The mediating effects of self-efficacy, family health, and perceived stress on the relationship between perceived social support and eHealth literacy in nursing students: a structural equation model

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Abstract

Background This study aimed to explore the association between perceived social support and eHealth literacy in Chinese nursing students, with a particular emphasis on the mediating effects of self-efficacy, family health, and perceived stress within this relationship.

Method This study utilized data drawn from the 2023 Psychology and Behavior Investigation of Chinese Residents (PBICR) survey, which involved a sample of 967 nursing students. Structural equation modeling was utilized to examine the relationships among the study variables.

Results The mediating effect analysis revealed a negative direct relationship between perceived social support and eHealth literacy in Chinese nursing students ($\beta = -0.149$, $p < 0.001$). Both self-efficacy ($\beta = 0.124$, $p < 0.05$) and family health ($\beta = 0.148$, $p < 0.05$) acted as mediators in the association between perceived social support and eHealth literacy. Additionally, perceived social support positively affected eHealth literacy through a chain mediation of self-efficacy, perceived stress, and family health ($\beta = 0.008$, $p < 0.05$).

Conclusion This study provides valuable insights for developing strategies to enhance nursing students' eHealth literacy, ultimately contributing to their professional development and the quality of healthcare services they provide.

Keywords Perceived social support, eHealth literacy, Self-efficacy, Family health, Perceived stress, Nursing students

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Introduction

With the rapid development of electronic technological innovations, electronic media such as internet-enabled mobile devices have become crucial channels for information acquisition and communication. People often search for health information online [1]. eHealth literacy refers to the ability to find, access, comprehend, and assess health-related information from digital platforms and subsequently use this information to manage health concerns [2]. For healthcare professionals, especially nurses, the skill to find effective and reliable health information is essential [3]. As future key members in the healthcare sector, nursing students benefit significantly from possessing eHealth literacy, which is vital for their professional development and the quality of healthcare services they provide [4, 5]. In the medical field, knowledge updates rapidly, with new research findings, treatment methods, and technologies continually emerging. Nursing students with eHealth literacy can utilize online resources to stay informed about these new developments, adopt new technologies, and enhance their professional competence, thereby offering higher-quality healthcare services to patients [3, 5]. Elevating eHealth literacy among nursing students helps shape well-rounded healthcare professionals, meeting societal demands, and promoting the advancement of the healthcare industry [4].

Nursing students face a uniquely demanding educational experience that combines rigorous academic coursework with extensive clinical practice. The need for practical skills, emotional resilience, ethical decision-making, interdisciplinary collaboration, and continuous learning sets nursing education apart from many other academic disciplines [6]. Social support may assist them in dealing with these challenges and improve their mental health [7]. Prior studies have confirmed the influence of perceived social support on eHealth literacy [8–10]. Meanwhile, the eHealth literacy levels among nursing students still require improvement [5].

Currently, there remains a gap in understanding how perceived social support affects eHealth literacy. Bandura's Social Cognitive Theory emphasizes the interplay between personal, environmental, and behavioral factors [11]. In this framework, perceived social support and family health are considered environmental factors, while self-efficacy and perceived stress are personal factors. These factors may interact to collectively affect individual behavior, such as eHealth literacy [11]. Specifically, perceived social support may enhance self-efficacy, helping nursing students cope with psychological stress, and may support improvements in their eHealth literacy [12–14]. Family health also plays a critical role by providing emotional support and a stable home environment, which

may indirectly foster eHealth literacy [15, 16]. This study aims to explore the relationship between perceived social support and eHealth literacy among Chinese nursing students, focusing on how personal factors (self-efficacy, perceived stress) and environmental factors (perceived social support, family health) interact to affect eHealth literacy. By gaining a deeper understanding of these interactions, this study will help to provide scientific evidence to improve nursing students' eHealth literacy, offering strategies and new approaches for nursing education.

Background

Perceived social support refers to the perception of available resources or supportive social relationships obtained through social interactions [17], typically encompassing support from parents, friends, teachers, and others. It has been widely acknowledged as a critical factor influencing health behaviors and outcomes [18]. A study conducted on Korean women undergoing breast cancer treatment found that social support significantly impacts eHealth literacy [8], indicating that those who perceive higher support levels are more likely to engage with and benefit from eHealth resources. Similarly, research involving primary care providers in China also found a significant link between social support and eHealth literacy [9]. Furthermore, a study of 947 college students in China found a similar association between social support and eHealth literacy [10]. Within contemporary society, the role of perceived social support may be significant in facilitating individuals' engagement with eHealth resources, thereby enhancing their eHealth literacy [9].

Self-efficacy refers to an individual's confidence in their capacity to plan and carry out the actions necessary to handle future situations, serving as a decisive factor influencing behavior [19]. It affects how individuals cope with challenges, their perseverance in the face of difficulties, and their overall engagement in health-promoting activities [20]. According to Social Cognitive Theory, social support can enhance self-efficacy by providing encouragement, modeling effective behaviors, and offering instrumental assistance [11]. Previous research has shown that social support increases self-efficacy, which in turn promotes health behaviors [12]. A cross-sectional mixed methods study confirmed the impact of self-efficacy on eHealth literacy among adolescents [13]. Therefore, high perceived social support may boost individuals' confidence in their ability to use digital health resources, thereby enhancing their eHealth literacy [11–13].

Family health refers to the overall health and well-being of family members and the family unit as a whole, playing a crucial role in maintaining health and preventing disease [21]. A healthy family creates an environment of belonging and shared care among its members,

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enhancing their health and quality of life [21]. Research has shown that social support is a positive predictor of family functioning [22]. Families with higher perceived social support can create a supportive environment that provides emotional stability and exhibits strong communication patterns and effective problem-solving skills, all of which contribute to overall family health [23, 24]. Studies have also found that a healthy family environment can boost individuals' confidence in using eHealth resources, thereby improving their eHealth literacy [15, 16]. Family Systems Theory [25] provides a deeper understanding of these relationships by positing that individuals cannot be understood in isolation from their family unit, as family members are interconnected and interdependent. Within this theoretical framework, perceived social support and eHealth literacy are not simply individual attributes but are instead deeply embedded in the family environment. Therefore, in conditions of high perceived social support and family health, the eHealth literacy of family members may enhance the eHealth literacy of the entire family unit.

Perceived stress reflects a person's thoughts or feelings regarding their current degree of stress [26]. Nursing students often encounter high levels of stress [6], making effective stress management crucial for maintaining their academic performance and mental health [27]. The stress-buffering model suggests that social support aids individuals in managing crises, better adapting to environmental changes, and increaseing their sense of security and confidence in the face of stress [28]. Additionally, nursing students' self-efficacy has been proven to significantly affect perceived stress [14]. Therefore, we hypothesize that perceived social support may reduce perceived stress through the mediation of self-efficacy. Moreover, family health is adversely affected by high levels of stress [29]. Families with strong social support networks may tend to exhibit lower stress levels, promoting healthier interactions and environments, which benefit family health, encourage better health behaviors, and ultimately enhance eHealth literacy [15, 16].

Based on previous research findings, this study suggests the following hypotheses (Fig. 1):

> H1: Perceived social support is associated with eHealth literacy.
> H2: Self-efficacy mediates the relationship between perceived social support and eHealth literacy.
> H3: Family health mediates the relationship between perceived social support and eHealth literacy.
> H4: Perceived social support affects the eHealth literacy of nursing students in China through a chain mediation of self-efficacy, perceived stress, and family health.

Method

Participants and procedures

The data for this study was sourced from the 2023 Psychology and Behavior Investigation of Chinese Residents (PBICR), a large-scale, multi-center cross-sectional survey designed to capture comprehensive and representative data on the psychosocial and behavioral characteristics of Chinese residents. Conducted between June 20 and August 31, 2023, the PBICR collected responses from individuals across 150 cities in 22 provinces, 5 autonomous regions, 4 municipalities, and 2 special administrative regions (Hong Kong and Macao), covering 97% of China's provincial-level administrative divisions. Trained interviewers conducted face-to-face interviews to administer the survey, recording responses on Questionnaire Star, an extensively used online survey tool in
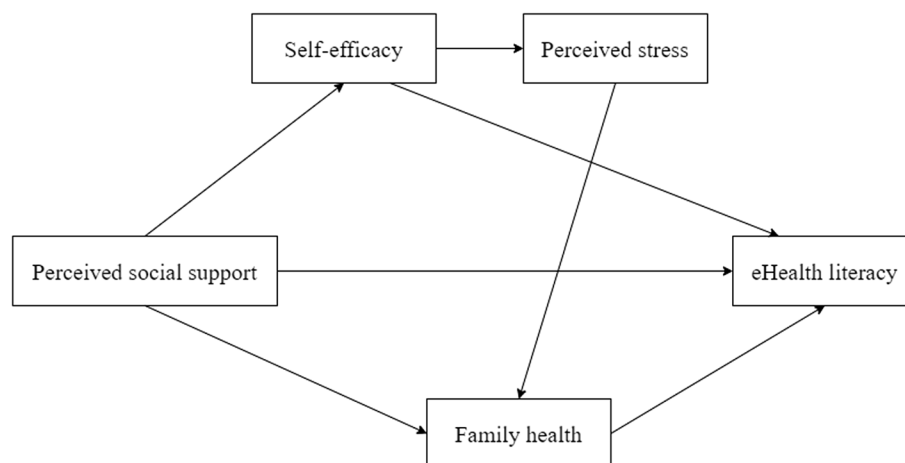

Fig. 1 Hypothesized model of the interrelationships of perceived social support, self-efficacy, family health, and perceived stress on eHealth literacy

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China. The process ensured anonymity, with informed consent obtained from all participants. Additional information regarding PBICR methodology is available elsewhere [30].

According to the formula for estimating sample size in structural equation modeling, the sample should be between 10 and 15 times the number of dimensions [31]. In this study, given the presence of 5 dimensions, the sample size was estimated at 15 times the number of dimensions, resulting in a minimum requirement of 75 participants. However, to achieve stable estimations in structural equation modeling, it is advisable to have at least 200 participants [32]. Taking into account a possible 20% rate of invalid responses, it was concluded that a sample size of 240 participants would be necessary.

To focus specifically on nursing students, we restricted our sample to individuals identified as current nursing students. From the original PBICR sample of 45830 participants, 967 nursing students were included in our final analysis.

Ethical considerations

According to the Declaration of Helsinki, this study received ethical approval from the Ethics Review Committee of Shandong Provincial Hospital (No. 2023–198). All participants provided informed consent.

Measures
Demographic characteristics

Age was categorized as 18–20, 21–22, and over 23 years. Gender was classified as woman and man. Ethnicity was divided into Han and minority. Education was categorized as college and below, undergraduate, and master's degree and above. The place of residence was classified as rural and urban. Hukou was categorized as agricultural and non-agricultural. Religious beliefs and love experience were recorded as no and yes.

Perceived social support

The Perceived Social Support Scale (PSSS) was a 3-item short form to assess perceived social support [18]. Participants responded to items using a 7-point Likert scale, with ratings ranging from 1 (strongly disagree) to 7 (strongly agree). Total scores varied from 3 to 21, with higher scores reflecting greater perceived social support. In this study, the PSSS demonstrated a Cronbach's α of 0.898.

eHealth literacy

eHealth literacy was assessed using the eHealth Literacy Scale-Short Form (eHEALS-SF) [33], consisting of 5 items. Participants rated each item on a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree). Scores could range from 5 to 25, where higher scores reflect higher eHealth literacy. In this study, the eHEALS-SF demonstrated a Cronbach's α of 0.931.

Self-efficacy

The 3-item New General Self-Efficacy Scale-Short Form (NGSES-SF) was used to assess self-efficacy [34]. Using a 5-point Likert scale, participants rated the items from 1 (strongly disagree) to 5 (strongly agree). The total scores varied from 3 to 15, with higher scores reflecting higher self-efficacy. In this study, the NGSES-SF demonstrated a Cronbach's α of 0.947.

Family Health

The Short Form of the Family Health Scale (FHS-SF) was used to measure family health [21]. It was a 10-item scale for assessing family health. Using a 5-point Likert scale, participants rated the items from 1 (strongly disagree) to 5 (strongly agree). Reverse scoring was applied to items 6, 9, and 10. The total scores could vary between 10 and 50, with higher scores reflecting better family health. In this study, the FHS-SF demonstrated a Cronbach's α of 0.792.

Perceived stress

Perceived stress was evaluated using a 4-item Short Form Perceived Stress Scale (PSS-4) [26]. Participants rated each item on a 5-point Likert scale, ranging from 0 (never) to 4 (very often). Possible scores ranged from 0 to 16, with higher scores indicating higher perceived stress. The PSS-4 demonstrated a Cronbach's α of 0.939 in this study.

Statistical analysis

Statistical analyses were performed with IBM SPSS version 25.0 and Amos version 28.0 (IBM Corp., Armonk, NY, USA). $P < 0.05$ (two-sided test) was considered statistically significant.

First, to evaluate common method bias, a Harman single-factor test was conducted [35]. Second, the Kolmogorov–Smirnov test was conducted to determine the normal distribution. Descriptive statistics were reported as frequencies and percentages. Third, Spearman correlation analysis was conducted to explore the relationships between perceived social support, self-efficacy, family health, perceived stress, and eHealth literacy. Finally, structural equation modeling was utilized to examine how self-efficacy, family health, and perceived stress mediate the relationship between perceived social support and eHealth literacy. Bootstrap tests were performed with 5,000 repetitions to assess the significance of the mediating effect, ensuring that the 95% confidence interval (CI) excluded 0. Model fit was assessed based on

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the following criteria: A chi-squared test of minimum discrepancy divided by degrees of freedom (CMIN/DF) of less than 3 is considered acceptable, while the comparative fit index (CFI), Tucker-Lewis index (TLI), and goodness of fit index (GFI) should all be 0.90 or higher. Additionally, the root mean square error of approximation (RMSEA) should be 0.08 or below, while the standardized root mean square residual (SRMR) should not exceed 0.06 [36].

Results

Common method bias test
The Harman single-factor test identified five factors with eigenvalues greater than 1. The initial factor explained 30.063% of the total variance, which is lower than the critical standard of 40%. This suggests that significant common method bias is not present in this study [35].

Demographic characteristics of participants
Among the 967 participants, the majority were aged between 18 and 20 years (49.328%), identified as women (80.558%), belonged to the Han ethnicity (88.314%), were undergraduates (61.531%), resided in urban areas (72.802%), held agricultural hukou (64.012%), did not have religious beliefs (93.899%), and had previous love experiences (61.841%) (Table 1).

Descriptive statistics and Spearman correlation analysis
The nursing students exhibited an average eHealth literacy score of 19.800 ± 3.593. Their scores for perceived social support, self-efficacy, family health, and perceived stress were 15.160 ± 3.922, 10.720 ± 2.413, 40.070 ± 5.950, and 4.000 (2.000, 7.000), respectively (Table 2).

Spearman correlation analysis indicated that eHealth literacy was positively correlated with perceived social support $(r_s = 0.185, p < 0.01)$, self-efficacy $(r_s = 0.253, p < 0.01)$, and family health $(r_s = 0.305, p < 0.01)$. Perceived social support was positively correlated with self-efficacy $(r_s = 0.615, p < 0.01)$ and family health $(r_s = 0.459, p < 0.01)$. A positive correlation was also found between self-efficacy and family health $(r_s = 0.279, p < 0.01)$. In addition, perceived stress showed negative correlations with perceived social support $(r_s = -0.196, p < 0.01)$, self-efficacy $(r_s = -0.231, p < 0.01)$, family health $(r_s = -0.236, p < 0.01)$, and eHealth literacy $(r_s = -0.190, p < 0.01)$ (Table 2).

Mediating effect analysis
The assessment of the structural equation model revealed that the final version achieved satisfactory goodness-of-fit indices: CMIN = 4.218, DF = 3, CMIN/DF = 1.406, CFI = 0.999, TLI = 0.996, GFI = 0.998, RMSEA = 0.021, SRMR = 0.014. Figure 2 illustrates the standardized path coefficients.

Table 1 Demographic characteristics of the participants ($N = 967$)

Variables	N	Percentage (%)
Age (years)		
18–20	477	49.328
21–22	256	26.474
> 23	234	24.199
Gender		
Woman	779	80.558
Man	188	19.442
Ethnicity		
Han	854	88.314
Minority	113	11.686
Education		
College and below	204	21.096
Undergraduate	595	61.531
Master's degree and above	168	17.373
Place of residence		
Urban	704	72.802
Rural	263	27.198
Hukou		
Agricultural	619	64.012
Non-agricultural	348	35.988
Religious belief		
No	908	93.899
Yes	59	6.101
Love experience		
No	369	38.159
Yes	598	61.841

Percentages might not add up to 100% due to rounding

Table 3 presents the results of the structural equation model analysis. First, perceived social support could significantly and positively affect the self-efficacy of nursing students ($\beta = 0.652$, $p < 0.001$, Model 1). Second, self-efficacy could significantly and negatively affect the perceived stress of nursing students ($\beta = -0.152$, $p < 0.001$, Model 2). Third, perceived social support ($\beta = 0.392$, $p < 0.001$) and perceived stress ($\beta = -0.208$, $p < 0.001$) could significantly affect the family health of nursing students (Model 3). Fourth, perceived social support ($\beta = -0.149$, $p < 0.001$), self-efficacy ($\beta = 0.191$, $p < 0.001$), and family health ($\beta = 0.378$, $p < 0.001$) could significantly affect the eHealth literacy of nursing students (Model 4).

Table 4 presents the results of the mediating effect analysis. The mediating effect of self-efficacy and family health was significant. Specifically, these mediating effects stemmed from three indirect pathways. First, the indirect effect of perceived social support on eHealth literacy through self-efficacy had a path coefficient of 0.124 (Bootstrap 95% CI: 0.073 to 0.180). Second, the

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Table 2 Descriptive statistics and the correlation between perceived social support, self-efficacy, family health, perceived stress, and eHealth literacy (N = 967)

Variables	Mean (SD) or median (P$_{25}$, P$_{75}$)	1	2	3	4	5
1. Perceived social support	15.160(3.922)	1.000				
2. Self-efficacy	10.720(2.413)	0.615**	1.000			
3. Family health	40.070(5.950)	0.459**	0.279**	1.000		
4. Perceived stress	4.000(2.000,7.000)	−0.196**	−0.231**	−0.236**	1.000	
5. eHealth literacy	19.800(3.593)	0.185**	0.253**	0.305**	−0.190**	1.000

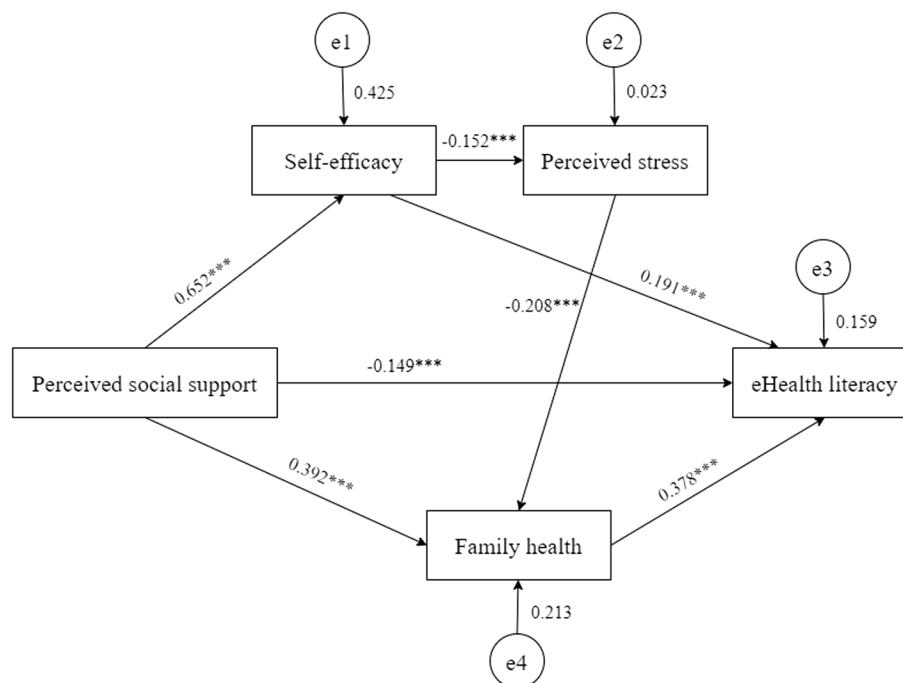** $p < 0.01$ (two-tailed). Correlations were Spearman correlation coefficients

Fig. 2 Model for the effects of perceived social support, self-efficacy, family health, and perceived stress on eHealth literacy. Note: ***$p < 0.001$ (two-tailed)

indirect effect of perceived social support on eHealth literacy through family health had a path coefficient of 0.148 (Bootstrap 95% CI: 0.114 to 0.186). Third, the indirect effect of perceived social support on eHealth literacy through self-efficacy, perceived stress, and family health had a path coefficient of 0.008 (Bootstrap 95% CI: 0.004 to 0.013).

Discussion

This study explored the mediating roles of self-efficacy, family health, and perceived stress in the relationship between perceived social support and eHealth literacy among nursing students in China. In general, the results indicated that the perceived social support had a negative direct effect, a positive indirect effect, and a positive total effect on eHealth literacy. Self-efficacy and family health emerge as pivotal mediating factors, indicating the pathways through which perceived social support affects eHealth literacy. Perceived social support, through a chain mediation of self-efficacy, perceived stress, and family health, indirectly affects the Chinese nursing students' eHealth literacy.

This study indicated a significantly negative direct effect of perceived social support among nursing students on their eHealth literacy. Therefore, the H1 hypothesis was supported. Previous studies have predominantly underscored the beneficial role of social support in promoting health behaviors and outcomes [37–39], diverging from

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Table 3 Regression analysis of the association between variables in the structural equation model

Outcome variable	Predictive variable	R^2	β	SEs	t	95%CI	
						Lower	Upper
Model 1							
Self-efficacy	Perceived social support	0.425	0.652	0.015	26.729***	0.592	0.704
Model 2							
Perceived stress	Self-efficacy	0.023	−0.152	0.050	−4.777***	−0.228	−0.074
Model 3							
Family health	Perceived social support	0.213	0.392	0.044	13.662***	0.333	0.447
	Perceived stress		−0.208	0.045	−7.264***	−0.271	−0.147
Model 4							
eHealth literacy	Perceived social support	0.159	−0.149	0.038	−3.638***	−0.234	−0.066
	Self-efficacy		0.191	0.058	4.901***	0.110	0.268
	Family health		0.378	0.020	11.654***	0.300	0.453

*** $p < 0.001$ (two-tailed)

Table 4 Total, direct, and indirect effects of perceived social support on eHealth literacy

Effect types	Paths	Effect	Bootstrap SE	Bootstrap 95% CI
Total effect	Perceived social support → eHealth literacy	0.131	0.036	0.057 to 0.200
Direct effect	Perceived social support → eHealth literacy	−0.149	0.042	−0.234 to −0.066
Indirect effects	Total indirect effect	0.280	0.033	0.220 to 0.348
	Perceived social support → Self-efficacy → eHealth literacy	0.124	0.027	0.073 to 0.180
	Perceived social support → Family health → eHealth literacy	0.148	0.018	0.114 to 0.186
	Perceived social support → Self-efficacy → Perceived stress → Family health → eHealth literacy	0.008	0.002	0.004 to 0.013

our findings. We hypothesize this inconsistency may stem from the degree of reliance nursing students place on social support. Within nursing education, various factors such as extensive knowledge acquisition, skill training, clinical internship requirements, stringent assessment and evaluation criteria [40], as well as encountering challenges like managing emergencies during clinical internships [41], may prompt them to seek more social support for coping and adaptation to gain a sense of security and confidence [42]. While social support can offer valuable resources and assistance, an overreliance on others' support may diminish individual autonomy and self-learning capabilities [43], which can reduce their motivation to actively engage in health-related tasks and subsequently affect the cultivation of their eHealth literacy. Hence, we emphasize the significance of fostering students' autonomy and problem-solving abilities in nursing education to mitigate excessive reliance on external support. Future research should delve deeper into the potential mechanisms and boundary conditions of this relationship, furnishing insights for tailored interventions and educational strategies aimed at enhancing eHealth literacy across nursing students.

Our findings indicated that perceived social support positively affected eHealth literacy through the mediating role of self-efficacy, thereby supporting the H2 hypothesis. This finding was consistent with Bandura's Social Cognitive Theory, which suggested that self-efficacy is crucial to individuals' motivation, behavior, and achievement [11]. Perceived social support serves as an important psychosocial resource that individuals may use to deal with challenges and adversities across various life domains [44]. Previous research has shown that social support fosters individuals' self-efficacy [45]. Nursing students who perceive higher perceived social support may develop stronger beliefs in their ability to effectively navigate and utilize electronic health resources. Individuals with strong self-efficacy are more inclined to actively seek and utilize digital health information, overcome technological barriers, and critically evaluate the credibility and relevance of online health resources [46], which can contribute to their eHealth literacy. Our study underscores the significant roles of perceived social support and self-efficacy in promoting individuals' eHealth literacy, contributing to a better

understanding of the psychosocial factors shaping individuals' engagement with digital health resources.

Our study revealed that perceived social support among nursing students positively affected eHealth literacy through the mediating role of family health. Thus, the H3 hypothesis was supported. Meanwhile, consistent with the Family Systems Theory [25], individual behavior can be influenced by family circumstances. Previous research has also demonstrated that social support can positively predict family functioning, enabling families to cope with dysfunction and promote family health [22]. Parents have an important role in fostering healthy lifestyles, and a health-promoting family environment encourages individuals to make healthier choices [47]. Therefore, a supportive and health-conscious family environment may facilitate open discussions about health issues and encourage the effective use of digital health tools for health management [15, 16]. By recognizing the impact of family-level factors on eHealth literacy, healthcare practitioners and policymakers can devise interventions and educational programs targeted at the family level to promote eHealth literacy, empowering individuals to take an active role in managing their health.

This study discovered that perceived social support could indirectly affect the eHealth literacy of nursing students in China through a chain mediation effect of self-efficacy, perceived stress, and family health, thereby supporting the H4 hypothesis. Furthermore, the findings offer empirical evidence for Social Cognitive Theory [11], which emphasizes the role of both individual and environmental factors in shaping behavior. Meanwhile, this finding also aligns with the stress-buffering model [28], which suggests that social support increases individual feelings of security and confidence in coping with stress. Previous studies indicated that perceived social support enhances individuals' self-efficacy, with higher perceived social support may exhibit greater self-efficacy [45, 48]. Nursing students with high self-efficacy are often more confident and optimistic, better equipped to handle challenges and stress, thus potentially experiencing lower perceived stress [49]. When they perceive lower stress, they may demonstrate more positive changes conducive to family health, such as improved mental health, enhanced emotional support, healthier lifestyles, and improved communication, fostering a relaxed and enjoyable family atmosphere [29, 50, 51]. Higher levels of family health may suggest a supportive family environment, potentially increasing their access to health-related resources and aiding in the cultivation of eHealth literacy [15]. This study suggested the importance of comprehensive interventions in nursing education and practice that target not only nursing students' capacities but also broader social and family environments to promote optimal development in eHealth literacy.

The findings indicated that perceived social support had a direct negative effect on eHealth literacy. However, its total effect remains positive through mediating mechanisms, highlighting the complexity of the relationship between perceived social support and eHealth literacy. This relationship may also be affected by other factors or pathways. For instance, personality traits and cultural backgrounds can affect how nursing students perceive and utilize social support [52]. Additionally, environmental factors such as the accessibility of eHealth resources and the quality of digital health information may impact the association between social support and eHealth literacy [53]. These findings underscore the need for targeted interventions to optimize the positive effect of perceived social support on eHealth literacy while mitigating potential drawbacks. Future research should explore the mechanisms that connect social support to eHealth literacy, aiming to develop targeted strategies for effectively promoting eHealth literacy among nursing students.

This study had several limitations. First, while our sample consisted of 967 nursing students from various regions and diverse educational backgrounds, the extent to which our findings can be generalized may still be restricted. To enhance external validity, future studies should aim to incorporate participants from a broader range of geographic and cultural backgrounds. Second, given the cross-sectional design of this study, establishing causality among the variables is not possible. Longitudinal designs in future research could provide a more thorough exploration of the causal relationships involved. Third, the reliance on self-reported data raises concerns about potential social desirability and recall biases. Future studies should utilize objective measurement instruments to confirm the accuracy of self-reported information.

Conclusion

This study explored the relationship between perceived social support and eHealth literacy in Chinese nursing students, demonstrating the positive effect of perceived social support on eHealth literacy through a mediating role of self-efficacy, perceived stress, and family health. It underscored the interconnection of individual and environmental factors in cultivating health behaviors, highlighting the importance of a holistic approach in nursing education and practice. The findings suggest that nursing education programs should focus on supporting social support systems and fostering a healthy family environment to enhance nursing students' eHealth literacy. It provides valuable insights into the mechanisms through which perceived social support impacts eHealth literacy,

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offering practical strategies for developing well-rounded, competent nursing professionals, ultimately contributing to their professional development and the quality of healthcare services they provide.

Data availability
The data in this study can be obtained from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
According to the Declaration of Helsinki, this study received ethical approval from the Ethics Review Committee of Shandong Provincial Hospital (No. 2023–198). All participants provided informed consent.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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