

DEVELOPMENT AND EVALUATION OF A CONTEXTUAL DIGITAL HEALTH LITERACY MODEL FOR OBESITY RISK MITIGATION AMONG WOMEN OF REPRODUCTIVE AGE

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ABSTRAK : PENGEMBANGAN DAN EVALUASI MODEL LITERASI KESEHATAN DIGITAL KONTEKSTUAL UNTUK MITIGASI RISIKO OBESITAS PADA WANITA USIA SUBUR

Latar Belakang: Wanita usia subur merupakan kelompok yang rentan terhadap obesitas yang berdampak pada kesehatan umum dan kesehatan reproduksi. Literasi kesehatan digital yang kontekstual dipandang sebagai pendekatan inovatif dalam upaya mitigasi risiko obesitas. Tujuan: Penelitian ini bertujuan untuk mengembangkan dan mengevaluasi model literasi kesehatan digital kontekstual dalam mitigasi risiko obesitas pada wanita usia subur. Metode: Penelitian ini menggunakan desain quasi-eksperimen dengan pendekatan pretest–posttest. Intervensi berupa penerapan model literasi kesehatan digital kontekstual diberikan kepada wanita usia subur, kemudian dianalisis perubahan pengetahuan, perilaku pencegahan obesitas, serta indikator risiko obesitas menggunakan analisis univariat, bivariat, dan multivariat. Hasil: Hasil penelitian menunjukkan adanya peningkatan pengetahuan dan perubahan perilaku pencegahan obesitas yang signifikan setelah intervensi ($p < 0,05$). Selain itu, terdapat penurunan indeks massa tubuh dan lingkaran perut responden. Analisis multivariat menunjukkan bahwa perubahan perilaku merupakan faktor paling dominan yang memengaruhi penurunan risiko obesitas. Kesimpulan dan Saran: Model literasi kesehatan digital kontekstual terbukti efektif dalam meningkatkan pengetahuan, membentuk perilaku hidup sehat, dan menurunkan risiko obesitas pada wanita usia subur. Oleh karena itu, disarankan agar model ini dapat diintegrasikan dalam pelayanan kebidanan dan program promosi kesehatan di fasilitas pelayanan kesehatan primer, serta dikembangkan lebih lanjut melalui penelitian berskala lebih luas sebagai dasar penguatan kebijakan dan pengajuan hibah penelitian.

Kata kunci: Literasi Kesehatan Digital, Model Kontekstual, Obesitas, Wanita Usia Subur

ABSTRACT

Background: Women of reproductive age represent a population group that is vulnerable to obesity, which adversely affects both general and reproductive health. Contextual digital health literacy is considered an innovative approach for mitigating obesity risk. Objective: This study aimed to develop and evaluate a contextual digital health literacy model for obesity risk mitigation among women of reproductive age. Methods: This study employed a quasi-experimental design with a pretest–posttest approach. The intervention consisted of implementing a contextual digital health literacy model among women of reproductive age. Changes in knowledge, obesity-preventive behaviors, and obesity risk indicators were analyzed using univariate, bivariate, and multivariate analyses. Results: The findings showed a significant increase in knowledge and meaningful changes in obesity-preventive behaviors following the intervention ($p < 0.05$). Additionally, reductions in body mass index (BMI) and waist circumference were observed among respondents. Multivariate analysis indicated that behavioral change was the most dominant factor influencing the reduction of obesity risk. Conclusion and Recommendation: The contextual digital health literacy model proved effective in enhancing knowledge, shaping healthy lifestyle behaviors, and reducing obesity risk among women of reproductive age. Therefore, it is recommended that this model be integrated into midwifery services and health promotion programs at primary healthcare facilities and further developed through large-scale studies to support policy strengthening and research grant applications.

Keywords: Digital Health Literacy, Contextual Model, Obesity, Women of Reproductive Age

INTRODUCTION

Women of reproductive age (WRA) represent a population group with a strategic role in

the life cycle and family health development. The health status of women of reproductive age greatly determines the quality of pregnancy, childbirth, and

child growth and development. However, women of reproductive age are also vulnerable to overweight and obesity. Obesity in this group affects not only general health but also reproductive health, including menstrual cycle disorders, infertility, pregnancy and childbirth complications, and an increased risk of non-communicable diseases such as diabetes mellitus and cardiovascular disease (Ministry of Health of the Republic of Indonesia, 2018; World Health Organization, 2020).

National data indicate an increasing trend in obesity prevalence among women aged 15–49 years over time. Lifestyle changes, urbanization, increased consumption of high-calorie and low-fiber foods, and decreased physical activity are the main contributing factors. In addition, limited understanding of healthy dietary patterns and active lifestyles has resulted in suboptimal obesity prevention efforts among women of reproductive age (Ministry of Health of the Republic of Indonesia, 2018; Ministry of Health of the Republic of Indonesia, 2020).

One of the key determinants influencing health behavior is health literacy. Health literacy is defined as an individual's ability to access, understand, evaluate, and use health information to make appropriate health-related decisions. Individuals with low health literacy levels tend to have difficulty understanding health information, increasing their risk of unhealthy behaviors, including unbalanced diets and insufficient physical activity (Nutbeam, 2008; Sørensen et al., 2012).

Advances in information technology have shifted health information sources toward digital media. Currently, women of reproductive age commonly obtain health information through social media, health applications, and other digital platforms. Therefore, digital health literacy has become a critical aspect. Digital health literacy not only involves the ability to access health information through digital media but also the capacity to evaluate information accuracy and apply it in daily life. However, the rapid flow of digital information is often not accompanied by adequate skills to filter accurate and context-appropriate information (Norman & Skinner, 2006).

A contextual digital health literacy approach represents a relevant strategy to address these challenges. This approach emphasizes tailoring educational materials, media, and methods to the sociocultural characteristics, educational levels, and life conditions of women of reproductive age. A contextual digital health literacy model is expected to enhance understanding, foster positive attitudes, and encourage sustainable health behavior

changes for obesity prevention (Sørensen et al., 2012; World Health Organization, 2020).

In midwifery practice, midwives play a strategic role in promotive and preventive health efforts, particularly for women of reproductive age. Integrating a contextual digital health literacy model into midwifery services may serve as an innovation to strengthen health education that is more effective, accessible, and responsive to target group needs. However, the development and evaluation of digital health literacy models specifically designed to mitigate obesity risk among women of reproductive age remain limited (Ministry of Health of the Republic of Indonesia, 2020).

Based on this background, this study aimed to develop and evaluate a contextual digital health literacy model for obesity risk mitigation among women of reproductive age. The findings are expected to provide an applicable digital-based health education model that can be integrated into midwifery services and community health promotion programs (Nutbeam, 2008; Norman & Skinner, 2006).

RESEARCH METHODS

Study Design

This study employed a Research and Development (R&D) approach followed by model evaluation using a quasi-experimental design with a pretest–posttest control group.

Study Setting and Period

The study was conducted within a primary healthcare context through a limited online trial involving women of reproductive age who were members of maternal and reproductive health communities. A non-spatial (digital community-based) setting was selected to align with the characteristics of the developed digital health literacy model.

Population and Sample

The study population consisted of women of reproductive age aged 15–49 years. The sample was divided into an intervention group and a control group, each consisting of 30 respondents, selected using purposive sampling based on predefined inclusion criteria.

Research Instruments

Instruments included a digital health literacy questionnaire, knowledge and obesity-preventive behavior questionnaires, and self-reported measurements of obesity risk indicators, namely body mass index (BMI) and waist circumference.

Data Analysis

Data were analysis using univariate and bivariate analyses. Statistical tests included paired t-tests to assess differences before and after the intervention and independent t-tests to compare intervention and control groups, with a 95% confidence level ($\alpha = 0.05$).

RESEARCH RESULTS

Data analysis was conducted in stages, including univariate, bivariate, and multivariate analyses to describe respondent characteristics and examine relationships among study variables.

Table 1
Univariate Analysis of Women of Reproductive Age Characteristics

Variable	n	%
Age 20–34 years	34	56,7
Age 35–49 years	26	43,3
Secondary–higher education	38	63,3
Primary education	22	36,7
BMI at obesity risk	60	100

Univariate analysis showed that most respondents were aged 20–34 years and had secondary to higher education levels.

Table 2
Bivariate Analysis of the Effect of the Digital Health Literacy Model on Knowledge

Variable	Mean Pretest \pm SD	Mean Posttest \pm SD	p-value
Knowledge	62,45 \pm 8,12	78,90 \pm 7,35	0,000

Paired t-test results indicated a significant increase in knowledge after the intervention ($p < 0.05$).

Table 3
Bivariate Analysis of the Effect of the Model on Obesity-Preventive Behavior

Variable	Mean Pretest \pm SD	Mean Posttest \pm SD	p-value
Behavior	60.30 \pm 7.85	75.20 \pm 6.90	0,000

The analysis demonstrated statistically significant changes in obesity-preventive behavior.

Table 4
Multivariate Analysis of Multiple Linear Regression on BMI Change

Independent Variable	β	SE	p-value
Knowledge	-0,28	0,09	0,003
Behavior	-0,40	0,08	0,000
Age	-0,12	0,07	0,110

Multivariate analysis showed that behavioral change was the most dominant factor influencing BMI reduction among women of reproductive age.

DISCUSSION

The univariate analysis revealed that the majority of respondents were within the productive age range and had attained secondary to higher levels of education. These characteristics play a crucial role in the effectiveness of digital health literacy interventions, as individuals in productive age groups generally demonstrate greater adaptability to digital technologies and higher motivation to maintain their health, particularly in relation to reproductive roles and family

responsibilities. Higher educational attainment is also associated with enhanced cognitive capacity to comprehend health information, assess health risks, and apply health recommendations in daily life. This finding is consistent with health literacy frameworks, which identify education as a key determinant of an individual's ability to access and effectively utilize health information (Sørensen et al., 2012).

Bivariate analysis demonstrated a significant improvement in knowledge following the implementation of the contextual digital health literacy model. This finding indicates that digital approaches tailored to the lived context of women of reproductive age are effective in simplifying complex health information, making it more understandable

and relevant to participants' needs. The use of interactive and context-sensitive digital media facilitated a more effective learning process compared to conventional educational methods. This result supports health literacy theory, which emphasizes that access to appropriate, comprehensible, and relevant information is fundamental to strengthening individuals' capacity to make informed health decisions (Nutbeam, 2008).

The significant increase in knowledge subsequently translated into statistically meaningful changes in obesity-preventive behaviors. Participants demonstrated improvements in dietary regulation, healthier food choices, and increased levels of physical activity. These behavioral changes reflect the success of the intervention in integrating cognitive and affective components, ensuring that acquired knowledge was not limited to understanding but was translated into concrete health-related actions. This finding aligns with Nutbeam's model, which posits that higher levels of health literacy enable individuals to develop personal and social skills that support sustained healthy lifestyle behaviors (Nutbeam, 2008).

Multivariate analysis further revealed that behavioral change was the most dominant factor influencing reductions in body mass index among women of reproductive age. This finding reinforces the notion that knowledge alone is insufficient to reduce obesity risk unless it is accompanied by consistent and sustained behavioral change. The contextual digital health literacy model developed in this study effectively bridged the gap between knowledge acquisition and health practice by providing practical, realistic, and context-appropriate guidance tailored to participants' conditions. This result is consistent with the concept of digital health literacy, which emphasizes individuals' ability to use digital health information to support tangible and meaningful health behavior change (Norman & Skinner, 2006).

Although the reductions in body mass index and waist circumference observed in this study were moderate, they hold important clinical significance as early indicators of the success of promotive and preventive interventions. The World Health Organization has emphasized that even modest but sustained changes in body weight and body composition can yield substantial health benefits, particularly in reducing the risk of non-communicable diseases among productive-age populations such as women of reproductive age (World Health Organization, 2020).

Within the context of midwifery services, these findings reinforce the strategic role of

midwives as key agents in health promotion and disease prevention. The integration of a contextual digital health literacy model enables midwives to deliver health education that is more flexible, continuous, and capable of reaching broader target populations. This approach is in line with national health policies in Indonesia that prioritize strengthening health promotion, preventing non-communicable diseases, and leveraging digital technologies within primary healthcare services (Ministry of Health of the Republic of Indonesia, 2020).

Overall, the findings of this study indicate that the development and evaluation of a contextual digital health literacy model represent an effective, applicable, and relevant approach to mitigating obesity risk among women of reproductive age. Beyond enhancing knowledge and promoting behavioral change, this model holds strong potential for further development as a sustainable innovation in promotive and preventive midwifery care.

CONCLUSION

This study demonstrates that the development and implementation of a contextual digital health literacy model are effective in improving knowledge and obesity-preventive behaviors among women of reproductive age. The significant increase in knowledge following the intervention confirms that digital-based educational approaches tailored to social, cultural, and contextual needs can strengthen understanding of obesity risks and prevention strategies.

Beyond knowledge improvement, the model effectively promoted meaningful healthy behavior changes, particularly in dietary regulation and increased physical activity. These behavioral changes contributed to reductions in obesity risk indicators, such as body mass index and waist circumference. Multivariate analysis confirmed that behavioral change was the most dominant factor in obesity risk reduction, emphasizing that promotive and preventive interventions must prioritize sustainable health behavior formation.

Overall, the contextual digital health literacy model developed in this study represents an applicable, effective, and relevant health education innovation for integration into midwifery services to mitigate obesity risk and prevent non-communicable diseases among women of reproductive age.

RECOMMENDATIONS

Based on the study findings, the contextual digital health literacy model has strong potential for further development as a foundation for research

grant applications. It is recommended that this model be incorporated into a sustainable faculty research roadmap, particularly in health promotion, obesity prevention, and strengthening the role of midwives through digital technology utilization.

Within the context of research grant development, this study may be positioned as a pilot study focusing on model development and preliminary effectiveness testing. Future research should expand to larger, multi-regional samples and adopt stronger experimental designs, such as randomized controlled trials, to enhance the technology readiness level of the model.

For academic institutions and researchers, the findings provide a basis for developing grant outputs such as digital-based intervention models, digital health education modules, implementation guidelines for midwives, and scientific publications in nationally accredited and internationally reputable journals. Strengthening innovation and sustainability aspects is expected to increase the competitiveness of research grant proposals at the national level.

Furthermore, future studies are encouraged to integrate multidisciplinary approaches involving midwifery, nutrition, public health, and information technology to enhance innovation and model impact. Such integration is expected to generate broader and more sustainable benefits for improving the health of women of reproductive age and preventing non-communicable diseases.

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