Asia. The research sample consisted of 31 research articles from international journals that discussed the comparison of cigarette consumption among teenagers in Asia. The inclusion criteria used in this research were articles originating from the PubMed and Springer Link databases.

Table 1. Database and Keywords.

| Database | Keywords |
|---------------------------|--|
| PubMed, Google Scholar | Keywords: ("Cigarette Consumption"[Mesh]) and ("Asian Adolescents"[Mesh]) Filter: Adult |
| Springer Link | Keywords: (Comparison of cigarette consumption), Filter: Discipline: Asian Adolescents Subdiscipline: Health |

The selected articles were chosen based on publications released between 2019 and 2023 (5 years) and were written in English. The exclusion criteria are articles requiring full text in languages other than English or Indonesian, articles published before 2019, articles with unclear publication sources, research results unrelated to health impacts, and articles requiring ISSN or ISBN. The eligibility criteria for this research were based on the PICOS criteria (population, intervention/exposure, outcome, study):

- The population in this study does not consist of cigarette consumers.
- The exposure in this study was not smoking.
- The outcomes evaluated in this study were not related to cigarette consumption in Asian adolescents.
- This research is not an observational study.

RESULTS AND DISCUSSION

Based on the search results for articles with the keywords above, it shows that there are 140 articles from Google Scholar, 135 articles from Springer Link, and 125 articles from PubMed. The next step is abstract review. After reviewing the abstracts of the 100 selected articles, 30 articles were excluded because they were not research on Comparative Adolescent

Cigarette Consumption In Asia, and 170 articles were included in the next step, namely full-text review. From a full-text search of 170 selected articles, articles were excluded because they did not meet

the criteria. Ten were identified for inclusion in the analysis.

Table 2. Summary of discussion data.

| Countries | Prevalence (man) | Most Influential Factor | | | |
|----------------|------------------|-------------------------|--------|-----|-------------|
| | | Friendship | Family | Ads | Unexplained |
| South Asia | (Unexplained) | ✓ | ✓ | ✓ | |
| Southeast Asia | 40% | | | | ✓ |
| Malaysia | 14,8% | ✓ | ✓ | ✓ | |
| Japan | (Unexplained) | ✓ | ✓ | | |
| China | 95% | | | | ✓ |
| Taiwan | (Unexplained) | ✓ | ✓ | ✓ | |
| East Timor | 55,5% | | | | ✓ |
| Indonesia | 60% | ✓ | ✓ | ✓ | |

1. Comparison of Adolescent Cigarette Consumption in Asia Based on Table

The studies above provide a profound understanding of the prevalence and factors influencing smoking habits among adolescents in various countries in Southeast Asia. Personal, environmental, and societal factors emerge as key relevant points in the analysis.

a) Friendship and smoking behavior

A study by Forster et al. (2003) highlights the role of peer influence in shaping smoking behavior among teenagers. This research found that teenagers are more likely to smoke if they have peers who smoke. The theory of planned behavior (TPB) can be used to explain these findings in more detail. TPB suggests that subjective norms, which are individuals' perceptions of support or disapproval from those around them regarding specific behaviors, greatly influence an individual's intentions and behavior. Teenagers tend to mimic the behavior of their peers as a form of social norm that affects their decision to smoke. Therefore, it is important to consider the influence of peer groups when designing interventions aimed at reducing cigarette consumption among teenagers.

b) Family and Smoking Behavior

Research by Mays et al. (2011) highlights the impact of having family members who smoke on teenagers' risk of initiating smoking. The results of this study indicate that teenagers who have family members who smoke are more likely to start and continue smoking. TPB can also be used to understand these findings. Family plays a significant role in shaping subjective norms and behavioral control among teenagers. Teenagers' perceptions of how their families view smoking behavior can influence their intentions and ability to control that behavior. Therefore, interventions targeting teenagers need to take into account the influence of family in smoking prevention efforts.

c) Advertising and Smoking Behavior

A study by Lovato et al. (2011) emphasizes the impact of cigarette advertising on smoking behavior among teenagers. This research shows that exposure to cigarette advertising can increase the likelihood of teenagers starting to smoke. In this context, TPB can be used to explain how cigarette advertising can influence teenagers' attitudes and subjective norms toward smoking. Cigarette advertising can create a positive perception of smoking and establish subjective norms that

support smoking behavior among teenagers. Therefore, restricting cigarette advertising and effective promotion of smoking risks are crucial in smoking prevention efforts among teenagers.

d) Cross-Country Comparison

Based on the prevalence of smoking data and the most influential factors presented in the table, it can be seen that friendship, family, and advertising factors have a significant impact on smoking behavior in different Asian countries. For example, in Malaysia, teenagers who have smoking peers, exposure to family members who smoke, and exposure to cigarette advertising significantly affect smoking prevalence among teenagers. In Taiwan, similar factors also have an impact, while in China high smoking prevalence can also be associated with exposure to cigarette advertising. However, in some countries, like East Timor, these factors may not explain the high smoking prevalence, indicating other variables that need to be considered.

Overall, personal, environmental, and social factors play a significant role in shaping smoking behavior among teenagers in Asia. The use of theoretical frameworks such as TPB helps in understanding the complexity of these factors and designing effective interventions to reduce cigarette consumption among teenagers.

2. Factors of Cigarette Consumption in Adolescents

Cigarette consumption in adolescents is a serious concern in the context of public health. Several factors may influence levels of cigarette consumption among adolescents, and a deeper understanding of these factors is an important step in developing effective prevention strategies. A teenager's surrounding environment can play a key role in forming smoking habits. Exposure to passive smoking at home, tobacco company policies that facilitate cigarette accessibility, as well as advertising and promotion of

cigarettes around teenagers, can have a significant influence (Salman et al., 2021).

Social factors include influence from peers, social norms, and exposure to tobacco advertising. Adolescents are often influenced by the decisions of their peers, and social norms that support smoking can create social pressure to follow the trend. In addition, tobacco advertising that is attractive and targets teenagers can also be an influencing factor. Some teens may seek out cigarettes as a stress coping mechanism or a way to manage emotional distress. Cigarette use can be considered as a form of escape from personal problems or the pressures of daily life (Sawitri & Maulina, 2020).

To reduce cigarette consumption in adolescents, a holistic approach needs to be applied. Educational programs that focus on the health impacts of smoking, the establishment of anti-smoking social norms, and psychological support for adolescents seeking coping mechanisms for stress could be initial steps. Apart from that, the active role of families, schools, and communities in providing better understanding and creating an environment that supports healthy decisions is also very important. Policies regulating tobacco advertising, increasing cigarette prices, and economic regulatory measures can also help reduce the prevalence of cigarette consumption among adolescents (Nuzula & Oktaviana, 2019).

3. Cigarette Consumption among Adolescents in Asia

Comparison of youth cigarette consumption in Asia is a critical aspect in understanding the public health challenges in this region. Various studies have explored factors influencing smoking behavior in adolescents, presenting in-depth insights that can guide public health policies and effective interventions (Gupte et al., 2020).

First of all, it can be observed that differences in adolescent cigarette consumption levels can be influenced by personal, environmental and societal factors. Several studies highlight the role of pocket money,

exposure to second-hand smoke at home, and peers who smoke as personal and environmental factors that contribute to smoking behavior. Along with this, societal factors, such as tobacco company policies and the prevalence of free cigarettes, also play a significant role in shaping the views and smoking habits of adolescents in various Asian countries (Mishu et al., 2021).

The importance of understanding gender dimensions is also reflected in these studies. The difference between smoking prevalence in male and female adolescents is a prominent highlight. This phenomenon requires a different approach to designing public health prevention and intervention programs that focus on gender diversity (Zanetta et al., 2020).

Adolescent smoking trends can also be seen from a socio-demographic perspective. Differences in prevalence between countries, as illustrated in studies of Brunei, Cambodia, Indonesia, Laos, Malaysia, the Philippines, Thailand, Timor-Leste, and Vietnam, provide insight into the diversity of socio-economic conditions that may influence smoking behavior. Research on the impact of loneliness, relationships with peers, and parental influence provides further insight into the psychosocial factors that may shape smoking behavior. These factors are not only relevant at the individual level but also provide insight into family dynamics and social environments that may play a key role in shaping adolescent smoking behavior (Titova et al., 2023).

In the context of cross-country comparisons, the findings provide a complex picture of the determinants of adolescent smoking behavior in Asia. While some factors may be universal, cultural and policy variations among countries require a contextual and differentiated approach to designing prevention strategies. It is important to underscore that this research sets the stage for further knowledge and cross-cultural comparisons that can provide in-depth insights into optimal ways of addressing youth cigarette consumption in Asia. The continuation of this research will be key to detailing

more effective interventions and designing policies that can address the complex and varied public health problems across the region.

CONCLUSION

Comparative analysis of adolescent smoking consumption in Asia becomes more substantial with the profound understanding derived from these studies. The studies highlight the roles of personal, environmental, and societal factors in shaping adolescent smoking habits, particularly in Asia. Gender differences in smoking prevalence emphasize the need for a gender-sensitive approach in prevention programs, enriching the comparative dimensions of adolescent smoking consumption across various countries. Understanding socio-demographic and cultural diversity among countries, such as advertising, peer relationships, and parental influence, provides a complex context for this comparison. Thus, this research establishes a solid foundation for detailing the comparison of adolescent smoking consumption in Asia, supporting more effective and contextual public health efforts. The importance of ongoing research is reflected in tailoring interventions to the specific needs of each country, supporting holistic prevention measures to promote a healthy lifestyle among adolescents throughout Asia.

REFERENCES

- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. doi:10.1016/0749-5978(91)90020-t
- Forster, J. L., Widome, R., Bernat, D. H., & Erickson, D. J. (2003). Adolescent smoking onset and escalation: A longitudinal cohort study in Minnesota. *Preventive Medicine*, 36(6), 710-720.
- Fujii, M., Kuwabara, Y., Kinjo, A., Imamoto, A., Jike, M., Otsuka, Y., Itani, O., Kaneita, Y., Minobe, R., & Maesato, H. (2021). Trends in the co-use of alcohol and tobacco among Japanese adolescents: Periodical nationwide cross-sectional surveys 1996-2017. *BMJ Open*, 11(8), e045063.

- Gafur, M. (2021). Hubungan Penggunaan Rokok Elektrik Vapor dengan Tidal Volume Pada Remaja Di Desa Lumutan Kecamatan Botolinggo Kabupaten Bondowoso. *Frontiers in Neuroscience*, 14(1).
- Gupte, H. A., D'Costa, M., & Chaudhuri, L. (2020). Why do Adolescents Initiate and Continue Using Tobacco and Areca Nut?: A Qualitative Study Tracing Pathways of Use among School-Going Adolescents in Mumbai, India. *Nicotine and Tobacco Research*, 22(11). <https://doi.org/10.1093/ntr/ntaa01>
- Hong, S. A., & Peltzer, K. (2019). Early adolescent patterns of alcohol and tobacco use in eight Association of South-East Asian Nations (ASEAN) member states. *Substance Use & Misuse*, 54(2), 288-296.
- Kresnayana, I. M., & Bagiastra, I. N. (2021). Studi Perbandingan Legalitas Pengaturan E-Cigarettes di Indonesia dengan Beberapa Negara Asia Tenggara. *Jurnal Magister Hukum Udayana (Udayana Master Law Journal)*, 10(1), 125-137.
- Liang, Y.-C., Liao, J.-Y., Lee, C. T.-C., & Liu, C.-M. (2022). Influence of Personal, Environmental, and Community Factors on Cigarette Smoking in Adolescents: A Population-Based Study from Taiwan. *Healthcare*, 10(3), 534.
- Ling, M. Y. J., Rodzlan Hasani, W. S., Mohd Yusoff, M. F., Abd Hamid, H. A., Lim, K. H., Tee, G. H., Baharom, N., Ab Majid, N. L., Robert Lourdes, T. G., & Mat Rifin, H. (2019). Cigarette smoking among secondary school-going male adolescents in Malaysia: Findings from the National Health and Morbidity Survey 2017. *Asia Pacific Journal of Public Health*, 31(8_suppl), 80S-87S.
- Lovato, C., Linn, G., & Stead, L. F. (2011). Impact of tobacco advertising and promotion on increasing adolescent smoking behaviours. *Cochrane Database of Systematic Reviews*, 2011(10), CD003439.
- Masturoh, & Siswati. (2019). Penggunaan Mini Poster Terhadap Perilaku Merokok Pada Remaja Di Desa Karang Anyar Kecamatan Kedungbanteng Kabupaten Tegal. *Bhamada: Jurnal Ilmu Dan Teknologi Kesehatan (E-Journal)*, 10(1). <https://doi.org/10.36308/jik.v10i1.1>
- Mays, D., Gilman, S. E., Rende, R., Luta, G., Tercyak, K. P., & Niaura, R. S. (2011). Parental smoking exposure and adolescent smoking trajectories. *Pediatrics*, 128(2), 286-293.
- McClure-Thomas, C., Lim, C., Sebayang, S., Fausiah, F., Gouda, H., & Leung, J. (2022). Perceived Loneliness, Peer, and Parental Relationship With Smoking: A Cross-Sectional Analysis of Adolescents Across South-East Asia. *Asia Pacific Journal of Public Health*, 34(8), 770-777.
- Mishu, M. P., Siddiqui, F., Shukla, R., Kanaan, M., Dogar, O., & Siddiqi, K. (2021). Predictors of Cigarette Smoking, Smokeless Tobacco Consumption, and Use of both forms in Adolescents in South Asia: A Secondary Analysis of the Global Youth Tobacco Surveys. *Nicotine and Tobacco Research*, 23(6). <https://doi.org/10.1093/ntr/ntaa202>
- Nuzula, F., & Oktaviana, M. N. (2019). Faktor-Faktor yang Mempengaruhi Kejadian Dismenore Primer pada Mahasiswi Akademi Kesehatan Rustida Banyuwangi. *Jurnal Ilmiah Kesehatan Rustida*, 6(1). <https://doi.org/10.55500/jikr.v6i1.67>
- Puteh, S. E. W., Manap, R. A., Hassan, T. M., Ahmad, I. S., Idris, I. B., Sham, F. M., Lin, A. B. Y., Soo, C. I., Mohamed, R. M. P., & Mokhtar, A. I. (2018). The use of e-cigarettes among university students in Malaysia. *Tobacco Induced Diseases*, 16.
- Putri, L. P. I. (2021). Hubungan Pengetahuan Bahaya Rokok dengan Perilaku Merokok (Studi Observasional Cross Sectional di Kelurahan Penggaron Lor Kota Semarang). *Ilmu Kesehatan*, 14(1).
- Salman, S., Nilasari, N., & Suyitno, S. (2021). Analisis Faktor yang Berhubungan dengan Perilaku Merokok pada Remaja di Kabupaten Karawang. *Jurnal Kesmas (Kesehatan Masyarakat) Khatulistiwa*, 8(3). <https://doi.org/10.29406/jkkm.v8i3.2970>
- Satpathy, N., Jena, P. K., & Epari, V. (2022). Gender Dimensions of Youth Vulnerability Toward Access to Cigarettes in South-East Asia: Evidence from Global Youth Tobacco

- Survey. *Frontiers in Public Health*, 10, 976440.
- Sawitri, H., & Maulina, F. (2020). Karakteristik Perilaku Merokok Mahasiswa Universitas Malikussaleh 2019. *AVERROUS: Jurnal Kedokteran Dan Kesehatan Malikussaleh*, 6(1). <https://doi.org/10.29103/averrous.v6i1.2663>
- TCSC, I. (2018). Paparan Iklan, Promosi, dan Sponsor Rokok di Indonesia. *Jurnal Penelitian*.
- Titova, O. N., Kulikov, V. D., & Sukhovskaya, O. A. (2023). Vaping Lung Damage (Review). *Pediatrician (St. Petersburg)*, 14(3). <https://doi.org/10.17816/ped143111-120>
- Widnyani, N. M., Astitiani, N. L. P. S., & Putri, B. C. L. (2021). Penerapan Transformasi Digital pada UKM Selama Pandemi COVID-19 di Kota Denpasar. *Jurnal Ilmiah Manajemen Dan Bisnis*, 6(1). <https://doi.org/10.38043/jimb.v6i1.3093>
- World Health Organization. (2021). *Optimizing Active Case-Finding for Tuberculosis: Implementation Lessons from South-East Asia*.
- Zanetta, R., Nobre, M., & Alencar, A. C. (2020). Bringing Up Leaders to Multiply the Promotion of Healthy Lifestyle Among Adolescents Peers. *International Journal of Tuberculosis and Lung Disease*, 21(11), 1140-1146. <https://doi.org/10.5588/ijtld.17.0049>