CHALLENGES ENHANCING HEALTHY LIFESTYLE BEHAVIORS IN COMMUNITY SETTINGS IN INDONESIA: THE ROLE OF SOCIAL LITERACY, RELIGIOUS INVOLVEMENT, AND TECHNOLOGY-EQUIPPED SYSTEMS

Muria HERLINA[1], Sukri PALUTTURI[2]
Sri Putri PERMATA[3], Yusuf HUSMIATI[4]
Laila Meiliyandrie Indah WARDANI[5], Adi FAHRUDIN[6]
M. Rezaul ISLAM[7]

Abstract: *The primary objective of this study was to investigate the impact of social literacy, religious involvement, and technology-equipped systems on the promotion of healthy lifestyle behaviors in community settings in Indonesia. The study utilized a mixed-method research approach and was carried out in three villages within an Indonesian province. Quantitative data was gathered from 235 respondents through face-to-face structured interviews using a simple random sampling procedure,*

[1] PhD., Department of Social Welfare, Faculty of Social and Political Sciences, Universitas Bengkulu, Indonesia; e-mail: mherlina@unib.ac.id, ORCID: 0000-0002-6245-6754

[2] PhD, Department of Health Administration and Policy, Faculty of Public Health, Universitas Hasanuddin, Makassar, Indonesia, Email: sukripalutturi@unhas.ac.id, ORCID: 0000-0002-1074-7445

[3] PhD., Department of Social Welfare, Faculty of Social and Political Sciences, Universitas Bengkulu, Indonesia; Email: sppermata@unib.ac.id, ORCID: 0000-0003-0914-568X

[4] PhD., Badan Riset dan Inovasi Nasional, Jakarta, Indonesia, Email: husmiati@brin.go.id, ORCID: 0000-0001-5449-6062

[5] PhD., Department of Psychology, Faculty of Psychology, Universitas Mercu Buana, Jakarta, Jakarta, Indonesia; Email: laila.meiliyandrie@mercubuana.ac.id ORCID: 0000-0001-8299-5037

[6] PhD., Department of Psychology, Faculty of Psychology, Universitas Bhayangkara Jakarta Raya, Jakarta Raya, Jakarta, Indonesia; E-mail: adi.fahrudin@dsn.ubharajaya.ac.id, ORCID: 0000-0001-7140-6006

[7] PhD., Professor, Institute of Social Welfare and Research, University of Dhaka, Dhaka, BANGLADESH; and Center for Family and Child Studies, Research Institute of Humanities and Social Sciences, University of Sharjah, Sharjah, UNITED ARAB EMIRATES; E-mail: rezauldu@gmail.com, ORCID: 0000-0002-2217-7507

while qualitative data was collected from 28 respondents through a semi-structured interview schedule using a purposive sampling procedure. Additionally, observations were conducted in the three selected communities. The study found that socio-cultural factors, including religious systems, social systems, and technology, significantly influenced healthy lifestyle behaviors in Indonesian communities. Strong associations were observed between these factors and various aspects of healthy living, such as physical activity, fruit and vegetable consumption, not smoking or drinking alcohol, routine health checkups, environmental hygiene, and latrine use. These findings underscored the significance of social support, religious involvement, and technology- equipped systems in promoting and improving healthy behaviors within community settings. Findings would be important guidelines for policymakers and health practitioners for designing and implementing effective health promotion strategies to enhance healthy lifestyle behaviors in community settings.

Keywords: Healthy lifestyle behaviors, Community settings, Social literacy, Religious involvement, Technology-equipped system, Indonesia

1. Introduction

The promotion of healthy living has been a long-standing goal of public health efforts worldwide. Healthy lifestyle behaviors such as regular physical activity, proper nutrition, and adequate sleep have been linked to reduced risk of chronic diseases, improved mental health, and enhanced overall quality of life (World Health Organization, 2021). In Indonesia, the importance of healthy living has been recognized in various government policies and initiatives such as the National Movement of Healthy Living (Gerakan Hidup Sehat, GERMAS) and the Healthy Indonesia Program (Program Indonesia Sehat) (Ministry of Health, 20186. However, there is still a need for effective strategies to promote healthy behaviors in communities, particularly in rural areas where access to health services and information may be limited. Integrating social literacy, religious beliefs, and technology is a potential approach to fostering healthy living movements. Social literacy involves comprehending and navigating social structures and norms, which can have an impact on health behaviors (Paek & Hove, 2012). Religion influences health behaviors by virtue of its values, beliefs, and practices (Musa et al., 2015). Technology enables access to health information, facilitates communication and social support, and allows for behavior tracking and self-monitoring (Lee & Kim, 2017).

In recent years, there has been a growing recognition of the importance of incorporating cultural and contextual factors in health promotion interventions (Resnicow et al., 2014). This approach acknowledges that health behaviors are influenced by social, cultural, and economic factors and interventions that consider these factors are more likely to be effective and sustainable. In Indonesia, cultural and religious beliefs are integral to daily life and can significantly impact health behaviors (Musa et al., 2015). The Covid-19 pandemic has further emphasized the importance of maintaining a healthy lifestyle to prevent the spread of the virus and mitigate its impact (Wijayanti & Rachmi, 2020). The pandemic has disrupted various aspects of life, including access to healthcare, social support networks, and economic opportunities in Indonesia. In this context, promoting healthy living movements becomes crucial for community resilience. Therefore, culturally

and contextually appropriate interventions are essential for the successful promotion of healthy living movements in communities.

Promoting healthy living movements in communities is crucial for reducing the disease burden and improving population productivity. Promoting healthy lifestyle behaviors in community settings poses a crucial public health challenge, especially in Indonesia, where socio-cultural factors play a significant role. However, there is a lack of comprehensive understanding regarding how social literacy, religious involvement, and technology- equipped systems can enhance healthy behaviors within Indonesian communities. Understanding the factors that influence healthy lifestyle behaviors in community settings is essential for developing effective health promotion strategies. The inclusion of social literacy, religious involvement, and technology-equipped systems as potential determinants in this study will provide valuable insights into their significance and potential impact on promoting healthy behaviors. This research finding will guide policymakers and health practitioners in designing targeted interventions to enhance healthy lifestyle behaviors in Indonesian communities.

2. Literature Review

Healthy lifestyle behaviors encompass actions individuals take to enhance their physical, mental, and social well-being. These behaviors include regular physical activity, a balanced diet, avoidance of harmful substances, sufficient sleep, and stress management (World Health Organization, 2021). Maintaining healthy lifestyle behaviors is vital in the prevention of chronic diseases such as diabetes, cardiovascular disease, and cancer, which are major contributors to morbidity and mortality globally. In Indonesia, there has been a rapid increase in the prevalence of chronic diseases, affecting approximately 25% of the population (Rachmawati et al., 2019). Promoting healthy lifestyle behaviors is thus a key public health priority in Indonesia and other countries. Efforts to promote these behaviors in Indonesia take various forms, such as health education programs, community-based interventions, and policy initiatives. For instance, the Indonesian government has implemented a national health insurance program to improve healthcare access and outcomes. Additionally, community-based interventions targeting schools, workplaces, and religious institutions aim to promote healthy behaviors and prevent chronic diseases (Wibowo et al., 2021).

Social literacy, religious involvement, and technology-equipped systems are interconnected factors that synergistically promote healthy lifestyle behaviors. Social literacy involves skills like critical thinking, communication, and cultural competence, enabling individuals to make informed health decisions and access support from social networks. Religious involvement influences values and behaviors related to health in Indonesia, providing social support and ethical frameworks (Tsoraya et al., 2022). Technology-equipped systems, including digital tools like mobile apps and social media, play a significant role in promoting healthy behaviors, especially among younger generations (Lee et al., 2022). Understanding the interplay between these elements is crucial for effective health promotion interventions in diverse cultural contexts.

Research on social literacy, religious involvement, and technology-equipped systems highlights their importance in promoting healthy lifestyle behaviors within communities.

Goswami et al. (2010) demonstrated a positive association between social support and physical activity levels in older adults. Thorton et al. (2006) found that social support from family and friends contributed to maintaining a healthy diet. Jung (2022) discovered a positive relationship between religious involvement and healthy behaviors, including physical activity and healthy eating. Tristão Parra et al. (2018) revealed that participation in faith-based health interventions improved diet and physical activity. According to Coughlin and Stewart (2016), the utilization of wearable fitness devices, such as Fitbits, has been shown to enhance physical activity levels among older adults. Laranjo et al. (2021) reported that the use of mobile health apps led to improvements in physical activity and diet.

Social literacy, religious involvement, and technology-equipped systems have the potential to enhance healthy lifestyle behaviors in community settings. Community movements aimed at reducing disease burden, and healthcare costs, and promoting productivity can foster clean and healthy living habits from an early age (Nasiatin et al., 2020; Watts et al., 2019). Public health models can strengthen primary healthcare programs, improving overall health outcomes (Assefa et al., 2019). The success of social movements in healthcare requires consideration of the interaction between society and the government, with participation, empowerment, and co-governance strategies being crucial determinants of health (González-Agüero et al., 2022). The People's Health Movement has played a significant role in strengthening healthcare systems through its collective efforts and collaboration with health institutions (León et al., 2020). Enhancing healthcare quality necessitates improved health facility infrastructure, as it positively impacts health utilization and reduces costs (Sacks et al., 2020).

Public health plays a crucial role in promoting healthy living initiatives (De Biasi et al., 2020). Engaging in artistic activities fosters purpose, meaningful relationships, and well-being (Poulos et al., 2019). Understanding the local context is essential for effective disease prevention, management, and global governance (Heller et al., 2019). Communication across cultures relies on movement skills and knowledge (Quennerstedt, 2019). Religion and cultural practices are integral to disease control and can be adapted to local contexts (Javaid et al., 2020; Winiger & Peng-Keller, 2020; Daher-Nashif et al., 2021). Technology facilitates access to information, benefiting communities (Javaid et al., 2020).

The community movement in realizing local health has not been implemented. The social system and religion influence public health and the technology used. Religion has not been fully implemented in implementing a healthy life, especially for the local community. The existing social system has not been able to realize a healthy lifestyle. Culture has played an essential role in environmental health perspectives (Prescott & Logan, 2019). The use of technology has not yet become the main focus in disseminating news and information because of the low level of knowledge. Online health information-seeking behavior influences offline health-related behavior among the population (Moreland et al., 2016).

Sociocultural factors influence physical activity, with the religious system impacting various health behaviors such as consuming vegetables and fruits, avoiding smoking and alcohol, and maintaining environmental hygiene (Schickedanz et al., 2019). Technology

and equipment also play a role in promoting healthy behaviors like vegetable and fruit consumption, regular health checks, and access to restrooms. These components encompass the seven indicators of implementing healthy living community movements. Community involvement, guided by community leadership and participation, is crucial for improving quality of life and achieving social, religious, cultural, and technological systems (Schickedanz et al., 2019). Social mobilization exemplifies community participation in national public health systems development (León et al., 2020). Starting with families, communities, and appropriate technology, the movement for a healthy living community can be fostered.

Limited research has explored the effectiveness of integrating social literacy, religious involvement, and technology in promoting healthy lifestyle behaviors in community settings. While some studies have examined social support and technology, the influence of religious involvement on healthy behaviors is not well understood. Technology research has primarily focused on individual-level interventions, overlooking their potential impact in community settings. This study aims to address these gaps by examining the combined effects of social literacy, religious beliefs, and technology on promoting healthy behaviors in communities. By investigating these factors, this study seeks to enhance our understanding of their role in promoting healthy lifestyles. Further research is needed to explore the integration of these elements in community-based interventions for promoting healthy behaviors.

3. Research Method and Data

This study employed a mixed-method approach, combining both quantitative and qualitative methods to gather comprehensive data. A total of 235 respondents from three villages in Bengkulu province, Indonesia, were selected through simple random sampling based on the Slovin formula (Martha & Kresno, 2016). Quantitative data was collected using a structured questionnaire that covered various topics related to the research questions, including demographic information, experiences, and socio-cultural aspects. The study used social system/community organization, religious system, and technology as independent variables, and physical activity, consumption of vegetables and fruits, non-smoking, abstinence from alcohol, health checkup, environmental hygiene, and latrine/toilet usage as dependent variables. In contrast, qualitative data was obtained through in-depth case interviews with 28 individuals. A semi-structured interview questionnaire was employed to understand the local context and sociocultural realities aligned with the research objectives. Additionally, the researchers conducted daily observations of three selected communities for three months, documenting their daily activities and livelihood patterns relevant to the study objectives, using an observation checklist.

For quantitative data analysis, the study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to estimate complex cause-effect relationship models, incorporating both latent and observed variables (Hair et al., 2021). On the other hand, for qualitative data analysis, the researchers utilized NVIVO software (Wong, 2008). The participants who responded to the research announcement received the questionnaire, and their return of the questionnaire indicated their consent to participate. The study followed research ethics by obtaining approval from the appropriate institutional review

board and securing informed consent forms from all participants. Before data collection, the research objectives, and the benefits of taking part in the study were clearly explained to the respondents. The researchers emphasized that participation was voluntary, and they assured the confidentiality of the participants' data.

4. Results

Table 1 presents the sociodemographic profile of respondents, providing insights into their characteristics. Regarding age distribution, the majority of respondents fall within the 40-49 age group, constituting 41.06% of the sample, followed by those aged 20-29 (14%) and 50-59 (18.84%). Education levels vary, with a significant proportion (40.10%) having completed junior high school, while 29.47% attended primary school and 15.56% reached high school. Surprisingly, 6.28% of respondents never attended school, indicating some lack of formal education. In terms of income, a considerable percentage (59.52%) earn between 3-4.49 million Indonesian Rupiah (US$200 -326), while the lowest income bracket (900,000 and less) (US$60) represents only 1.93%. The majority of respondents work in agricultural roles, with 54.59% identified as farmers and 27.54% as farm laborers. The Serawai ethnic group represents the largest share (58.94%) among the respondents, followed by Rejang (16.43%) and Java (12.08%). This sociodemographic overview provides valuable information for understanding the characteristics and diversity of the surveyed population.

Table 1: Sociodemographic profile of the respondents

Sociodemographic information	%
Age	
20	1.93
20-29	14
30-39	11.11
40-49	41.06
50-59	18.84
60	13.04
Education	
Never went to school	6.28
Not graduated from elementary school	10.14
Primary school	29.47
Junior high school	40.10
High school	15.56
Income level (Indonesian Rupiah)	
900,000 and less	1.93
1-2.9 million	19.32
3-4.49	59.52

Sociodemographic information	%

5-6.9	14.98
7 million and higher	4.35
Number of dependencies	
2	3.86
3-4	13.04
5-6	64.73
7-8	8.21
8 and more	10.14
Occupation	
Farmer	54.59
Farm labourer	27.54
Trade	6.76
Casual	10.14
Follow the child	1.93
Ethnicity	
Serawai (B/S)	58.94
Rejang	16.43
Java	12.08
Pesemah (South Sumatra)	7.73
Campul	4.83

Table 2: R-Square Value

Variable	R Square
Socio-Cultural	0.781
Healthy living community movement	0.948

Table 2 presents the R-Square values for two variables. The variable 'socio-cultural' has an R-Square value of 0.781, while the variable 'healthy living community movement' has an R-Square value of 0.948. This finding showed that socio-cultural aspects such as religious systems, social systems, and equipment/technology have affected socio-cultural societies by 78.1%. Meanwhile, the behavior of healthy living movements was indicated by 94.8% by physical activity, vegetable, and fruit consumer patterns, not smoking, not drinking alcohol, routine health checks, environmental hygiene, and using latrines in the family. The measurement of research variables is presented in Figure 1.

Figure 1: Path Coefficients for the direct relationship between religious systems, social systems, and equipment/technology have affected sociocultural societies
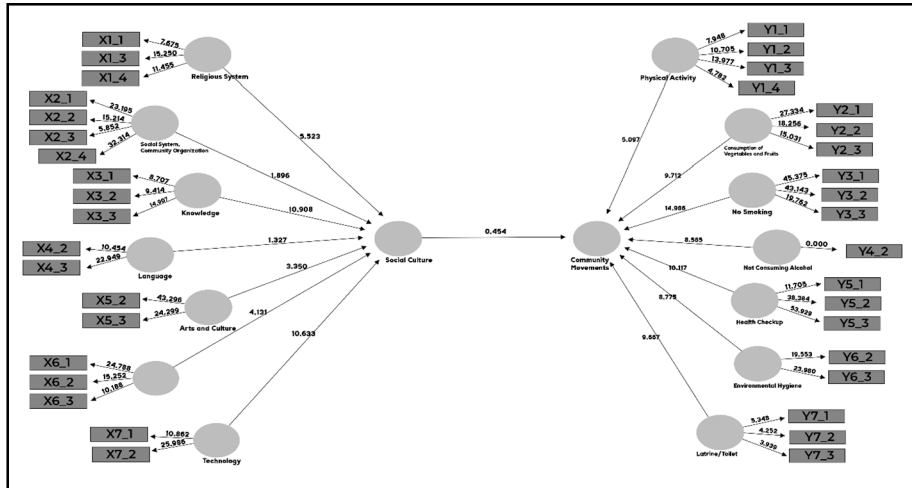
Before analyzing the structural model, this study ensured that there were no lateral collinearity issues. Although the vertical collinearity criterion for discriminant validity was met, the problem of lateral collinearity (predictor-criterion collinearity) may occasionally lead to subtly misleading conclusions because it can hide the model's strong causal effect. This frequently occurs when two variables that are believed to be causally related measure the same notion. All the Inner VIF values for the independent variables (Social system /community organization (X2), religious system (X1), and technology (X3) were evaluated for lateral multicollinearity that was less than 5, indicating that lateral multicollinearity was not an issue in this study. Figure 1 shows the results of the path coefficient for the direct relationship, while Table 3 presents the hypothesis testing analysis for the direct relationship structural model.

Table 3: Significant between Independents and dependent variables

Dependents variables	Independent Variables	Original sample (O)	Standard error (STERR)	T Statistics (O/STERR)	T-Table
Physical activity (Y1)	Social system/ community organization (X2)	0.241982	0.070501	**3.432318****	1.960
Consumption of vegetables and fruits (Y2)	Religious system (X1)	0.135849	0.059077	**2299515****	1.960
	Technology (X3)	0.132975	0.066608	**1.996378****	1.960

Dependents variables	Independent Variables	Original sample (O)	Standard error (STERR)	T Statistics (O/STERR)	T-Table
No smoking (Y3)	Religious system (X1)	-0.265515	0.104084	**2.550970****	1.960
Not consuming alcohol (Y4)	Religious system (X1)	-0.282083	0.079763	**3.536536****	1.960
Health checkup (Y5)	Social system/ community organization (X2)	-0.203857	0.075342	**2.705737****	1.960
	Technology (X3)	0.317514	0.123703	**2.566733****	1.960
Environmental hygiene (Y6)	Religious system (X1)	0.136642	0.058460	**2.337372****	1.960
Latrine/Toilet (Y7)	Technology (X3)	0.314211	0.102357	**3.069771****	1.960

Table 3 shows the results of the variable significance analysis (dependent variables Y1-Y7 and independent variables X1-X3). The original sample (O), standard error (STERR), T statistics (O/STERR), and T-Table values are also provided. The table indicates that there is a significant relationship between physical activity (Y1) and the system social/community organization (X2), with a T statistic of 3.432318. Similarly, there is a significant relationship between the consumption of vegetables and fruits (Y2) and the religious system (X1), with a T statistic of 2299515. Both relationships have a T-Table value greater than 1.960, indicating statistical significance. There is also a significant relationship between not smoking (Y3) and the religious system (X1), with a T statistic of 2.550970. The same is true for not consuming alcohol (Y4) and the religious system (X1), with a T statistic of 3.536536. Furthermore, there is a significant relationship between environmental hygiene (Y6) and the religious system (X1), with a T statistic of 2.337372. Regarding the remaining dependent variables, there is a significant relationship between health checkups (Y5) and the social system/community organization (X2), with a T statistic of 2.705737, as well as between health checkups (Y5) and technology (X3), with a T statistic of 2.566733. Finally, there is a significant relationship between latrine/toilet (Y7) and technology (X3), with a T statistic of 3.069771. In all these cases, the T-Table value is greater than 1.960, indicating statistical significance.

The community, primarily engaged in farming, valued social interaction and support during agricultural activities. Physical activity, such as walking, was a significant part of their daily routine, while recreation took precedence over organized sports. Food held importance in social gatherings, and the government implemented health promotion programs targeting smoking, obesity, and physical activity. The community believed in natural and healthy nutrition, work, and stress reduction for longevity and good health. The religious system emphasized health and provided a sense of meaning and community peace, with worshipers consuming more fruits and vegetables. Language and communication played a role in sharing agricultural knowledge, and technological

advancements influenced farmers' attitudes towards knowledge sharing, potentially impacting community health positively.

In the religious system, smoking was discouraged and deemed detrimental to hygiene and health. There was awareness regarding the health consequences associated with smoking, including the development of serious diseases such as cancer, chronic coughing, and respiratory difficulties. Despite this, smoking became a habit among adult men, who saw it as a symbol of confidence and a work ethic. Those who drank alcohol also tended to smoke at the same time. The majority of the population holds the belief that consuming alcohol is prohibited by religion due to its intoxicating nature, illegality, and negative impact on those around them. Having a good understanding of the effects of alcoholic beverages had a positive impact on public health. Knowledge also influenced attitudes and behaviors related to public health literacy and communication.

The social system functioned as a platform to promote and encourage individuals to undergo health checkups by disseminating relevant health-related information. Various social institutions, such as PKK activities, mosques, youth associations, and others, facilitated the dissemination of health-related knowledge and insights, emphasizing the importance of regular health checkups to prevent or promptly treat diseases. Language is the primary tool used for communication and interaction to promote health information. Health tools and technologies, such as midwives, medical equipment, and traditional medicine, were utilized to deliver medical treatment. These tools and facilities instill individuals with confidence to seek healthcare and play a crucial role in increasing the allocation of funds and resources for health purposes. The religious system played a crucial role in promoting cleanliness and maintaining hygiene during worship. This included the requirements of personal cleanliness such as bathing and ablution, as well as keeping the places of worship and surrounding environments clean. Community members actively encouraged one another to engage in activities aimed at maintaining a clean environment. Effective communication played a crucial role in promoting public health, and it was accomplished through various means such as media campaigns and organized events.

Residents in local communities utilized existing equipment and technology to construct latrines or toilets from available materials, such as blocks or wood. They also utilized equipment and technology to promote health, including the use of traditional simple equipment to create latrines. The emergence of information technology resulted in the development of intelligent healthcare, which incorporates a new generation of information technologies to improve health outcomes. The advancement of technology presented opportunities to improve the quality of health services. As the healthcare paradigm shifts from a disease-centered care model to a community-centered care model, stakeholders could leverage technology to support the public health movement. A structured teaching program could significantly improve knowledge and attitudes toward health. The lack of support and the busy schedules of villagers contributed to the unclean village environment. Early healthy living practices in childhood positively impacted health outcomes in school-age children, prompting public policy to focus on early intervention in family healthy living practices to improve children's health.

5. Discussion

The study aimed to investigate the impact of socio-cultural and healthy living community movements on health behaviors in a rural community. The study revealed that socio-cultural aspects, including religious systems, social systems, and technology, significantly influenced healthy lifestyle behaviors in the community. The variables 'socio-cultural' and 'healthy living community movement' had high R-Square values of 0.781 and 0.948, respectively, indicating the impact of these factors on promoting healthy behaviors. The analysis further demonstrated significant relationships between various dependent variables (e.g., physical activity, consumption of vegetables and fruits, not smoking, not consuming alcohol, routine health checkups, environmental hygiene, and latrine/toilet use) and independent variables (e.g., religious system, social system/community organization, and technology). The findings highlighted the importance of social support, religious involvement, and technology-equipped systems in influencing health behaviors in Indonesia's community settings, particularly in areas such as physical activity, healthy eating habits, smoking and alcohol consumption, health checkups, environmental hygiene, and technology adoption. These insights can serve as a basis for designing interventions and policies aimed at enhancing healthy lifestyles, improving public health literacy and communication, promoting cleanliness, and leveraging technology for health promotion. These efforts can be implemented not only in communities within Indonesia but also in communities beyond its borders.

The findings indicated on the sociocultural aspects are consistent with previous research that has identified the importance of sociocultural factors in shaping health behaviors (Grossoehme et al., 2020). For example, previous studies have shown that religious affiliation is associated with healthier behaviors such as lower rates of smoking and alcohol consumption (McCaffery et al., 2020; Gritz et al., 2020; Sohlberg & Bergmark, 2020). Another study found that social support is positively associated with physical activity (Sarkar et al., 2016). In addition, our findings are consistent with previous studies that have explored the relationship between sociocultural factors and health behaviors (such as Vaida, 2020; Kafadar et al., 2019; Sahinoz and Sahinoz, 2020). Murimi et al. (2016) examined the effect of culture on fruit and vegetable consumption among African Americans. The study found that cultural factors, such as family traditions and ethnic identity, were important determinants of fruit and vegetable consumption among African Americans. Similarly, Clark et al. (2018) investigated the impact of religion on health behaviors among a population of African Americans. The study found that religiosity was positively associated with health-promoting behaviors, such as physical activity and healthy eating.

Moreover, the findings of the current study align with previous research that has explored the influence of social and community systems on health behaviors. Flórez et al. (2018) investigated the impact of social networks on physical activity among African American adults. The study found that social networks positively influenced physical activity levels among participants. Similarly, Carducci et al. 2020) and Hark et al. (2016) explored the impact of community-based interventions on health behaviors among African Americans. The study found that community-based interventions were effective in promoting healthy behaviors, such as physical activity and healthy eating.

Our study also highlighted the importance of technology in supporting health and improving the quality of health services that are consistent with Karampourian et al. (2019), Tian et al. (2019), Slametiningsih et al. (2021), Kim and Chung (2019), and Lin et al. (2020). The use of existing equipment and technology in the community has been reported to help residents make latrines and toilets, which are essential for maintaining good hygiene and preventing the spread of diseases. This finding is supported by previous research that has demonstrated the effectiveness of technology-based interventions in promoting healthy behaviors, such as physical activity and healthy eating (notably Fjeldsoe et al., 2011; Lau et al., 2011). Yarime et al. (2019) emphasized the potential of innovative technologies, such as mobile health (mHealth) applications, in improving healthcare access and delivery in low-income communities. Similarly, Raghavendra et al. (2020) highlighted the effectiveness of using technology-based interventions, such as telemedicine and electronic health records, in improving healthcare outcomes in rural areas. The traditional simple equipment used by residents has also been found to support health and hygiene. However, with the development of information technology, the concept of intelligent healthcare has become prominent. Evidence suggests that innovative healthcare practices leverage the use of emerging information technologies, leading to enhanced quality of health services and the promotion of community-centered care models (Tian et al., 2019; Slametiningsih et al., 2021).

The paradigm shift from disease-centered care to community-centered care has been reported in several studies, and stakeholders can maximize the use of technology to support the public health movement. The use of technology in healthcare has been found to improve access to care, reduce costs, and increase efficiency. For instance, telemedicine has been shown to provide remote care to patients, especially those in rural areas, which has significantly improved their health outcomes (Kim & Chung, 2019). In addition, a structured teaching program is effective in improving knowledge and attitudes toward health. The implementation of such programs can help residents understand the importance of maintaining good health and hygiene practices. Additionally, the importance of education and community-based interventions in promoting healthy behaviors has also been widely documented. De Silva et al. (2019) and Mohammed et al. (2021) found that community-based interventions, such as health education programs, were effective in improving health behaviors and reducing the incidence of non-communicable diseases. Similarly, Kim and Chung (2018) reported that structured education programs were effective in improving health literacy and promoting healthy lifestyles in low-income communities. This is particularly important in villages where the environment is not clean and residents are busy working, and hence, may not prioritize the importance of maintaining good hygiene practices (Mohammed et al., 2021).

Overall, the findings of the present study provided further support for the importance of socio-cultural and community-level factors in promoting healthy behaviors. Policymakers and public health professionals should consider these factors when developing interventions to improve health behaviors and promote health in underserved communities. Furthermore, the findings of the study suggest that technology can play a role in promoting health behaviors.

6. Limitations of the Study

The study conducted had several limitations that should be taken into account when interpreting the results. One of the main limitations was that the study was conducted in a single rural community, which could restrict the generalizability of the findings to other settings. Since rural communities often have unique characteristics and socio-cultural factors, the findings may not be representative of urban or suburban areas. Therefore, caution should be exercised when applying the results to different populations or locations. Another limitation of the study was the reliance on self-reported data. Self-reporting is a common method used in research, but it is important to acknowledge that it can be prone to reporting bias. Participants may provide responses that they perceive to be more socially desirable or that align with their own beliefs and values. This could potentially impact the accuracy and reliability of the data collected, leading to skewed or incomplete information.

To address these limitations, future research should consider expanding the study to include a more diverse range of communities and settings. By including different geographical locations, such as urban or suburban areas, researchers can obtain a more comprehensive understanding of the impact of socio-cultural and healthy living community movements on health behaviors across different contexts. This would enhance the generalizability of the findings and provide a broader perspective on the topic. Additionally, future studies should aim to incorporate objective measures of health behaviors. While self-reported data can provide valuable insights, it is often subject to recall bias and social desirability bias. Objective measures, such as wearable devices or observational assessments, can provide more accurate and reliable data on individuals' actual health behaviors. By utilizing these objective measures, researchers can strengthen the validity of their findings and provide a more robust analysis of the impact of healthy living community movements on health behaviors.

7. Conclusion

Based on a mixed-method approach, this study aimed to investigate how social literacy, religious involvement, and technology-equipped systems contribute to the promotion of healthy lifestyle behaviors in community settings within Indonesia. The summary findings were as follows:

- Sociocultural factors including religious systems, social systems, and technology, significantly influence healthy lifestyle behaviors in Indonesian communities.

- Socio-cultural aspects account for 78.1% of the variation in healthy behaviors, while physical activity, vegetable and fruit consumption, not smoking, not drinking alcohol, routine health checks, environmental hygiene, and latrine use account for 94.8% of the variation.

- Significant relationships were observed between healthy behaviors and religious systems, social systems/community organizations, and technology.

- The religious system is associated with vegetable and fruit consumption, not smoking, not drinking alcohol, and environmental hygiene.

- The findings emphasize the importance of social support, religious involvement, and technology-equipped systems in promoting healthy behaviors.

The outcomes of this study are anticipated to provide valuable input to policymakers in their efforts to enhance public health. Specifically, this research is expected to be beneficial for health policymakers by drawing attention to the socio-cultural aspects and local wisdom of the Indonesian community. The findings of this paper offer international readers valuable insights into the cultural factors that influence healthy behaviors in Indonesia. They contribute to cross-cultural understanding and offer transferable interventions for promoting healthy lifestyles. Moreover, the study highlights the potential of technology-equipped systems and explores the societal implications of social literacy and religious involvement. These findings can guide the development of culturally sensitive health promotion strategies and interventions in various countries around the world. These policy implications include:

- Promoting social literacy: Investing in social education programs can enhance individuals' ability to navigate social situations effectively. These programs can be integrated into various settings, including schools, workplaces, and community centers.

- Encouraging religious involvement: Supporting religious institutions and organizations that promote healthy living can foster religious involvement. Providing resources for health education programs, incorporating health messaging into religious teachings, and partnering with religious institutions for health services can encourage healthy behaviors.

- Investing in technology-equipped systems: Developing technology-equipped systems that provide access to health information and resources is crucial. This includes mobile health applications, online health resources, and utilizing social media platforms for health dissemination.

- Addressing health disparities: Tackling health disparities requires addressing social determinants of health. Initiatives such as community gardens, improved public transportation systems to promote physical activity, and policies promoting affordable housing, education, and employment opportunities can address disparities and promote healthy lifestyles.

Authorship

All authors equally contributed to the paper.

Acknowledgements

Funding

Universitas Bengkulu Research and Community Service Institute (LPPM) (Grant Number 1752/UN30.15/PG/2021).

Declaration of conflicting interests

Authors declare no potential conflict of interest.

Consent

Written permission and consent were taken from all respondents. Consent was taken from Universitas Bengkulu to publish this paper.

Ethical Approval

Institute for Research and Community Service (LPPM) at Universitas Bengkulu, Indonesia.

References

Assefa, Y., Gelaw, Y. A., Hill, P. S., Taye, B. W., & Van Damme, W. (2019). Community health extension program of Ethiopia, 2003-2018: Successes and challenges toward universal coverage for primary healthcare services. *Globalization and Health*, *15*(1), 24. https://doi.org/10.1186/s12992-019-0470-1

Carducci, B., Oh, C., Keats, E. C., Roth, D. E., & Bhutta, Z. A. (2020). Effect of food environment interventions on anthropometric outcomes in school-aged children and adolescents in low-and middle-income countries: a systematic review and meta-analysis. *Current Developments in Nutrition*, *4*(7), nzaa098.

Clark, E. M., Williams, B. R., Huang, J., Roth, D. L., & Holt, C. L. (2018). A longitudinal study of religiosity, spiritual health locus of control, and health behaviors in a national sample of African Americans. *Journal of Religion and Health*, *57*, 2258-2278.

Coughlin, S. S., & Stewart, J. (2016). Use of consumer wearable devices to promote physical activity: a review of health intervention studies. *Journal of Environment and Health Sciences*, *2*(6), 1-10.

Daher-Nashif, S., Hammad, S. H., Kane, T., & Al-Wattary, N. (2021). Islam and mental disorders of the older adults: Religious text, belief system and caregiving practices. *Journal of Religion and Health, 60*(3), 2051–2065.

De Biasi, A., Wolfe, M., Carmody, J., Fulmer, T., & Auerbach, J. (2020). Creating an age-friendly public health system. *Innovation in Aging*, *4*(1), igz044.

De Silva, W. I., Samarasinghe, D., & Wickramasinghe, R. S. (2019). Community-based interventions for non-communicable diseases prevention: A systematic review and meta-analysis. *International Journal of Preventive Medicine, 10*(1), 27.

Fjeldsoe, B., Neuhaus, M., Winkler, E., & Eakin, E. (2011). Systematic review of maintenance of behavior change following physical activity and dietary interventions. *Health Psychology*, *30*(1), 99.

Flórez, K. R., Richardson, A. S., Ghosh-Dastidar, M. B., Troxel, W., DeSantis, A., Colabianchi, N., & Dubowitz, T. (2018). The power of social networks and social support in promotion of physical activity and body mass index among African American adults. *SSM-Population Health*, *4*, 327-333.

González-Agüero, M., Vargas, I., Campos, S., Cancino, A. F., Quezada, C. Q., & Egaña, M. U., (2022). What makes a health movement successful? Health inequalities and the insulin pump in Chile. *Critical Public Health, 32*(2), 181–192.

Goswami, S., Köbler, F., Leimeister, J. M., & Krcmar, H. (2010). Using online social networking to enhance social connectedness and social support for the elderly. https://aisel.aisnet.org/icis2010_submissions/109/

Gritz, E. R., Talluri, R., Domgue, J. F., Tami-Maury, I., & Shete, S. (2020). Smoking behaviors in survivors of smoking-related and non–smoking-related cancers. *JAMA Network Open*, *3*(7), e209072-e209072.

Grossoehme, D. H., Friebert, S., Baker, J. N., Tweddle, M., Needle, J., Chrastek, J., ... & Lyon, M. E. (2020). Association of religious and spiritual factors with patient-reported outcomes of anxiety, depressive symptoms, fatigue, and pain interference among adolescents and young adults with cancer. *JAMA Network Open*, *3*(6), e206696-e206696.

Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook* (p. 197). Springer Nature.

Hark, L., Waisbourd, M., Myers, J. S., Henderer, J., Crews, J. E., Saaddine, J. B., ... & Katz, L. J. (2016). Improving access to eye care among persons at high-risk of glaucoma in Philadelphia—design and methodology: the Philadelphia glaucoma detection and treatment project. *Ophthalmic Epidemiology*, *23*(2), 122-130.

Jung, J. H. (2022). Religious Attendance and Health Behavior in Cross-National Perspective: The Role of Religious Context. *Review of Religious Research*, *64,* 601-626.

Kafadar, D., Esen, A. D., & Arıca, S. (2019). Determining health-promoting behavior in smokers preparing to quit: a holistic and personalized approach. *EPMA Journal*, *10*, 115-123.

Karampourian, A., Ghomian, Z., & Khorasani-Zavareh, D. (2019). Qualitative study of health system preparedness for traumatic incidents in a religious mass gathering. *Injury*, *50*(5), 1097-1104.

Kim, R. & Chung, W. (2019). Associations of socioeconomic and religious factors with health: a population-based comparison study using the 2010 East Asian social survey between China and Korea. *BMC Public Health*. *19*(1), 35.

Laranjo, L., Ding, D., Heleno, B., Kocaballi, B., Quiroz, J. C., Tong, H. L., ... & Bates,

D. W. (2021). Do smartphone applications and activity trackers increase physical activity in adults? Systematic review, meta-analysis and metaregression. *British Journal of Sports Medicine*, *55*(8), 422-432.

Lau, P. W., Lau, E. Y., Wong, D. P., & Ransdell, L. (2011). A systematic review of information and communication technology–based interventions for promoting physical activity behavior change in children and adolescents. *Journal of Medical Internet Research*, *13*(3), e1533.

Lee, Y., Kim, T., & Jung, H. (2022). The relationships between food literacy, health promotion literacy and healthy eating habits among young adults in South Korea. *Foods*, *11*(16), 2467.

Lee, Y. J., & Kim, J. (2017). A mobile health intervention to promote self-monitoring of dietary intake and physical activity among women with metabolic syndrome: A randomized controlled trial. *International Journal of Nursing Studies, 69*, 21-28.

León, M., Jiménez, M., Vidal, N., Bermúdez, K., De Vos, P., (2020). The Role of Social Movements in Strengthening Health Systems: The Experience of the National Health Forum in El Salvador (2009–2018). *Internatioonal Journal of Health Service, 50*(2). 218–233. https://doi.org/10.1177/0020731420905262

Lin, L., Li, W., Wan, Y., Wang, X., Liang, L., & Luo, N. (2020). The influence of early childhood healthy living practices on school-age health outcomes. *BMC Public Health, 20*(1), 1-8.

Martha Evi dan Kresno Sudarti, 2016. *Metodologi Penelitian Kualitatif*, Untuk bidang kesehatan, PT. RajaGrafindo Persada, Jakarta

McCaffery, K. J., Dodd, R. H., Cvejic, E., Ayre, J., Batcup, C., Isautier, J. M. J., et al., 2020. Health literacy and disparities in COVID-19–related knowledge, attitudes, beliefs and behaviours in Australia. *Public Health Research and Practice, 30*(4), 30342012.

Ministry of Health. (2016). National Movement of Healthy Living (GERMAS) in Indonesia. Retrieved from https://www.kemkes.go.id/article/view/16071400001/national-movement-of-healthy-living-germas-in-indonesia.html

Ministry of Health. (2018). Basic Health Research 2018. Jakarta: Ministry of Health.

Mohammed, M. A., Sidik, S. M., & Rampal, K. G. (2021). Effectiveness of a structured teaching program on knowledge and attitudes towards occupational hazards among rubber factory workers in Klang, Selangor. *International Journal of Environmental Research and Public Health, 18*(4), 1917.

Moreland, J., French, T., Cumming, G., 2016. Exploring online health information seeking in Scotland. CEUR Workshop Proc. 1574 (Pahi 2015), 73–80.

Murimi, M. W., Chrisman, M., McCollum, H. R., & Mcdonald, O. (2016). A qualitative study on factors that influence students' food choices. *Journal of Nutrition and Health, 2*(1), 1-6.

Musa, A. S., Pevalin, D. J., & Shamsuddin, K. (2015). Religion, culture, and healthcare choices of Arab women. *Journal of Muslim Minority Affairs, 35*(1), 16-29.

Nasiatin, T., Pertiwi, W. E., Setyowati, D. L., Palutturi, S., 2021. The roles of health-promoting media in the clean and healthy living behavior of elementary school students. Gaceta Sanitaria. 35, S53–S55.

Paek, H. J., & Hove, T. (2012). Social cognitive factors and perceived social influences that improve adolescent eHealth literacy. *Health Communication, 27*(8), 727-737.

Prescott, S. L., Logan, A. C., 2019. Planetary Health: From the Wellspring of Holistic Medicine to Personal and Public Health Imperative. *Explore, 15*(2), 98–106.

Rachmawati, S., Prihhastuti-Puspitasari, H., & Zairina, E. (2019). The implementation of a chronic disease management program (Prolanis) in Indonesia: a literature review. *Journal of Basic and Clinical Physiology and Pharmacology, 30*(6).

Raghavendra, T., Aldosari, M., Saleem, M. A., & Ibrahim, M. (2020). Telemedicine and electronic health records in rural communities: the importance of innovation in global health. *Journal of Taibah University Medical Sciences, 15*(2), 73-78.

Resnicow, K., Baranowski, T., Ahluwalia, J. S., & Braithwaite, R. L. (2014). Cultural sensitivity in public health: Defined and demystified. *Ethnicity & Disease, 24*(1), 67-71.

Sahinoz, T., Sahinoz, S., Investigation 2020. of healthy living strategies in elderly who achieved to live long and healthy. *Pakistan Journal of Medical Science, 36*(3), 371–375.

Slametiningsih, W., Wulandari, R. D., & Purwaningrum, E. (2021). Factors influencing the adoption of health technology in the community. *International Journal of Technology Management and Sustainable Development, 20*(2), 189-200.

Sarkar, S., Taylor, W. C., Lai, D., Shegog, R., & Paxton, R. J. (2016). Social support for physical activity: Comparison of family, friends, and coworkers. *Work, 55*(4), 893-899.

Schickedanz, A., Hamity, C., Rogers, A., Sharp, A. L., Jackson, A., 2019. Clinician Experiences and Attitudes Regarding Screening for Social Determinants of Health in a Large Integrated *Health System and Medical Care. 57*, S197–S201.

Sohlberg, T., Bergmark, K. H., 2020. Lifestyle and Long-Term Smoking Cessation.

Tobacco Use Insights. 13, 1179173X20963062.

Tian, S., Yang, W., Le Grange, J. M., Wang, P., Huang, W., & Ye, Z. (2019). Smart healthcare: making medical care more intelligent. *Global Health Journal, 3*(3), 62-65.

Thornton, P. L., Kieffer, E. C., Salabarría-Peña, Y., Odoms-Young, A., Willis, S. K., Kim, H., & Salinas, M. A. (2006). Weight, diet, and physical activity-related beliefs and practices among pregnant and postpartum Latino women: the role of social support. *Maternal and Child Health Journal*, *10*, 95-104.

Tian, S., Yang, W., Grange, J. M. L., Wang, P., Huang, W., Ye, Z., 2019. Smart healthcare: making medical care more intelligent. *Journal of Global Health, 3*(3), 62–65.

Tristão Parra, M., Porfírio, G. J., Arredondo, E. M., & Atallah, Á. N. (2018). Physical activity interventions in faith-based organizations: a systematic review. *American Journal of Health Promotion*, *32*(3), 677-690.

Tsoraya, N. D., Primalaini, O., & Asbari, M. (2022). The role of Islamic religious education on The development youths' attitudes. *Journal of Information Systems and Management (JISMA)*, *1*(1), 12-18.

Vaida, M., 2020. The importance of movement and healthy living in young people. The Annals of Dunarea de Jos' University of Galati Fascicle XV Phys Edu and Sport Manag. 1, 37–42.

Watts, P. N., Blane, D., Netuveli, G., (2019). Minimum income for healthy living and frailty in adults over 65 years old in the English Longitudinal Study of Ageing: A population-based cohort study. *BMJ Open, 9*(2), e025334.

Wibowo, M. I. N. A., Yasin, N. M., Kristina, S. A., & Prabandari, Y. S. (2021). A systematic review on self-reported questionnaires to assess medication adherence in diabetic patients. *Malaysian Journal of Public Health Medicine*, *21*(2), 359-373.

Winiger, F., Peng-Keller, S., 2021. Religion and the World Health Organization: An evolving relationship. *BMJ Global Health, 6*(4), e004073.

Wong, L. P. (2008). Data analysis in qualitative research: A brief guide to using NVivo. *Malaysian family physician: the official journal of the Academy of Family Physicians of Malaysia*, *3*(1), 14.

World Health Organization. (2021). Healthy living. Retrieved from https://www.who.int/news-room/q-a-detail/healthy

Wijayanti, D., & Rachmi, C. N. (2020). The challenges of public health management during the COVID-19 pandemic in Indonesia. *Asia Pacific Journal of Public Health, 32*(4), 156-158.

Yarime, M., Tanaka, Y., & Honda, Y. (2019). Potential of innovative technologies in improving healthcare access and delivery in low-income communities. *International Journal of Environmental Research and Public Health, 16*(2), 214.