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

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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.

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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.

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

Characteristics of Respondents and Descriptive Statistics

This study involved 250 adult respondents aged 18 years and above who were active social media users. Most respondents were in the 20–40 year age group and resided in urban areas. This demographic profile is relevant because individuals of productive age are increasingly exposed to sedentary lifestyles, high sugar consumption, and irregular physical activity, which elevate the risk of Type 2 Diabetes Mellitus (T2DM) (Simbolon et al., 2020).

Descriptive analysis shows that respondents generally demonstrated moderate to high levels of health literacy and exposure to health promotion content on social media. The mean score for health literacy was 62.4 (SD = 7.8) out of a maximum possible score of 80, indicating that most respondents were able to access, understand, and utilize health information adequately. This finding is consistent with Hasibuan et al. (2024), who reported an improvement in health literacy levels among urban populations due to increased access to digital health information.

Exposure to health promotion on social media also showed a high average score of 41.7 (SD = 6.3) out of 50. Respondents reported frequent encounters with health-related content on platforms such as Instagram, TikTok, and YouTube. These platforms have become dominant channels for health communication in Indonesia, particularly among productive-age populations (Nursanti, 2021).

Regarding T2DM prevention behavior, respondents achieved a mean score of 48.9 (SD = 8.5). This score reflects preventive actions such as reducing sugar intake, engaging in physical activity, and undergoing regular health checks. However, the relatively wide standard deviation indicates variability in the consistency of preventive behaviors among respondents, supporting the argument that knowledge does not always translate directly into sustained action (Puspitasari, 2022).

Table 1. Descriptive Statistics of Study Variables (n = 250)

Variable	Mean	SD	Maximum Score
Health Literacy	62.4	7.8	80
Health Promotion Exposure on Social Media	41.7	6.3	50
T2DM Prevention Behavior	48.9	8.5	60

Correlation Between Health Literacy, Social Media Health Promotion, and T2DM Prevention

Pearson correlation analysis demonstrated a significant positive relationship between health literacy and T2DM prevention behavior ($r = 0.521$, $p < 0.01$). This finding indicates that individuals with higher health literacy are more likely to engage in behaviors that reduce the risk of T2DM. This result supports previous findings by Hidayatullaili et al. (2023), which emphasized that the ability to understand and evaluate health information plays a critical role in chronic disease prevention.

Similarly, exposure to health promotion on social media was positively correlated with T2DM prevention behavior ($r = 0.438$, $p < 0.01$). This result suggests that frequent interaction with health-related content on social media platforms is associated with increased adoption of preventive behaviors. Yuliana and Sari (2021) highlighted that social media serves as an effective medium for raising public awareness and encouraging health-related actions when content is relevant and accessible.

Table 2. Pearson Correlation Analysis Between Variables

Variables	r	p-value
Health Literacy and T2DM Prevention	0.521	<0.01
Social Media Health Promotion and T2DM Prevention	0.438	<0.01

Contribution of Health Literacy and Social Media Promotion to T2DM Prevention

Multiple linear regression analysis indicates that health literacy and health promotion on social media jointly have a significant effect on T2DM prevention behavior ($F(2,247) = 48.12$, $p < 0.001$). The adjusted R^2 value of 0.284 shows that both variables explain 28.4% of the variance in preventive

behavior. This finding aligns with Maspupah et al. (2022), who emphasized that behavioral prevention of T2DM is influenced by multiple educational and informational factors.

Partially, health literacy demonstrated a stronger influence (β = 0.451, p < 0.001) compared to health promotion exposure on social media (β = 0.312, p < 0.001). This result reinforces the argument that exposure to information alone is insufficient without adequate cognitive capacity to interpret and apply that information effectively. Putri and Anshari (2019) emphasized that functional, communicative, and critical literacy are essential for transforming information into sustainable health behavior.

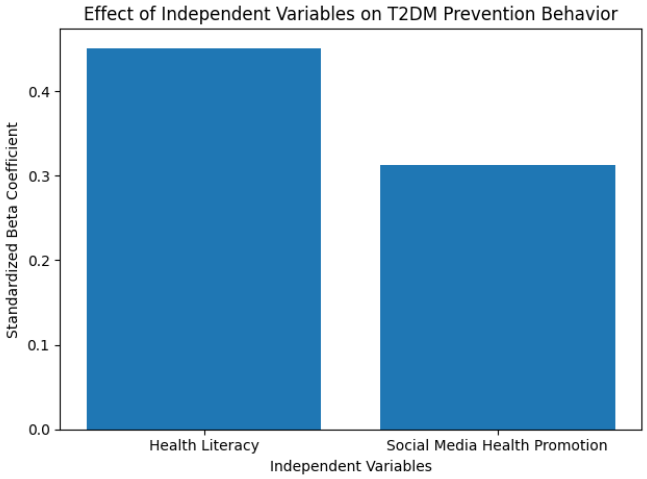

Figure 1. Standardized Regression Coefficients of Independent Variables on T2DM Prevention Behavior

Discussion

The findings of this study highlight the central role of health literacy in shaping T2DM prevention behavior in the digital era. Individuals with higher literacy levels are better equipped to interpret health information, assess its credibility, and apply it in daily life. This ability becomes increasingly important in the context of social media, where health information varies widely in quality and accuracy (Budiman et al., 2023).

Although social media health promotion contributes significantly to preventive behavior, its effectiveness depends on users' literacy levels. Without adequate health literacy, individuals may misinterpret information or adopt unhealthy practices promoted by unreliable sources. This finding supports Widyasari (2017), who noted that educational background influences how individuals respond to health information and perceived disease risk.

Furthermore, the results suggest that digital health promotion strategies should prioritize clarity, relevance, and interactivity. Content that is visually engaging and contextually appropriate is more likely to capture attention and encourage behavior change (Mulyanti & Masdinarsyah, 2021). However, these strategies must be accompanied by efforts to strengthen health literacy to ensure that information leads to informed and rational decision-making.

Overall, the results confirm that health literacy and health promotion on social media are complementary components in T2DM prevention. Strengthening only one aspect without addressing the other may limit the effectiveness of preventive interventions. An integrated approach that

combines literacy enhancement with strategic digital health promotion is therefore essential for reducing the risk of T2DM among productive-age populations.

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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