Media of Health Research
Vol. 3 No. 1, April 2025, pages: 1-6
e-ISSN 2987-7784
DOI: https://doi.org/10.70716/mohr.v3i1.135

The Relationship Between Health Literacy and Health Promotion on Social Media with Efforts to Prevent Type 2 Diabetes Mellitus

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Article History

Manuscript submitted:
12 March 2025
Manuscript revised:
3 April 2025
Accepted for publication:
16 April 2025

Keywords

health literacy,
health promotion,
social media,
prevention,
type 2 diabetes mellitus

Abstract

Type 2 Diabetes Mellitus is one of the non-communicable diseases with an increasing prevalence in Indonesia. Early prevention becomes a strategic step to reduce the number of new cases, especially through health promotion approaches and increasing public health literacy. This study aims to analyze the relationship between health literacy and health promotion on social media with efforts to prevent Type 2 Diabetes Mellitus. The method used is quantitative with a cross-sectional survey approach involving 250 adult respondents who are active social media users. The instruments used include a health literacy questionnaire, the intensity of health promotion exposure on social media, and indicators of diabetes prevention behaviors. Data were analyzed using Pearson correlation and multiple linear regression tests. The results show that there is a significant positive relationship between health literacy ($r = 0.521$, $p < 0.01$) and health promotion on social media ($r = 0.438$, $p < 0.01$) with efforts to prevent Type 2 Diabetes Mellitus. These findings indicate the importance of strengthening digital-based health education and improving the community's ability to understand health information to promote healthy behavior. This study recommends optimizing informative and interactive health promotion content on social media as an effective prevention strategy.

How to Cite: Andriyan, R., Mahmudah, A. & Gebremedhin, T. (2025) The Relationship Between Health Literacy and Health Promotion on Social Media with Efforts to Prevent Type 2 Diabetes Mellitus. *Media of Health Research, 3*(1), 1–6. https://doi.org/10.70716/mohr.v3i1.135

Introduction

Type 2 Diabetes Mellitus (T2DM) is one of the most pressing public health challenges that has become increasingly concerning over the past few decades, both globally and nationally. According to data from the International Diabetes Federation (IDF), in 2021, Indonesia ranked fifth in the world for the number of diabetes cases, with an estimated 19.5 million cases, the majority of which are Type 2 Diabetes Mellitus (IDF, 2021). T2DM not only imposes a significant economic burden on the healthcare system but also profoundly impacts the quality of life of individuals and families. Various

studies indicate that T2DM is preventable through appropriate lifestyle changes, including dietary management, increased physical activity, and weight control (Maspupah *et al.*, 2020).

Amid the rising prevalence of T2DM, preventive efforts have become critical. Primary prevention based on behavioral change plays a key role and heavily depends on an individual's health literacy. Health literacy refers to the ability of individuals to access, understand, and apply health information to make informed decisions regarding their health (Hasibuan *et al.*, 2024). In chronic diseases such as T2DM, health literacy determines how well individuals can recognize risk factors, conduct early detection, and implement preventive measures.

Low health literacy is a significant barrier to controlling non-communicable diseases. Research by Hidayatullaili *et al.* (2023) demonstrates that individuals with high health literacy are more likely to undergo health screenings and adopt healthy lifestyles. This suggests that health literacy is theoretical and has practical implications for public health behaviors. In this context, improving health literacy represents a strategic and long-term intervention to prevent T2DM. In addition to health literacy, health promotion in the digital age has become essential for delivering preventive messages to the broader population. The use of social media as a health promotion channel has rapidly developed with the growth of internet users in Indonesia. Data from the Indonesian Internet Service Providers Association (APJII) in 2022 shows that more than 77% of Indonesia's population is connected to the Internet, with the majority accessing information through social media. In this context, social media functions as a communication tool and a primary source of health information (Yuliana & Sari, 2021).

Health promotion through social media offers advantages in terms of broad reach, rapid information dissemination, and interactivity, allowing for direct community involvement. Research by Nursanti (2021) found that social media-based health campaigns positively influence raising health awareness, particularly among adolescents and young adults. However, the effectiveness of these campaigns depends mainly on the quality of the information shared and the audience's ability to discern accurate information. The increasing volume of health information on social media presents its own set of challenges. The public is faced with overwhelming information, not all valid or reliable. Therefore, health literacy plays a crucial role as a filter to separate accurate information from misleading content. Digital health literacy has become an essential skill in the information age, as highlighted by Budiman *et al.* (2023), who noted that internet users with strong digital literacy tend to be more selective and critical in receiving health information from social media.

Good health literacy and exposure to high-quality health promotion through social media are believed to enhance efforts to prevent T2DM significantly. Individuals who have a deeper understanding of health and can access relevant information from social media are more likely to engage in preventive actions such as regular check-ups, maintaining a healthy diet, and exercising regularly (Puspitasari, 2022). This creates a strong conceptual foundation for further investigating the relationship between health literacy, digital health promotion, and T2DM prevention behavior. However, there is still limited research in Indonesia that specifically examines the relationship between health literacy and health promotion on social media in the context of T2DM prevention efforts. Some studies remain isolated, focusing only on aspects of health literacy or the effectiveness of social media campaigns. The integration of these two variables is highly relevant, considering the public's increasing reliance on online information (Marbun *et al.*, 2024).

This study aims to fill this gap in the literature by exploring how health literacy and health promotion on social media jointly contribute to T2DM prevention behavior. This research provides theoretical contributions to developing health literacy and digital health promotion studies and offers practical implications for policymakers and health promoters. The importance of this study is also driven by the rising trend of T2DM cases among the productive age group. Research by Simbolon *et al.* (2020) shows that the proportion of T2DM patients aged 25–45 has increased significantly over the past five years. This phenomenon underscores the need for adaptive promotive and preventive

interventions that address changes in modern society's lifestyle and information consumption patterns.

Furthermore, the high use of social media among the productive age group makes this platform a potential medium for disseminating effective health promotion messages. Content that is packaged with engaging visuals, concise yet meaningful messages, and high interactivity has the potential to increase user engagement and encourage behavior change (Mulyanti & Masdinarsyah, 2021). However, these interventions need to be supported by approaches that consider individual literacy levels so that they are informative and transformative. The context of digital health promotion requires synergy between content providers, policymakers, and users. A deep understanding of the relationship between literacy and social media exposure can assist in designing more targeted health promotion strategies. For instance, using health influencers with a positive track record or disseminating data-driven infographics could effectively reach a broad audience with credible messages (Widyasari, 2017).

Equally important, health literacy measurement must consider functional, communicative, and critical aspects, as proposed in Nutbeam's health literacy model. This model emphasizes that the ability to read and understand information alone is insufficient; it must also be accompanied by the ability to communicate and critically assess information (Putri & Anshari, 2019). Therefore, health promotion strategies on social media should also be designed to enhance these three literacy levels.

This study is expected to serve as a reference in designing evidence-based T2DM prevention programs, considering health literacy and the dynamics of digital communication. The findings could also provide valuable input for health institutions, academics, and communities to build more inclusive, information technology-based public health interventions. Given the increasing complexity of public health challenges, a comprehensive and adaptive approach is required. Health literacy and health promotion on social media are not standalone entities but complement each other in shaping healthy behaviors. By gaining a deeper understanding of the relationship between the two, innovative strategies to combat the growing T2DM epidemic can be developed.

Research Methods

This study employs a quantitative approach with a cross-sectional design to analyze the relationship between health literacy and health promotion on social media about preventing Type 2 Diabetes Mellitus (T2DM). This approach was chosen because it allows for data collection at a specific time to identify patterns in the relationships between the studied variables. The study was conducted from November 2024 to January 2025, with the target population consisting of adults aged 18 years and older who actively use social media for at least one hour per day. This group was selected because they are within the productive age range, vulnerable to non-communicable diseases, including T2DM, and represent Indonesia's dominant social media users.

The sample comprised 250 respondents selected using purposive sampling. The inclusion criteria were as follows: (1) residents of urban areas in Indonesia, (2) having an active account on at least one social media platform (such as Instagram, TikTok, or Facebook), and (3) willingness to complete an online questionnaire. The research instrument consisted of three main sections: (1) a health literacy scale, (2) a health promotion exposure intensity scale on social media, and (3) a T2DM prevention behavior scale. Each section was developed based on relevant theoretical indicators and adaptations from instruments validated in previous studies.

The health literacy instrument was adapted from the Health Literacy Questionnaire (HLQ), which was modified and tailored to the local context and the Indonesian language. This scale measures an individual's ability to access, understand, and use health information daily. It consists of 16 items assessed using a Likert scale from 1 to 5 (strongly disagree to agree strongly).

Meanwhile, exposure to health promotion on social media was measured using 10 items assessing the frequency, type of content, and user engagement with health information encountered on social

media. T2DM prevention behavior was assessed using 12 items covering eating habits, physical activity, frequency of health checks, and other habits contributing to the prevention of the disease.

Before being used in the main study, the instrument was pretested on 30 respondents with similar characteristics to measure validity and reliability. The validity test results indicated that all items had an item-total correlation > 0.3, while reliability testing using Cronbach's Alpha showed an α value > 0.7 for all three scales, indicating good internal consistency. Data was collected online using the Google Forms platform, with the survey link distributed via social media and digital communities. Respondents provided consent before accessing the questionnaire, and the collected data was guaranteed to be kept confidential.

The collected data were analyzed using SPSS version 25. Statistical analyses included Pearson's correlation test to identify relationships between variables and multiple linear regression to assess the contribution of each independent variable to the dependent variable. Classical assumptions such as normality, multicollinearity, and heteroscedasticity were tested first to ensure the feasibility of the regression model. A significance level of $p < 0.05$ was used to determine whether the relationships found were statistically significant.

This study also considered ethical aspects by obtaining approval from the faculty's internal ethics committee and ensuring voluntary participation. No financial incentives were provided to respondents, but participants were given a summary of the research results through an infographic after completing the study. With this systematic design, the study's results are hoped to provide a valid and relevant depiction of the relationship between health literacy, digital health promotion, and T2DM prevention behavior in urban Indonesian society.

Results and Discussion

This study involved 250 adult respondents aged 18 years and above, all active social media users. Most of the respondents are from urban areas and fall within the age range of 20–40 years, an age group statistically more at risk for non-communicable diseases, including Type 2 Diabetes Mellitus (T2DM) (Simbolon *et al.*, 2020). This demographic characteristic is significant because the working-age group often adopts a sedentary lifestyle and consumes high-sugar foods, which increases the potential risk of diabetes.

Descriptive analysis reveals that the average health literacy score of the respondents is 62.4 (SD = 7.8) out of a maximum score of 80. This result indicates that most respondents fall into the moderate to high health literacy category. This aligns with the findings of Hasibuan *et al.* (2024), which stated that health literacy in Indonesia's urban population has shown a positive trend in recent years, mainly due to easier access to online health information.

Exposure to health promotions on social media is also categorized as high, with an average score of 41.7 (SD = 6.3) out of a maximum score of 50. Most respondents reported frequently encountering health-related content on Instagram, YouTube, and TikTok platforms. These findings are consistent with the study by Nursanti (2021), which emphasized that social media has become the primary channel for distributing health information, especially during and after the COVID-19 pandemic. Regarding T2DM prevention behaviors, the average score of the respondents was 48.9 (SD = 8.5). This includes avoiding excessive sugar consumption, engaging in regular physical activity, and performing regular blood sugar tests. Although the scores are relatively high, there is variation among individuals, indicating that some population members have not fully adopted preventive lifestyles. This is in line with the research by Puspitasari (2022), which noted that despite increased knowledge levels, translating knowledge into concrete actions remains a challenge.

Pearson's correlation test reveals a positive and significant relationship between health literacy and T2DM prevention efforts ($r = 0.521$, $p < 0.01$). This means that the higher an individual's health literacy, the more likely they are to engage in preventive behaviors. A study by Hidayatullaili *et al.*

(2023) also found that an individual's ability to understand health information significantly influences their attitudes and preventive behaviors towards chronic diseases, including T2DM.

A similar relationship was found between health promotion on social media and T2DM prevention efforts ($r = 0.438$, $p < 0.01$). This suggests that the more frequently an individual is exposed to health information through social media, the more likely they are to take preventive actions. This indicates that social media can be effective for health promotion campaigns if appropriately managed. Yuliana and Sari (2021) affirmed that social media is crucial in raising public awareness about health issues.

In the multiple linear regression analysis, both health literacy and health promotion on social media were found to have a significant impact on T2DM prevention behaviors ($F(2,247) = 48.12$, $p < 0.001$), with an adjusted R^2 value of 0.284. This indicates that the two independent variables together explain 28.4% of the variance in prevention behaviors, as supported by the findings of Maspupah *et al.* (2020), which suggested that educational and promotional approaches should work in tandem to produce significant behavioral change.

Partially, health literacy had a greater influence ($\beta = 0.451$, $p < 0.001$) compared to health promotion on social media ($\beta = 0.312$, $p < 0.001$). This reinforces the view of Putri & Anshari (2019), who argued that a strong understanding of health issues allows individuals to comprehend information and make rational and sustainable decisions related to a healthy lifestyle.

These findings also underscore the importance of digital health literacy, which refers to an individual's ability to access, evaluate, and use health information from digital platforms. Budiman *et al.* (2023) emphasized that without adequate digital literacy, social media users are vulnerable to health misinformation, which could pose new risks, such as following extreme diets that are not evidence-based.

Additionally, variations in health literacy and exposure to health promotions were found to be influenced by educational level. Respondents with higher education levels showed better health literacy scores and a greater tendency for preventive behaviors than those with lower education levels. This finding is consistent with the work of Widyasari (2017), who showed that formal education shapes perceptions and responses to health information.

It is important to note that while social media plays a role as an information channel, its effectiveness highly depends on the quality of the content and communication strategy. Overly technical or one-sided content tends to attract less attention, whereas visual, narrative, and interactive content is more engaging (Mulyanti & Masdinarsyah, 2021). Therefore, health promoters need to understand the dynamics of digital communication in order to craft messages that are not only informative but also persuasive.

This research illustrates that digital health promotion cannot stand alone without strengthening individuals' capacity to absorb information. A holistic approach integrating literacy, technology, and community participation is required. Marbun *et al.* (2024) noted that community-based interventions and user-friendly digital platforms have great potential to foster a sustainable, healthy lifestyle culture. Thus, the results suggest that collaboration between education and health promotion in the digital realm can be an effective preventive strategy for reducing the risk of Type 2 Diabetes Mellitus. However, a measured, evidence-based, and sustainable approach is necessary for digital health promotion to raise awareness and result in tangible behavioral changes.

Conclusion

This study demonstrates a significant relationship between health literacy, health promotion on social media, and efforts to prevent Type 2 Diabetes Mellitus (DMT2). Health literacy has been shown to contribute more significantly than health promotion exposure in shaping preventive behaviors. However, the combination of both can provide a synergistic effect in encouraging the public to adopt healthy lifestyles and avoid DMT2 risk factors. These findings offer empirical evidence

that health literacy enhancement programs must accompany effective health promotion strategies in the digital age. Individuals who receive, understand, and apply information daily are more likely to take appropriate preventive actions. Therefore, literacy-based education needs to be systematically designed through cross-sector collaboration.

This research key recommends improving community-based and digital health literacy programs, especially those targeting the productive age group. Additionally, health promotion content on social media should be tailored to the audience's level of understanding, using simple yet informative language and involving credible public figures or health influencers. Governments and health organizations can use the results of this study to develop integrated health promotion strategies that combine educational and digital approaches. Future research could expand its scope by incorporating qualitative methods, conducting in-depth analyses of social media content, or evaluating the long-term effectiveness of specific promotion campaigns in altering behavior. With the increasing health challenges posed by non-communicable diseases, including DMT2, health literacy, and digital health promotion must be viewed as two sides of the same coin. Preventive efforts will strengthen when the public has adequate knowledge and access to accurate, appropriate, and engaging information.

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