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Entrepreneurship in Social Media Literacy and Intentions for Diabetes Prevention among Adolescent Students

Ika Nur Pratiwi[1*], Dita Dwi Oktav Prabawati[2], Erna Dwi Wahyuni[3], Nursalam Nursalam[4], Ika Yuni Widyawati[5], Nor Aziyan Yahaya[6]
[1,2,3,4]Faculty of Nursing, Airlangga University, Indonesia
[5]Research Group in Medical-Surgical Nursing, Airlangga University, Indonesia
[6]Faculty of Medicine, Universiti Malaya, Malaysia
[1]ikanurpratiwi@fkp.unair.ac.id, [2]dita.dwi.oktav-2020@fkp.unair.ac.id, [3]erna-d-w@fkp.unair.ac.id, [4]nursalam@fkp.unair.ac.id, [5]ika-y-w@fkp.unair.ac.id, [6]aziyan@ummc.edu.my
***Corresponding Author**

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ABSTRACT

Diabetes Mellitus (DM) **prevention behavior** is essential for reducing DM incidence among adolescents, a population increasingly exposed to lifestyle risks and heavily engaged with digital platforms. Social media provides a promising channel for health promotion, yet limited evidence explains how literacy in this medium supports preventive behaviors. **This study aims** to analyze the correlation between social media literacy and intention with DM prevention behavior among adolescent students. **A cross-sectional** design with purposive sampling was conducted involving 231 students aged 16 years in East Java, Indonesia. Data were collected using questionnaires measuring social media literacy, intention, and DM prevention behavior, while Spearman's rho correlation <0.05 was applied for analysis. Descriptive findings showed that 58% of participants were female, 67.1% used more than three social media platforms, 39% accessed social media 3–4 hours daily, and 4.3% had a family history of DM. **The analysis revealed** significant positive correlations between social media literacy ($p<0.001$, $r=0.325$) and intention ($p<0.001$; $r=0.305$) with DM prevention behavior. Adolescents with higher literacy and stronger intentions were more likely to exhibit proactive DM prevention actions. **These results** demonstrate that emerging technologies, particularly social media, hold substantial potential as promotive and preventive tools for adolescent health. Enhancing social media literacy can improve adolescents' ability to identify, interpret, and apply credible health information, supporting healthier behavioral choices. The study suggests that integrating digital health literacy into adolescent-focused programs may strengthen early preventive efforts and reduce future DM risk.

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1. INTRODUCTION

Diabetes Mellitus (DM) is one of the most common non-communicable diseases found in health problems and the highest cause of mortality and morbidity globally. In recent years, the incidence of DM in adolescents has increased and presents a challenge that has many risks of complications [1–3]. The global prevalence

of DM in 2021 is estimated at 10.5% (536.6 million people), increasing to 12.2% (783.2 million) in 2045 [4]. Indonesia is in 5th position with 19.47 million DM sufferers [5]. It is estimated that more than 50% of diabetes cases in the world are undetected or undiagnosed. The prevalence of DM in adolescents aged 10–19 years has increased by an average of 26.6% each year, this increase is known to occur with increasing age of 0.29 per 1,000 in adolescents aged 10–14 years and 1.04 per 1,000 in adolescents aged 15–19 years [6]. A significant proportion of adolescents in East Java Province have been identified with prediabetic conditions, marked by Impaired Fasting Glucose (IFG) levels ranging from 100 to 125 mg/dL, with a reported prevalence rate of 54.8% [7, 8]. An unhealthy lifestyle is believed to be the most dominant factor [9–11]. Behavioral modification is important to be done as early as possible to prevent the occurrence of a prediabetes epidemic [12].

The development of new digital technology and the increasing use of social media have opened up access for adolescents to obtain health information, health promotion media, and increase knowledge about disease prevention behavior [13, 14]. Social media as a new technology is able to change the way adolescents communicate and is used continuously every day [15, 16]. Research shows that almost 95% of adolescents use social media and adolescent students are born with digital adaptation related to new information technology [7, 14] some of the most widely used platforms include Instagram, Facebook, YouTube, and Twitter [13, 17]. Traditional platforms currently show low levels of acceptance and engagement among adolescents [18]. In Indonesia, the largest social media users are adolescents at 87.5% [19]. Survey data in 2024 showed that 31.42% of adolescents accessed information related to infotainment and gossip [20]. The low number of adolescents accessing health information on social media raises concerns, especially in relation to healthy living behavior. Knowledge through social media literacy and intentions influence individuals to form a behavior [20].

One important approach in preventing DM is to educate adolescents about healthy lifestyles and disease prevention through new technologies. Research shows that health literacy is a crucial factor that influences the management of daily diabetes self-management [21, 22]. Social media has advantages over traditional face-to-face visits between patients and health professionals [13, 23, 24]. It is important for adolescent students to access health information that can be obtained through social media so that it can generate intentions to behave in a healthy way. However, although access to health information through social media is increasingly easy, low levels of social media literacy among adolescents can be a barrier to utilizing this information for positive behavioral change [23, 24]. Research shows that adolescents who have low levels of social media literacy tend to have more difficulty in distinguishing valid and beneficial information for health [16, 17, 25]. Thus, although social media can be a valuable source of information, its effectiveness in influencing DM prevention behavior still needs to be explored further, especially in the context of social media literacy and adolescent intentions [21, 26].

Previous studies have shown that high social media literacy can improve individual understanding of health issues, which in turn has the potential to encourage adolescents' intention to behave healthily [24, 27, 28]. In addition, the intention to take preventive action also plays an important role in determining whether someone will take steps to prevent DM and is a key factor in the implementation of information obtained through social media [29, 30]. This study makes a direct contribution to the advancement of the Sustainable Development Goals (SDGs), particularly SDG 3: Good Health and Well-being [31, 32], by demonstrating how improved social media literacy can empower adolescents to identify credible and beneficial information regarding healthy lifestyle choices. Such literacy enhances their intention to engage in early preventive behaviors, thereby potentially lowering the incidence of Non-Communicable Diseases (NCDs) such as diabetes mellitus. Furthermore, the study aligns with SDG 9 Industry, Innovation, and Infrastructure [31, 33], as it highlights the strategic use of digital platforms as innovative tools for health interventions. By leveraging emerging technologies, this research offers a novel perspective on the integration of digital media into sustainable and effective health promotion strategies, particularly those aimed at broader adolescent populations. This study aims to explore how social media literacy and adolescents' intention influence DM preventive behavior through new technology, focusing on the perspective of adolescent students in Indonesia.

2. METHODS

2.1. Study Setting

This study used a descriptive correlational design with a cross-sectional approach to explore how social media literacy and adolescent intentions influence DM prevention behavior through new technology (social media) from the perspective of adolescent students in Indonesia. This approach allows data collection

at one point in time to analyze the extent to which these factors are interrelated in the context of social media without requiring long-term observation [34]. In addition, this approach is efficient to obtain a quick overview of the influence of social media on adolescent behavior in preventing DM in East Java Province, Indonesia.

2.2. Sample Size

The population in this study consisted of 10th grade students at a high school in Sidoarjo, East Java Province, Indonesia, during November-December 2024, totaling 435 students registered in the 2024/2025 academic year. Sampling was conducted using a purposive sampling technique with the following inclusion criteria: aged 16 years, owning a cellphone, and having and actively using at least one of the popular social media platforms in Indonesia. The independent variables in this study were social media literacy and intention, while the dependent variable was DM prevention behavior. The determination of sample size used the Slovin formula [35, 36], and the resulting sample included 231 adolescent students [37].

2.3. Data Collection

The research data used primary data collected through questionnaires. After obtaining permission from the school, the researcher coordinated with the school to distribute questionnaires to 10th grade students who met the inclusion criteria. Students who were willing to participate in the study were given informed consent forms to be signed by their parents or guardians. The students were then asked to fill out the questionnaire, which was directly accompanied and monitored by the researcher. The instruments in this study consisted of three questionnaires a social media literacy questionnaire, an intention questionnaire, and a DM prevention behavior questionnaire.

The social media literacy questionnaire was used to measure the ability to access, understand, assess, and apply DM prevention information. It covered dimensions such as health cure, disease prevention, and health promotion via social media. The questionnaire included 22 statements measured using a Likert scale ranging from "strongly disagree" to "strongly agree" for favorable statements, and reverse scoring for unfavorable ones. Score categorization was divided into three levels: low (score $<$ 66.912), medium (66.912 $\leq$ score $<$ 86.988), and high (score $\geq$ 86.988). The validity test showed $r_{\text{count}} > r_{\text{table}}$ ($r_{\text{table}} = 0.349$), and the reliability test resulted in a Cronbach's alpha of 0.960, indicating that the questionnaire was valid and reliable.

The intention questionnaire measured respondents' intentions or desires to engage in DM prevention behaviors, including the willingness to seek information and consider individual behaviors in preventing DM. This questionnaire contained 10 statements, also using a Likert scale with favorable and unfavorable statements scored accordingly. Score categorization was: low (score $<$ 27.804), medium (27.804 $\leq$ score $<$ 34.879), and high (score $\geq$ 34.879), with a minimum possible score of 10 and a maximum of 40. The instrument was adapted and modified from previous research [38]. The validity test showed $r_{\text{count}} > r_{\text{table}}$ ($r_{\text{table}} = 0.349$), and the reliability test produced a Cronbach's alpha of 0.723, indicating good validity and reliability.

The DM prevention behavior questionnaire measured behaviors such as maintaining healthy eating and drinking patterns, seeking DM-related information, engaging in regular physical activity, and monitoring blood sugar levels [39]. This instrument consisted of 10 statements rated on a Likert scale, with similar scoring methods for favorable and unfavorable items. Score categorization included: low (score $<$ 19.153), medium (19.153 $\leq$ score $<$ 23.643), and high (score $\geq$ 23.643), with total possible scores ranging from 10 to 40. This questionnaire was also adapted and modified from previous studies. The validity test showed $r_{\text{count}} > r_{\text{table}}$ ($r_{\text{table}} = 0.349$), and the reliability test showed a Cronbach's alpha value of 0.742, confirming the questionnaire was valid and reliable for use.

2.4. Data Analysis

The data were analyzed using descriptive analysis methods to determine the percentage and frequency distribution of the data. Bivariate analysis was conducted to examine the relationship between the independent and dependent variables using the Spearman's Rho test with a significance level of 0.05. This non-parametric test was selected because the data did not meet the normality assumption based on the Shapiro Wilk test and involved ordinal measurement scales. Spearman's Rho is appropriate for evaluating monotonic relationships in non-normally distributed or ordinal data. Given the ordinal nature of the independent variables and the categorical outcome, this test was considered more suitable than Pearson's correlation [38]. This approach allowed for a more accurate analysis of potential non-linear associations in the dataset [39]. A p-value of less than 0.05 indicated that the alternative Hypothesis (H1) was accepted, while a p-value greater than 0.05 indicated that H1 was rejected. Statistical analysis was conducted using SPSS version 21.0 for Windows.

2.5. Ethical Clearance

Ethical approval for this study was obtained from the Health Ethics Commission of Universitas XX (Approval Number: 34 XX-KE XX). The research was conducted in full compliance with national and international ethical guidelines, including those outlined in the Declaration of Helsinki and the Belmont Report, particularly concerning studies involving vulnerable populations such as minors. Ethical considerations were central to the study design and implementation, ensuring that the rights, dignity, and well-being of all participants were respected throughout the research process.

In alignment with established standards for research involving children and adolescents, the study adopted a dual consent approach. Prior to data collection, both the adolescent participants and their parents or legal guardians received clear, written information explaining the research objectives, methodology, potential risks, anticipated benefits, and confidentiality protections. This information was delivered in an ageappropriate and culturally sensitive manner to ensure full comprehension.

Informed consent was obtained from both the minors and their guardians, with ample opportunity given to ask questions or decline participation. The consent form explicitly stated that participation in the study was entirely voluntary and that choosing not to participate or choosing to withdraw at any point would not result in any negative consequences or loss of benefits. This ensured autonomy and upheld the principle of voluntariness central to ethical research practices.

Additional steps were taken to maintain strict confidentiality and protect the anonymity of participants. Identifiable information was excluded from all datasets, and all data were stored securely in encrypted, password-protected systems accessible only to authorized members of the research team. Furthermore, during the reporting and publication phases, care was taken to present findings in aggregate form to prevent individual identification.

Regular audits and monitoring were conducted by the ethics oversight body to ensure adherence to protocol. The research team also engaged in ethics training sessions prior to the commencement of fieldwork to reinforce best practices for participant engagement, informed consent procedures, and data protection.

Overall, the ethical framework of this study was built on transparency, respect, and accountability ensuring that the involvement of adolescent participants was not only compliant with ethical regulations but also supportive of their rights as individuals contributing to scientific knowledge.

To ensure the privacy and protection of all participants, particularly those from vulnerable groups such as minors, the study implemented comprehensive ethical safeguards. All collected data were fully anonymized prior to analysis and stored securely in a password protected digital repository, accessible only to authorized research personnel. Any identifiable information, including names, contact details, or other sensitive attributes, was carefully removed to prevent the possibility of re-identification. This measure ensured that participant confidentiality was maintained throughout the research lifecycle from data collection to publication.

Data access was restricted under a strict confidentiality protocol, which included role-based permissions and encryption of all datasets. To further uphold ethical standards, the research team adhered to guidelines established by institutional review boards and international ethical frameworks such as the Declaration of Helsinki. In line with these standards, the anonymized data will be retained for a period not exceeding 10 years. Upon expiration, all records will be permanently destroyed using secure data erasure methods to prevent any future unauthorized retrieval or misuse.

The research followed the approved ethical protocol rigorously to guarantee the rights, dignity, and welfare of participants at every stage. Risk mitigation strategies were employed proactively to minimize any physical, psychological, or informational harm. Additionally, participants were informed about their rights to voluntary participation and withdrawal at any point without penalty. These procedures ensured not only compliance with ethical norms but also the maintenance of trust between researchers and participants, thereby enhancing the credibility and integrity of the entire research process.

3. RESULT AND DISCUSSION

Based on Table 1, it shows that the gender of the participants was dominated by females, with a total of 134 participants (58%). The majority of participants stated that they did not have a family history of disease, with 212 participants (69.3%). However, a small percentage reported having a family history of DM, amounting to 4.3%. The number of social media platforms owned by adolescent students was most frequently more than three, reported by 155 participants (67%). The average duration of daily social media access among adolescent

students was most commonly between 3–4 hours, reported by 91 participants (39%). WhatsApp and Instagram were the types of social media owned by all adolescent students.

Table 1. Demographic Characteristics of Adolescent Students (n=231)

Characteristics	**Frequency**	**Percentage (%)**
Gender		
Male	97	42
Female	134	58
Family history of disease		
No family history of disease	212	69.3
Hypertension	5	2.2
Heart disease	4	1.7
Diabetes mellitus	10	4.3
Number of social media owned		
1	16	6.9
2–3	60	26
>3	155	67.1
Average social media access		
$\leq$ 2 hours/day	26	11
3–4 hours/day	91	39
5–6 hours/day	64	28
$\geq$ 7 hours/day	50	22
Total	231	100
Social Media owned:		
Whatsapp	231	100
Instagram	231	100
Facebook	81	35.1
Tiktok	215	93.1
Youtube	202	87.4
Twitter/X	94	40.7
Total	**1,054**	

Table 1 presents the demographic characteristics of the 231 adolescent students included in this study. The gender distribution shows that females make up the majority of respondents (58%), while males represent 42%. Most students reported having no family history of disease (69.3%), although a small number indicated a family history of hypertension, heart disease, or diabetes. The table also outlines patterns of social media ownership, where most adolescents reported using more than three platforms (67.1%). In terms of daily access, a considerable proportion spent 5–6 hours (28%) or more than 7 hours per day (22%) on social media, indicating a high level of digital engagement.

The data further highlight the popularity of specific social media platforms among adolescents. All respondents reported using WhatsApp and Instagram (100%), making them the most widely adopted platforms. TikTok was used by 93.1% of students, followed by YouTube at 87.4% and Twitter/X at 40.7%. These findings reflect the strong penetration of social media in adolescents' daily lives and underscore the importance of understanding how such usage patterns may influence their behavior, lifestyle, and overall well-being.

Based on Table 2, the social media literacy category demonstrates a relatively balanced distribution, with most adolescents falling into the medium category (55%), followed by a substantial proportion in the low category (40%). This indicates that while many students possess a moderate level of literacy, a considerable number still exhibit limited skills in navigating and interpreting digital information. Meanwhile, for the intention variable, the majority of adolescent students are categorized as medium (65.8%), suggesting a moderate readiness or willingness related to the behavior being measured. A similar pattern is observed in the DM prevention behavior variable, where most participants also fall within the medium category (62.3%), reflecting that preventive actions are present but not yet optimal, and may benefit from targeted interventions or educational efforts.

Table 2. Distribution of Social Media Literacy Frequency, DM Prevention Intention and Behavior

Variables	Category	Frequency	Percentage (%)
Social Media Literacy	Low	94	40.7
	Medium	127	55
	High	10	4.3
Intention	Low	28	12.1
	Medium	152	65.8
	High	51	22.1
Diabetes mellitus prevention behavior	Low	45	19.5
	Medium	144	62.3
	High	42	18.2
	Total	**231**	**100**

Table 2 presents the distribution of the categories of social media literacy variables, intentions, and DM prevention behavior based on their respective measurement parameters. For the social media literacy variable, the medium category dominates across all assessed aspects. Specifically, in the accessing aspect, 161 respondents (69.7%) fall into the medium category, indicating a moderate ability to obtain information related to DM on social media platforms. The understanding aspect shows that 171 respondents (74%) are categorized at a medium level, suggesting a reasonable comprehension of DM-related content. Furthermore, the assessing aspect records the highest proportion, with 194 respondents (84%) classified in the medium category, reflecting a fairly strong capacity to critically evaluate DM information. Lastly, in the implementing aspect, 152 respondents (65.8%) belong to the medium category, indicating that most respondents moderately apply the information they receive on social media in relation to DM prevention. Overall, these findings illustrate that although respondents generally demonstrate adequate social media literacy regarding DM information, there remains substantial potential for improvement toward a higher level of critical engagement and preventive behavior.

Table 3. Distribution of Frequency Social Media Literacy, Intention and DM Prevention Behavior based on Parameters

No.	Parameter	Low		Medium		High	
		f	%	f	%	f	%
Social Media Literacy							
1.	Ability to access social media	28	12.1	161	69.7	42	18.2
2.	Ability to understand social media information	35	15.2	171	74.0	25	10.8
3.	Ability to assess social media information	21	9.1	194	84.0	16	6.9
4.	Ability to apply social media information	39	12.1	152	65.8	51	22.1
Intention							
1.	Looking for information related to DM prevention	30	13.0	180	77.9	21	9.1
2.	Considering individual behavior to prevent DM	45	19.5	144	62.3	42	18.2
DM Prevention Behavior							
1.	Actions to maintain good eating and drinking patterns	29	12.6	152	65.8	50	21.6
2.	Actions to seek information about DM disease	75	32.5	95	41.1	61	26.4
3.	Regular exercise	40	17.3	137	23.4	54	23.4
4.	The act of monitoring blood sugar	16	6.9	190	82.3	25	10.8

Based on Table 3, it shows that the majority of adolescent students are in the moderate intention category in the aspect of seeking information related to DM prevention, with 180 respondents (77.9%), and in the aspect of considering individual behavior to prevent DM, with 144 respondents (62.3%). The majority of adolescent student participants also exhibit moderate intensity in DM prevention behavior, particularly in the aspect of maintaining good eating and drinking patterns with 152 respondents (65.8%), seeking information on DM with 95 respondents (41.1%), engaging in regular exercise with 137 respondents (59.3%).

Table 4. Relationship between Social Media Literacy and Intention with DM Prevention Behavior

Variables	DM Prevention Behavior						Total		rho	p
	Low		Medium		High		n	%		
	f	%	f	%	f	%				
Social Media Literacy										
Low	28	12.1	74	32.0	8	3.5	110	47.6	0.325	<0.001[(a)]
Medium	0	0.0	108	46.8	13	5.6	121	52.4		
Total	28	12.1	182	78.8	21	9.1	231	100.0		
Intention										
Medium	23	10.0	153	66.2	13	5.6	189	81.8	0.305	<0.001[(a)]
High	5	2.2	26	11.3	11	4.8	42	18.2		
Total	28	12.1	179	77.5	24	10.4	231	100.0		

[(a)]Spearman Rho Test

Based on Table 4, it shows that social media literacy correlates with DM prevention behavior ($p < 0.001$) with $\rho = 0.325$, indicating a positive relationship. This means that the higher the level of social media literacy, the higher the DM prevention behavior. Likewise, intention correlates with DM prevention behavior ($p < 0.001$) with $\rho = 0.305$, which also shows a positive relationship indicating that the higher the level of intention, the higher the DM prevention behavior.

This study explores the relationship between social media literacy and intention to influence DM prevention behavior through new technology, focusing on the perspective of adolescent students in Indonesia. The results showed that social media literacy correlates with DM prevention behavior in adolescent students. Social media as a new digital-based technology provides easy access to health information that can influence individual behavior in maintaining a healthy lifestyle, such as better diet and increased physical activity [40–42]. Recent studies have shown that social media can increase knowledge about DM, as well as encourage positive behavioral changes in adolescents through information and social support [43]. However, other findings also state that although social media can be an effective educational tool, inconsistent information quality or misinformation circulating on the platform can reduce its effectiveness in encouraging DM prevention [40, 43].

This study explicitly integrates key constructs from two well-established behavioral theories: Social Cognitive Theory (SCT) and the Health Belief Model (HBM). Bandura's SCT supports positive research findings by emphasizing the importance of social environmental influences in shaping healthy habits [44, 45], while Social Cognitive Theory suggests that the influence of role models on social media can strengthen preventive behavior, although information uncertainty is a barrier for some individuals [46]. SCT posits that individuals acquire and adopt behaviors through processes of observational learning, modeling, and social interaction, particularly when such behaviors are reinforced by media exposure or influential role models [44, 45]. Within the context of this research, adolescents who frequently engage with health-related content on social media platforms such as Instagram and WhatsApp may be inclined to emulate preventive behaviors demonstrated by peers or influencers advocating healthy lifestyles. The observed association between social media literacy and DM prevention behavior lends empirical support to the SCT framework, highlighting the dynamic interplay between personal cognitive factors (e.g., media literacy competencies), behavioral enactment, and the social environment (e.g., digital media ecosystems).

Concurrently, the study also operationalizes core components of the Health Belief Model, particularly perceived susceptibility, perceived severity of disease, perceived benefits of preventive action, and cues to action. The finding that adolescents' intentions are significantly and positively associated with DM prevention behaviors aligns with HBM's central premise: individuals are more likely to initiate and sustain health-promoting behaviors when they recognize personal vulnerability, acknowledge the seriousness of a condition, believe in the efficacy of the proposed intervention, and are exposed to triggering stimuli or supportive information. This finding is in line with the Health Belief Model theory which states that individual perceptions of the risks and benefits of health actions influence their intentions to take preventive measures [47]. In this framework, intention functions as a mediating variable, facilitating the translation of social media literacy into concrete preventive behaviors among adolescents.

This study contributes a deeper understanding of how specific components of social media literacy influence adolescent health behaviors related to DM prevention. The data show that while most adolescent stu-

dents were categorized as moderate in their overall social media literacy, significant variations existed among the four measured sub dimensions access, understanding, assessment, and application. Most notably, the ability to apply information from social media into practice was limited, with only 22.1% classified in the high category. This indicates that although adolescents may access and understand health content, their capacity to translate this knowledge into concrete preventive actions remains insufficient [14, 48]. Factors such as knowledge, attitudes, perceived vulnerability, and perceived benefits also play an important role in determining DM prevention behavior in adolescents [48, 49]. A comprehensive approach is needed that considers various behavioral determinants to increase the effectiveness of DM prevention in adolescents [50, 51].

Another fact in this study was dimension of "ability to assess social media information" was also relatively weak, with only 6.9% demonstrating high evaluative ability. This suggests that adolescents are vulnerable to misinformation or may struggle to distinguish between credible and misleading health content. In contrast, the "ability to access" and "understand" information showed moderate to high levels in most participants (69.7% and 74%, respectively), suggesting that foundational engagement with content is not the primary issue rather, it is the depth of engagement that determines behavioral outcomes. These findings reinforce previous studies that highlight the gap between exposure to health-related information and actual behavior change, particularly when critical thinking and media evaluation skills are underdeveloped [14, 15, 52, 53]. Adolescents often interpret online health messages in simplified or superficial ways, acting on them without fully validating the source or context. Other studies have shown that educational media such as leaflets and websites can improve adolescent knowledge about DM, but their effectiveness depends on the design and delivery of information that is appropriate to the characteristics and preferences of adolescents [24, 36, 48, 54]. In this context, the application of information without strong evaluative skills poses risks of inappropriate or ineffective health behavior. Therefore, a more interactive and interesting educational approach is needed, as well as increasing adolescent digital literacy so that they can sort and apply health information more effectively.

Another finding in this study is that intention correlates with DM prevention behavior with a positive relationship, where the higher the level of intention, the higher the DM prevention behavior. This is relevant to several studies that support that intention or intention plays an important role in DM prevention behavior in adolescents. A study found that perception of vulnerability, perception of severity, and perception of benefits have a significant relationship with DM prevention behavior in adolescents [52]. Thus, the higher the intention or intention of adolescents to prevent DM, the higher their tendency to engage in effective preventive behavior. This study also found that adolescent students had moderate intentions in terms of seeking information related to DM prevention. This can be associated with research that explains that one of the influencing factors is the lack of knowledge and awareness of adolescents about the importance of DM prevention [1, 2, 11, 51]. A more proactive and interactive educational approach is needed to increase adolescents intention to seek information related to DM prevention.

The findings of this study demonstrate a significant positive correlation between social media literacy and adolescents' intention to engage in DM prevention behaviors. This evidence reinforces the study's direct contribution to Sustainable Development Goal (SDG) 3 Good Health and Well-being, particularly target 3.4 [31, 32], which emphasizes reducing premature mortality from non-communicable diseases through preventive measures and education. Enhanced social media literacy enables adolescents to critically assess and apply valid health information, thereby strengthening their motivation to adopt healthy behaviors and ultimately helping to curb the rising prevalence of DM from an early age. Moreover, the strategic use of social media as a vehicle for health education highlights its alignment with SDG 9 Industry, Innovation, and Infrastructure [31, 33], recognizing digital platforms as accessible, scalable, and innovative infrastructures well-suited to engage technology-oriented youth. Thus, integrating digital platforms into literacy-based health promotion represents a forward-thinking and impactful approach to advancing multiple sustainable development targets concurrently.

This study is the first to reveal the correlation between social media literacy and adolescent intentions to influence DM prevention behavior through new technology in 16-year-old adolescent students in East Java Province. A significant proportion of adolescents in East Java Province have been identified with prediabetic conditions, marked by IFG levels ranging from 100 to 125 mg/dL, with a reported prevalence rate of 54.8% [7]. This makes this age group important to get attention to carry out DM prevention behavior [11, 13, 51]. In addition, adolescents, especially in the 14–18 year age range, are active users of social media such as WhatsApp and Instagram, with a duration of social media use of more than 3 hours/day. This is relevant to the findings in this study that overall adolescent students have and actively use WhatsApp and Instagram for 3–4 hours/day. Other studies in Indonesia highlight the importance of social media-based health promotion in preventing DM

in adolescents, although they did not specifically examine the population in East Java Province [11, 17, 36]. A study in Java, Indonesia found that there was a significant relationship between the level of health literacy and the behavior of preventing non-communicable diseases (diabetes mellitus and hypertension) [55, 56]. Previous studies also found that there was a significant relationship between the level of knowledge and the influence of social media with the behavior of consuming foods at risk of DM [1, 3, 57]. It is known that cognitive and perceptual factors play an important role in the behavior of preventing DM in adolescents [36, 44, 58]. In addition, the high duration of social media use can have an impact on the mental and physical health of adolescents, such as sleep disorders and decreased motivation to learn [15, 27, 59]. Therefore, it is important for teenagers to manage their time using social media wisely to minimize the negative impacts that may arise.

This study was indeed conducted in a single school in East Java, which could limit the scope of generalizing the results to the broader adolescent population in Indonesia. However, East Java is a province with a notably high prevalence of prediabetic conditions, with IFG levels reaching 54.8% [7, 60]. This makes adolescents in the region a particularly vulnerable group, highlighting the importance of the study. Additionally, adolescents aged 14-18, who are active social media users such as WhatsApp and Instagram, are an appropriate target for social media-based health promotion [17, 22, 54, 61]. While the findings focus on adolescents in East Java, these results remain relevant in a broader context, both within Indonesia and internationally. In Indonesia, several studies have shown a significant relationship between health literacy levels and non-communicable disease prevention behaviors (including diabetes mellitus and hypertension) [55, 56, 62], although different regions were studied. International studies have also reported similar findings.

To comprehensively address the impact of social media on adolescents' preventive behaviors regarding diabetes mellitus, this study integrates diverse recent sources. Nevertheless, to contextualize the findings within a broader global framework, it is essential to draw upon international literature that illustrates the cross-cultural efficacy of digital health interventions. For example, a randomized controlled trial demonstrated that Facebook-based health campaigns significantly enhanced diabetes self-screening behaviors among Indonesian users [45]. Likewise, adolescents in the United Kingdom utilized social media during the COVID-19 pandemic to inform health-related behaviors, particularly in areas of physical activity and nutrition. In a similar vein, targeted social media engagement effectively increased pre-diabetes awareness among underserved Latino populations in rural Idaho [43]. Furthermore, evidence from Iran indicated that online social networks contributed meaningfully to improved medication adherence and health literacy among individuals living with HIV/AIDS, thereby underscoring the relevance of digital platforms across cultural and health domains [26]. Collectively, these international studies, when considered alongside our findings, affirm the role of social media not merely as a conduit for health information, but as a transformative tool capable of shaping health behaviors across diverse populations and settings when strategically implemented.

4. MANAGERIAL IMPLICATIONS

This study yields critical practical implications for a range of stakeholders, most notably educational institutions, healthcare professionals, and policymakers. The demonstrated positive correlation between social media literacy and adolescents' intention to engage in DM prevention behaviors underscores an urgent imperative to embed digital health education within formal school curricula. Educational institutions are encouraged to adopt comprehensive interventions such as digital health literacy modules, critical appraisal workshops for online health content, and interactive promotion initiatives leveraging social media platforms frequently accessed by adolescents.

Healthcare organizations may capitalize on these insights to craft youth-centered health communication campaigns utilizing innovative technologies, including AI-driven health chatbots, micro-learning video formats, and mobile applications designed to enhance user interaction. From a policy perspective, the findings advocate for the development of cohesive national strategies that promote interministerial collaboration particularly among the health, education, and information sectors to formally integrate social media literacy into public health frameworks. Such integrated efforts not only reinforce healthier behavior adoption among adolescents but also align with broader global agendas, notably Sustainable Development Goal 3 (Good Health and Well-being) and Goal 9 (Industry, Innovation, and Infrastructure), by advancing digital innovation in health education and communication.

However, this study is subject to several limitations. First, the cross-sectional design restricts our ability to establish causal relationships between social media literacy, intentions, and DM prevention behaviors,

as it only provides data at a single point in time. Second, the research was conducted in a single school, which limits the generalizability of the findings to a broader adolescent population with varying social, economic, and educational backgrounds. Furthermore, although we collected demographic data on gender, family medical history, and social media usage, other important variables such as family influence, socioeconomic status, and access to digital health information were not included in the analysis. These factors could significantly influence diabetes prevention behaviors and should be incorporated into future research to offer a more comprehensive understanding of the issue.

5. CONCLUSION

The results of this study clearly demonstrate that both social media literacy and intention have a significant positive correlation with DM prevention behavior among adolescent students. Higher levels of social media literacy enable adolescents to access, understand, critically evaluate, and apply credible online health information, which subsequently strengthens their ability to adopt healthier behaviors. Similarly, the level of intention also plays an essential role in shaping behavioral outcomes, as adolescents with stronger motivation and awareness are more likely to engage in preventive actions. These findings emphasize the need to further enhance digital literacy skills among adolescents so that they can navigate the vast amount of online information more effectively and translate it into meaningful health practices.

The study also highlights a strong pattern of social media engagement among 16-year-old adolescents, who typically own more than three social media accounts and spend an average of 3-4 hours per day accessing digital platforms. Such high exposure positions social media as a powerful vehicle for health promotion, offering the opportunity to reach adolescents through channels that are already deeply integrated into their daily lives. When supported by adequate critical literacy, social media can serve not only as a medium for disseminating health information but also as an interactive space that reinforces preventive behaviors through peer influence, digital communities, and engaging health content. To maximize this potential, the development and dissemination of innovative digital tools such as AI-based health applications, interactive chatbots, gamified educational content, and short-form digital health campaigns are crucial in ensuring that health messages are relevant, appealing, and easily understood by adolescent users.

From the perspective of the SDGs, the findings of this study provide meaningful contributions to global development efforts. This research directly aligns with SDG 3 Good Health and Well-being, particularly in advancing target 3.4, which stresses the importance of reducing premature mortality from non-communicable diseases through prevention, treatment, and awareness. By enhancing social media literacy and intention, adolescents become more capable of making informed health decisions, thereby strengthening community resilience against the growing threat of diabetes. Additionally, the study supports SDG 9: Industry, Innovation, and Infrastructure, as it showcases how digital platforms can be leveraged as innovative infrastructures for health education and behavior change. The synergy between education, technology, and public health underscores the need for collaborative efforts among government bodies, schools, healthcare organizations, and technology providers to ensure that digital health information is accurate, accessible, and capable of driving sustained behavioral improvement. Such cross-sector collaboration not only enriches public health initiatives but also ensures that digital innovation is harnessed in ways that meaningfully support adolescent well-being and long-term disease prevention.

6. DECLARATIONS

6.1. About Authors

Ika Nur Pratiwi (IP) https://orcid.org/0000-0001-5868-9355
Dita Dwi Oktav Prabawati (DP) https://orcid.org/0009-0006-3579-958X
Erna Dwi Wahyuni (ED) https://orcid.org/0000-0001-5147-5151
Nursalam Nursalam (NN) https://orcid.org/0000-0002-9052-6983
Ika Yuni Widyawati (IW) https://orcid.org/0000-0001-6045-9719
Nor Aziyan Yahaya (NY) https://orcid.org/0000-0002-4225-2148

6.2. Author Contributions

Conceptualization: IP; Methodology: ED; Software: DP; Validation: NN and NY; Formal Analysis: IW and IP; Investigation: DP; Resources: ED; Data Curation: NN; Writing Original Draft Preparation: NY and ED; Writing Review and Editing: DP and IW; Visualization: NY; All authors, IP, DP, ED, NN, IW and NY have read and agreed to the published version of the manuscript.

6.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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6.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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