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ORIGINAL ARTICLE

The relationship between health literacy and general well-being: mediating roles of importance of health and self-awareness and moderating role of health status in Turkish adults

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ABSTRACT

Objective: While health literacy is known to impact general well-being positively, the underlying mechanisms of this relationship are not fully understood. The current study examined the associations between health literacy and general well-being in adults, focusing on the mediating roles of the perceived importance of health and self-awareness behaviours and the moderating influence of health status.

Method: This study collected data via an online survey from a total of 2,101 Turkish-speaking adults, 1,482 females (70.5%) and 619 males (29.95%), aged between 17 and 60, with a mean age of 25.58 (SD = 9.66). Data collection was conducted during January and February 2023. Participants completed self-reported measures assessing health literacy, the importance of health, self-awareness, well-being, and health status.

Results: Mediation analysis indicated that health literacy is linked to general well-being through the importance of health [effect = 0.13, 95% [0.05, 0.11]) and self-awareness [effect = 0.06, 95% [0.05, 0.11]). Moderation analysis revealed a significant moderating effect of health status on the relationship between self-awareness and general well-being, with a significant relationship only evident among those reporting good health (B = 0.051, $p < 0.05$).

Conclusions: Enhancing health literacy is essential for improving general well-being by promoting individuals' understanding of health and fostering self-awareness. Understanding how health literacy and changes in health status impact well-being can inform the development of targeted interventions aimed at promoting both well-being and health outcomes.

KEY POINTS

What is already known about this topic:

(1) There is a relationship between health literacy and positive health outcomes, often attributed to the adoption of health-promoting behaviours.
(2) Previous studies have indicated that health literacy contributes significantly to an individual's health and well-being.
(3) Health literacy has been linked to better health awareness and the perceived importance of health, which play important roles in promoting healthier lifestyles.

What this topic adds:

(1) This study revealed that health literacy is indirectly related to general well-being through mediating roles of the perceived importance of health and self-awareness behaviours.
(2) The findings highlight that self-awareness positively relates to general well-being primarily among individuals with good health status.
(3) Enhancing health literacy levels can be a strategic approach to improving general well-being by promoting an understanding of health importance and fostering self-awareness.

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KEYWORDS
Health literacy; importance of health; self-awareness; well-being; health status; Turkish adults

Introduction

The association between health literacy, health perception, and overall well-being has been a growing area of research in the past decade, providing useful evidence for health promotion and disease prevention (Berkman et al., 2011; Sørensen et al., 2012). Health

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literacy, which refers to the ability to acquire, understand, and use basic health information, has been found to play a crucial role in empowering individuals regarding their health (von Conrady & Bonney, 2017). However, research emphasised that solely obtaining health knowledge is not sufficient to understand health behaviours and their consequences. Indeed, Klein Velderman et al. (2010) highlighted the importance of one's perceptions of health – encompassing thoughts, feelings, and expectations – often influencing the effect of health literacy on overall well-being. Understanding how individuals interpret their health status can provide useful evidence about how health literacy translates into actual well-being outcomes (Berete et al., 2024). This suggests that not just the objective knowledge of health, but also the subjective perceptions and cognitive processes, play a significant role in understanding one's well-being. Therefore, exploring the associations between health literacy, health perceptions, health status, and well-being is important for developing more effective health interventions. While these variables have been examined independently in previous studies, examining all these variables simultaneously in the current study, especially by investigating the mediating role of health perception (specifically through the importance of health and self-awareness) and the moderating role of health status is a crucial step towards advancing our understanding in this field.

Health literacy

Health literacy has been increasingly recognised as a critical factor in determining health outcomes and the quality of healthcare (Berkman et al., 2011). This concept involves a person's skill in finding, understanding, and using healthcare information effectively in different healthcare settings (von Conrady & Bonney, 2017). The World Health Organization broadens this definition to include the cognitive and social skills which motivate and enable individuals to access, understand, and use information for maintaining good health.

Extensive research indicated that health literacy is a more accurate predictor of health status than traditional indicators like education, employment, socioeconomic status, race, or gender (von Conrady & Bonney, 2017). Studies have found that lower levels of health literacy are associated with poorer health outcomes (DeWalt et al., 2004). For instance, inadequate health literacy can lead to increased hospitalisation rates, underutilisation of healthcare services, issues with medication intake, and higher mortality rates (Berkman et al., 2011). However, possessing high levels of health literacy does not automatically translate to wise health-related decision-making. Individuals with high literacy levels might still struggle to apply their knowledge effectively in areas outside their expertise (Nutbeam, 2009; von Conrady & Bonney, 2017).

Health perception

Health perception has been described as a subjective notion, influenced by personal beliefs, attitudes, as well as social and temporal comparisons; indeed, this evaluation is actively shaped by an individual's behaviours and lifestyle, rather than being characterised as a passive reflection (De Mateo-Silleras et al., 2019). Health perception involves self-awareness recognising how personal health behaviours, like exercising and eating right, impact overall health, while the importance of health refers to how much individuals value their health and regularly think about it (Diamond et al., 2007). Positive health perception has been found to endure, despite objective ratings of health deteriorating (Henchoz et al., 2008). This finding is crucial when accounting for treatment adherence, as it reveals that subjective health perception could play a pivotal role as an intermediary between health knowledge and treatment action. In other words, it can be argued that health perception connects the knowledge acquired from health literacy with behavioural practices that enhance an individual's well-being, overall appraisal of life satisfaction, happiness, and psychological functioning (Sonnentag, 2015).

In this study, we conceptualise health as both a cognitive and experiential construct, recognising that the interrelation between health knowledge and health perception provides a personalised understanding of health. Perceptions of health focus on an individual's feelings, thoughts, preconceptions, and expectations concerning their well-being, transcending objective health status. Indeed, this construct integrates objective health indicators with a range of individual attitudes, beliefs, and expectations, thus being of great importance for healthcare professionals who aim to provide tailored interventions and support patients along their path towards optimum health. Health perception is therefore an essential factor influencing attitudes towards health and the sense of responsibility towards one's health (Nielsen et al., 2004). This suggests that health perception influences health promotion, affecting both the

adoption and maintenance of health-promoting behaviours and overall well-being.

Health literacy and well-being

Previous studies have established a link between health literacy and health perception, suggesting that how individuals understand and interpret their health can significantly influence their health behaviours and overall well-being (Deniz et al., 2018; Tugut et al., 2021). More specifically, Zhang et al. (2021) have shown that various aspects of health literacy have both direct and indirect impacts on well-being and mental health; particularly, the ability to utilise health information has been found to play a significant role in this association. In a similar vein, the direct influence of health literacy on overall well-being supports Abdullah and Zakar's (2020) finding that health literacy is a key factor in enhancing well-being. These results corroborate Bjørnsen et al. (2019) findings, linking mental health literacy with the psychological well-being of young people, highlighting the significance of literacy on well-being.

It is important to note that scholars have explored individual differences in levels of health literacy, which have indeed been found to vary significantly across countries and demographics. Studies conducted in Europe revealed that almost half of the participants had low levels of health literacy, with substantial variations observed between countries. For instance, in Turkey, a significant portion of the population has been found to have lower levels of health literacy compared to European countries (Durusu-Tanrıöver et al., 2014). These disparities in health literacy were found to be associated with various demographic factors, including lower age, educational level, socioeconomic status, and ethnic background, with ethnic minorities often experiencing lower levels of health literacy (Blom et al., 2018; Durusu-Tanrıöver et al., 2014). Overall, health literacy was identified as a vital component of effective healthcare and personal well-being, influenced by a variety of demographic and cultural factors. It has been argued that improving health literacy through education and targeted interventions is crucial for increased health outcomes and informed decision-making in healthcare (Nutbeam, 2009).

Mediating role of health perception

We propose that health perception serves as a mediator between health literacy and self-rated well-being, thereby bridging the gap between knowledge and its internal and external manifestations of health. By exploring how individual health perceptions may mediate the connection between the understanding of health information and the general sense of well-being, this research strives to pave the way to the development of health promotion policies and interventions that consider the intricate layers of knowledge and its subsequent adherence behaviours.

Recent studies highlight the key factors that contribute to health promotion, particularly the associations between health literacy, health perception, and overall well-being. Health literacy, in particular, has been found to enhance individuals' ability to make informed health-related decisions, which subsequently has a positive impact on their well-being (Abdullah & Zakar, 2020; Amoah, 2018; Bjørnsen et al., 2019; Deniz et al., 2018; Tugut et al., 2021; Zhang et al., 2021).

However, few empirical studies have focused on health literacy as a mediator and moderator of health (Pelikan et al., 2018). Therefore, a recent line of research has emphasised the importance of exploring moderators within this relationship. More specifically, health literacy was found to moderate the effect of keeping a healthy physical activity routine and perceived good health, especially amongst those with lower health literacy (He et al., 2021). This was explained by the idea that individuals with adequate health literacy are more likely to use other indicators of good health rather than solely relying on exercising, except in situations where a negative health event could trigger the adoption of healthy behaviours, irrespective of the level of health literacy.

Another more recent study explored the moderating role of health literacy on the relationship between health anxiety and emotion regulation. Findings revealed a negative moderation effect implying that more accurate health literacy was related to a decrease in the strength of the relationship between health anxiety and one's ability to regulate their emotions, thus their ability to take action with regards to their health (Fang & Mushtaque, 2024).

Moderating role of health status

Health status is important to determine how individuals process health-related information and engage in healthy behaviours. Studies have shown that individuals with varying health statuses may respond differently to health literacy behaviours, with those in poorer health potentially requiring more tailored interventions to achieve similar levels of well-being (Berkman et al., 2011; Nutbeam, 2008). Additionally, the perceived importance of health and self-

awareness behaviours may be influenced by one's current health condition, impacting the relationship between health literacy and well-being (Kickbusch, 2001). Given these factors, it would be useful to examine health status as a moderator to understand its influence on these relationships better.

The present study

Understanding the associations between health literacy and general well-being is important for developing effective health interventions. In Turkey, where the population exhibits varying levels of health literacy (Durusu-Tanrıöver et al., 2014), examining these relationships can provide useful scientific evidence in the extant literature. Health literacy levels in Turkey are relatively lower compared to European countries (Durusu-Tanrıöver et al., 2014), which may impact the overall health outcomes and well-being of the population. To address this critical gap in the literature, it is important to examine the mediating effects of the perceived importance of health and self-awareness behaviours, as well as the moderating role of health status, specifically among Turkish adults. The findings can inform culturally and contextually relevant health policies and programs tailored to improve health literacy and well-being within the Turkish population. This focus on the Turkish context is essential as it highlights specific health challenges and opportunities unique to this geographical area, thereby enhancing the practical applicability and relevance of the research.

The current study aims to examine the mediating roles of the importance of health and self-awareness and the moderating role of health status in the association between health literacy and general well-being. Accordingly, the four below hypotheses are explored.

Hypothesis 1: Health literacy is positively associated with the importance of health, self-awareness, and general well-being.

Hypothesis 2: The importance of health and self-awareness are positively related to general well-being.

Hypothesis 3: The importance of health and self-awareness mediate the link between health literacy and general well-being in adults.

Hypothesis 4: Health status moderates the association between health literacy, the importance of health, self-awareness and general well-being.

Materials and methods

Study design

This study employed a cross-sectional survey design to investigate the relationships between health literacy, general well-being, perceived importance of health, self-awareness behaviours, and health status among Turkish adults. Data collection was facilitated through an online survey hosted on Google Forms, which enabled the efficient distribution of the survey and collection of responses. The use of the online platform allowed access to a broad and diverse participant pool, thereby enhancing the representativeness of the sample. The study received approval from the Agri Ibrahim Cecen University Ethics Committee (Decision No. 284).

Participants

The study included 2,101 participants, 1,482 female (70.5%) and 619 male (29.5%), ranging in age from 17 to 60, with a mean age of 25.58 (standard deviation = 9.66). Regarding educational level, 146 participants (6.9%) had not completed high school, 438 (20.8%) had completed high school, 1413 (67.3%) had an undergraduate university education, and 104 (5%) held postgraduate university degrees.

Measures

Demographic information

Participants were asked to report demographic information, including age, gender (male or female), and education level (did not complete high school, completed high school, undergraduate degree, or postgraduate degree).

Health status

Health status was assessed with a single question: "How would you rate your health in general?" Participants provided their self-rated health on a 5-point Likert scale, ranging from "poor" (1) to "excellent" (5). The health status variable, which was converted into a binary variable, was used as a moderator variable in our current model.

The Short-Form Health Literacy Questionnaire

The Short-Form Health Literacy Questionnaire (HLS-SF12), developed by Duong et al. (2019) and validated in Turkish by Yilmaz and Eskici (2021), was used to assess health literacy. The HLS-SF12 includes 12 self-report items rating the perceived difficulty of

each item based on four-point Likert scales ranging from 1 (very difficult) to 4 (very easy). The mean score is calculated to evaluate health literacy by dividing the total score by the number of items. The formula Index = (mean-1) × 50/3 is then applied, with a higher index score indicating superior health literacy. Sample items include "Accessing information about the treatment of diseases that concern you", "Understanding medicine prescriptions", and "To be able to evaluate the advantages and disadvantages of different treatment options related to your diseases". Yilmaz and Eskici (2021) demonstrated good evidence of reliability and validity for the HLS-SF12 within Turkish culture. Cronbach's alpha for the scale in this study was 0.81.

The Perception of Health Scale

The Perception of Health Scale (PHS) was originally devised by Diamond et al. (2007) and translated into Turkish by Kadioglu and Yildiz (2012). The PHS comprises 15 items assessing individuals' beliefs, attitudes, and perceptions influencing their health status. Each item is rated on a Likert-type scale ranging between 1 (strongly disagree) and 5 (strongly agree) across four subscales: control centre (5 items), precision (4 items), the importance of health (3 items), and self-awareness (3 items). Higher scores on the PHS refer to greater levels of importance of health. The total scores for the entire scale range from 15 to 75. In the current study, the sub-factors self-awareness and the importance of health are used. Example items for the importance of health are "I think about my health a lot" and "Whether I am healthy or not depends on me". Kadioglu and Yildiz (2012) established strong psychometric properties for the PHS within Turkish culture. In this study, Cronbach's alpha values were 0.68 for self-awareness and 0.76 for the importance of health.

The Scales of General Well-being

The Scales of General Well-being (SGWB) was originally developed by Longo et al. (2017, 2018) and adapted into Turkish by Odaci et al. (2021). The SGWB comprises a single factor with 14 items rated on a five-point Likert-type scale. Responses are rated on a scale from 1 (not true at all) to 5 (always true). Higher scores on the scale indicate elevated levels of overall well-being. Sample items include "I feel happy" and "I give my full attention to what I do in my activities". Odaci et al. (2021) conducted a reliability and validity study for the SGWB, providing satisfactory evidence of its usefulness. Cronbach's alpha for the scale in this study was 0.89.

Procedure

Participants were recruited through social media and snowball sampling to efficiently access a broader and potentially more representative group of participants through existing connections and referrals, with the survey link distributed across various social networking sites. Before participating, participants were required to provide informed consent, which was presented on the first page of the online survey. Participants who answered "yes" to the consent questions were permitted to continue, while those who did not provide consent were unable to proceed with the survey. They were assured that their identities would remain confidential and that their responses would not be shared with authorities. Participation was voluntary and anonymous, with participants free to withdraw from the study at any time. All participants were instructed that the order of measures would be consistent for everyone involved. The data were collected between January and February 2023.

The inclusion criteria were individuals who were Turkish-speaking, aged 18 years or older and had access to the Internet. Participants who did not meet the stated inclusion criteria were consequently excluded from participating in the study.

Statistical analysis

As all questions in the online survey were mandatory, no data was missing. Before testing the measurement and structural model, descriptive statistics, internal consistency reliability, and correlation analysis were conducted to understand the characteristics of the data. The confirmatory factor analysis, conducted through AMOS software version 25, was used to test the measurement model to confirm the validity of the constructs used in the analysis. The model comprised the constructs of health literacy, importance of health, self-awareness, and general well-being, with each construct represented by its respective items. In evaluating its goodness of fit, we presented the relative chi-square (CMIN/DF), traditional chi-square, and degrees of freedom values. While the chi-square value can be sensitive to sample size, often yielding significant results in large samples, we included it as part of standard practice. It was reported alongside other statistics to better assess the model fit. We considered a set of fit indices, including the goodness of fit index (GFI), comparative fit index (CFI), non-normed fit index (NNFI), incremental fit index (IFI), Tucker – Lewis index (TLI), adjusted goodness of fit index (AGFI), root mean square error of approximation (RMSEA),

and standardised root mean square residual (SRMR). An acceptable fit is denoted by a CMIN/DF below 5 and values of at least .90 for GFI, CFI, NNFI, IFI, TLI, and AGFI, while RMSEA and SRMR should be less than .08 (Hu & Bentler, 1999).

Structural Equation Modelling (SEM) was performed to test the proposed research model. SEM is an ideal approach for this research as it permits simultaneous relationships between the variables and also enables an analysis of the mediation model by assessing indirect effects. Using SEM, a structural model was conducted to examine how health literacy influenced general well-being through the importance of health and self-awareness. In this model, age, education level and health status were treated as covariates. For the moderation analysis, the 5-point Likert item assessing health status was recoded into two categories – poor and good – by grouping the original scale values into these two categories. Specifically, responses rated as 1 (poor) and 2 (fair) were combined into the "poor" category, while responses rated as 3 (good), 4 (very good), and 5 (excellent) were combined into the "good" category. This recoding was done to simplify the analysis and focus on the broader distinction between lower and higher health status. This binary health status variable was used as a moderator in the model to determine if there is a significant difference in the relationship between self-awareness and well-being across different health status categories. Model 15 in the PROCESS Macro plug-in facilitated the execution of this analysis. The collected data was analysed using SPSS for Windows version 29, while AMOS version 29 for Windows was utilised to test the measurement model.

Results

Descriptive statistics and correlations

Descriptive statistics, including means, standard deviations, Cronbach's alpha for each scale, and correlation coefficients, are reported in Table 1. The findings of Pearson correlations showed that higher health literacy is significantly associated with greater importance of health ($r = 0.47$, $p < 0.01$), increased self-awareness ($r = 0.43$, $p < 0.01$), enhanced general well-being ($r = 0.52$, $p < 0.01$), and better perceived health status ($r = 0.23$, $p < 0.01$). Furthermore, higher importance of health was significantly linked to greater self-awareness ($r = 0.55$, $p < 0.01$), improved general well-being ($r = 0.61$, $p < 0.01$), and better health status ($r = 0.29$, $p < 0.01$). Greater self-awareness was also significantly connected to enhanced general well-being ($r = 0.42$, $p < 0.01$) and better perceived health status ($r = 0.31$, $p < 0.01$). Additionally, individuals with higher general well-being tended to report better health status ($r = 0.25$, $p < 0.01$). Age was found to be associated with higher general well-being ($r = 0.08$, $p < 0.01$) and better health status ($r = 0.11$, $p < 0.01$). Although education was negatively correlated with age ($r = -0.30$, $p < 0.01$), it did not show significant associations with the other variables.

Measurement model

Confirmatory factor analysis was conducted to examine the measurement model. The results of this analysis produced good data model fit statistics (CMIN/DF = 3.74, $p < .001$, TLI = .95, CFI = .96, IFI = 0.96, NFI = 0.95, GFI = 0.97, AGFI = 0.96, SRMR = 0.03, RMSEA = 0.04). The results of this analysis are presented in Table 2.

Mediation model

The results of the mediation analysis are reported in Table 3 and Figure 1. According to the findings, health literacy, the importance of health, and self-awareness together explained 36% of the variance in general well-being. Additionally, health literacy accounted for 25% of the variance in self-awareness and 21% of the variance in the importance of health. Regarding the

Table 1. Correlations, reliabilities, means, and standard deviations for the study variables ($N = 2,101$).

Variables	1.	2.	3.	4.	5.	6.	7.
1. Health Literacy	—						
2. Importance of health	0.47**	—					
3. Self-awareness	0.43**	0.55**	—				
4. General well-being	0.52**	0.61**	0.42**	—			
5. Age	0.03	0.02	−0.02	0.08**	—		
6. Education	0.03	0.02	0.03	−0.05*	−0.30**	—	
7. Health status (1–5)	0.23**	0.29**	0.31**	0.25**	0.11**	0.10**	—
Cronbach's Alpha	0.81	0.76	0.68	0.89			
Mean	2.09	3.04	3.46	2.47	25.58	3.67	3.04
SD	0.34	0.59	0.80	0.48	9.66	0.78	0.87

Note. *$p < 0.05$; **$p < 0.01$; Health status was measured on a scale from 1 to 5, with 1 indicating poor health and 5 indicating excellent health; SD = standard deviation.

Table 2. Measurement model and SEM path analysis values ($N = 2,101$).

Statistic	Measurement values	Path values	Recommended cut-off criteria
CMIN/DF	3.74	4.34	<5
CFI	0.96	0.94	>0.90
SRMR	0.03	0.04	<0.08
RMSEA	0.04	0.04	<0.08
NFI	0.95	0.93	>0.90
GFI	0.97	0.96	>0.90
IFI	0.96	0.94	>0.90
AGFI	0.96	0.94	>0.90
TLI	0.95	0.93	>0.90

Table 3. Direct, total and indirect SEM analyses ($N = 2,101$).

Direct Paths			Beta	S.E.	C.R.	*p*
Health literacy	–>	Self-awareness	0.38	0.06	12.78	<.001
Health literacy	–>	Importance of health	0.37	0.06	11.89	<.001
Health status (1–5)	–>	Importance of health	0.21	0.02	8.52	<.001
Health status (1–5)	–>	Self-awareness	0.24	0.02	10.47	<.001
Importance of health	–>	General well-being	0.35	0.02	11.21	<.001
Self-awareness	–>	General well-being	0.15	0.02	5.14	<.001
Health literacy	–>	General well-being	0.24	0.04	7.62	<.001
Health status (1–5)	–>	General well-being	0.06	0.01	2.74	<.01
Education (1:Low, 5:High)	–>	General well-being	−0.06	0.01	−2.77	<.01
Age	–>	General well-being	0.08	0.00	3.55	<.001
Total effect	Beta	Lower	Upper	S.E.	*p*	
Health Literacy –> General well-being	0.43	0.38	0.48	0.026	0.001	<.001
Indirect effects						
Health literacy –> General well-being	0.18	0.15	0.23	0.02	0.001	<.001
Health literacy –> Importance of health –> General well-being	0.13	0.05	0.11	0.01	0.001	<.001
Health literacy –> Self-awareness –> General well-being	0.06	0.05	0.11	0.02	0.001	<.001

Note. All models explained 36% of the variance in general well-being.
Health status was measured on a scale from 1 to 5, with 1 indicating poor health and 5 indicating excellent health.

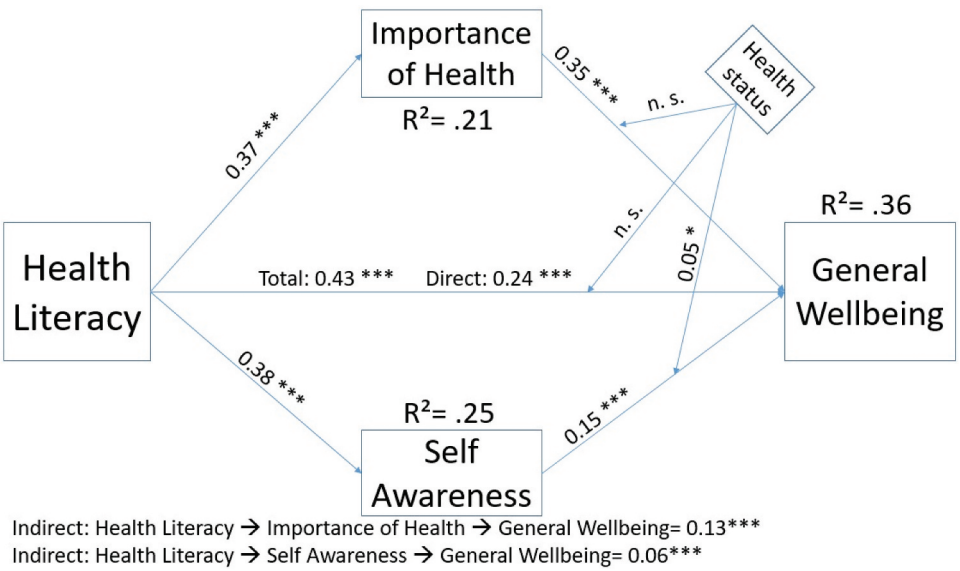


Figure 1. Illustration of the outcomes of the proposed research model, with the values on the figure representing standardised coefficient values.

pathways, the findings showed that health literacy was a significant predictor of self-awareness (β=.38, $p < .001$), importance of health (β=.37, $p < .001$) and general well-being (β=.24, $p < .001$). Importance of health (β=.35, $p < .001$) and self-awareness (β=.15, $p < .001$) significantly predicted general well-being. Furthermore, health status significantly predicted self-awareness (β=.24, $p < .001$), importance of health (β=.21, $p < .001$) and general well-being (β=.06, $p < .001$). Additionally, education level (β=-.06, $p < .001$)

and age (β=.08, $p < .001$) significantly predicted general well-being. In terms of indirect effects, the results showed that the path from health literacy to general well-being through the mediators was statistically significant [effect = 0.18, 95% [0.15, 0.23], $p < 0.001$). According to the results of the mediation analysis, significant indirect effects were identified in the association between health literacy and general well-being through the factors of the importance of health [effect = 0.13, 95% [0.05, 0.11], $p < 0.001$) and self-awareness [effect = 0.06, 95% [0.05, 0.11], $p < 0.001$).

Moderation model

The findings of the moderation model revealed a significant moderating effect of health status only on the relationship between self-awareness and general well-being (β = 0.051, $p < 0.05$; see Figure 1). No statistically significant moderation effects were observed in other relationships. The association between self-awareness and general well-being was positive among those with good health status, contrasting with those with poor health status (see Figure 2). The results of the simple slope analysis indicated that the relationship between self-awareness and general well-being was statistically significant at the level of good health status (β = 0.049, $p < .01$). However, this relationship was not significant at the level of poor health status (β = 0.002, $p > .05$).

Discussion

This study builds on the literature and aims at further elucidating the relationship between these variables, using the SEM focusing on investigating the mediating role of health perceptions in the association between health literacy and general well-being. The SEM analysis provided a robust statistical model for exploring both direct and indirect paths, adding to the empirical evidence corroborating the theoretical framework established by prior research.

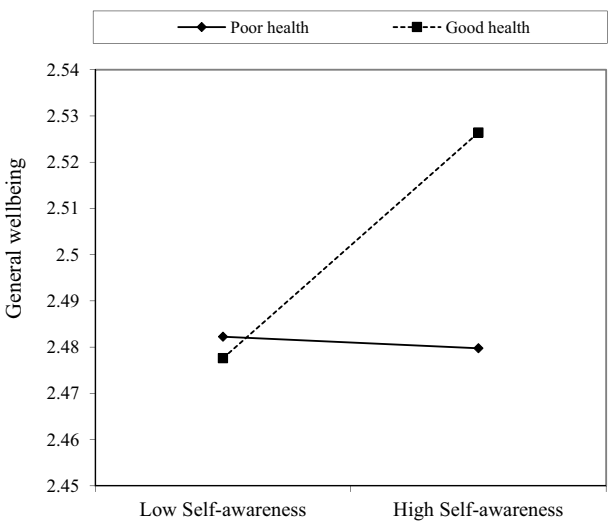


Figure 2. Moderation role of health status between self-awareness and general well-being.

Our findings were consistent with the literature (Deniz et al., 2018; Tugut et al., 2021), supporting the proposed relationships between health literacy, health perception and overall well-being. The SEM analysis reveals robust, significant direct connections between health literacy and health perception. This further strengthens the idea that individuals' comprehension of health information is directly linked to their perception of their well-being. Furthermore, the direct impact of health perception on overall well-being is consistent with Amoah (2018), emphasising the positive associations between health literacy, health and well-being.

In addition, the SEM model highlighted significant indirect effects of health literacy on general well-being through health perception. This is in line with Zhang et al. (2021) who showed that the impact of health literacy on health outcomes was found to be mediated by health behaviours, which are closely linked to health perception. This further suggests that health literacy not only directly impacts well-being, but also indirectly influences it by shaping individuals' perceptions and health behaviours. It can therefore be argued that the mediating role of health perception reflects the wider implications discussed by Bjørnsen et al. (2019), focusing on the significance of mental health literacy in promoting mental well-being. In sum, these findings strengthen the need to design interventions that promote health literacy, thereby improving health perceptions, general well-being, and mental health literacy. Indeed, Tohme et al. (2024) found that health literacy had a predictive role on mental health literacy; therefore, future research could explore whether interventions promoting health literacy could not only improve well-being but also mental health literacy.

The last aim of this study was to explore the moderating role of health status. The finding showed that health status played a significant moderating role in the relationship between self-awareness and general well-being. Specifically, individuals with good health status experience a positive relationship between their self-awareness and overall well-being, meaning that being more self-aware contributes to greater well-being for these individuals. In contrast, for individuals with poor health status, this positive effect is diminished or may not exist. The interpretation can be linked to the idea that individuals in better health are more

likely to benefit from self-awareness because they may have the capacity and resources to act on their self-reflection, make healthier choices, or cope with challenges effectively. On the other hand, those in poorer health may find that their self-awareness could exacerbate feelings of distress, as they may become more aware of their limitations or the severity of their health issues, negatively impacting their well-being. This argument aligns with Fang and Mushtaque's (2024) findings, which suggest that individuals who feel they have more control over their health outcomes are less likely to experience anxiety about their health and are better equipped to manage it. However, this relationship may be less relevant for those with poor health status, as greater self-awareness in such cases might not improve their well-being. Contrarily, individuals perceiving themselves as having health difficulties tend to be more likely to feel anxious about their health, and, as a way to defend against the anxiety, could deny or be less attuned to their health demands.

Practical implications of the findings

The findings from this study have significant implications for both research and clinical practice in the context of health literacy and general well-being. First, the mediation analysis indicated that improving health literacy can enhance general well-being by contributing to the perceived importance of health and fostering self-awareness behaviours. Health education programs should therefore prioritise these aspects, emphasising not only the dissemination of health information but also encouraging individuals to recognise the importance of health and engage in self-reflective practices. Second, the moderating effect of health status suggests that interventions might need to be tailored based on individuals' health conditions. For those with good health, interventions focusing on enhancing self-awareness might significantly improve well-being. This tailored approach ensures that resources are allocated efficiently and that interventions are more likely to be effective. Finally, healthcare providers can use this evidence to enhance patient care. By assessing patients' health literacy levels and promoting self-awareness, clinicians can provide more personalised and effective care plans. For patients in good health, reinforcing the importance of self-awareness behaviours can help maintain and improve their well-being.

Limitations and recommendations for future studies

Despite the uniqueness of this study, it is not without its limitations. First, data collection relied solely on self-report questionnaires, more prone to influences of mood and other biases. Future research could make use of qualitative tools, such as interviews, which may provide a more in-depth understanding of individuals' subjective perceptions of health, as well as their use of various tools to gain health knowledge. Future studies could enhance our understanding of health perceptions and health literacy by exploring a wider variety of populations and settings, thereby providing a broader perspective on these concepts. Second, the use of a snowball sampling strategy in our study may limit the generalisability of the findings because this method relies on participants referring to others they know, which can result in a sample that is not fully representative of the broader population. Third, the sample demographics were not fully comprehensive. Although we collected basic demographic information, additional details about social determinants of health, such as access to healthcare, could have provided a better understanding of the findings. The sample was predominantly female and largely university-educated, which likely influenced the levels of health literacy observed. This demographic skew limits the generalisability of the results to the broader population, including males and individuals with lower levels of education. Fourth, the age range of the sample, which primarily consisted of younger adults, may have impacted the results related to health and health literacy. Older adults, who may have different health experiences and literacy levels, were underrepresented in this study. Furthermore, this study was cross-sectional thus limiting the determination of causality and exploring changes over time. Longitudinal studies are essential to gain a more comprehensive understanding of these relationships across different demographic groups, involving diverse populations from different socioeconomic, cultural, and age backgrounds.

In light of the growing awareness regarding mental health difficulties, it is essential to investigate the role of health literacy within the broader context of well-being. Moreover, the increased reliance on digital information as a trusted source of knowledge merits further exploration within the context of health and mental health literacy (Tohme et al., 2024). These questions might indeed inform policy-oriented research to construct effective health and mental health promotion campaigns. Economic analyses investigating the effects of health literacy on healthcare use and

well-being may offer valuable insights into the cost-effectiveness of interventions aimed at enhancing health literacy, and ultimately health-promoting behaviours.

Conclusions

In conclusion, this study suggests that health literacy is indirectly associated with well-being through the mediating roles of the perceived importance of health and self-awareness. Additionally, our findings support the moderating role of health status in the relationship between self-awareness and well-being. Promoting health literacy is important for enhancing overall well-being by increasing the importance of health and self-awareness, especially among individuals in good health. These findings provide a foundation for developing intervention programs aimed at improving health literacy and well-being.

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Data availability statement

The data supporting this study's findings are available from the corresponding author upon reasonable request.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 helsinki Declaration and its later amendments or comparable ethical standards. The study protocol was reviewed and approved by the Agri Ibrahim Cecen University Ethics Committee (Decision No. 284).

Informed consent

Consent was obtained from all participants included in the study.

References

Abdullah, M., & Zakar, P. D. R. (2020). Health literacy in South Asia: Clarifying the connections between health literacy and well-being in Pakistan. *South Asian Studies*, *34*(2), 569–582.

Amoah, P. A. (2018). Social participation, health literacy, and health and well-being: A cross-sectional study in Ghana. *SSM-Population Health*, *4*, 263–270. https://doi.org/10.1016/j.ssmph.2018.02.005

Berete, F., Gisle, L., Demarest, S., Charafeddine, R., Bruyère, O., Van den Broucke, S., & Van der Heyden, J. (2024). Does health literacy mediate the relationship between socio-economic status and health related outcomes in the Belgian adult population? *BMC Public Health*, *24*(1), 1182. https://doi.org/10.1186/s12889-024-18676-7

Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine*, *155*(2), 97–107. https://doi.org/10.7326/0003-4819-155-2-201107190-00005

Bjørnsen, H. N., Espnes, G. A., Eilertsen, M. E. B., Ringdal, R., & Moksnes, U. K. (2019). The relationship between positive mental health literacy and mental well-being among adolescents: Implications for school health services. *The Journal of School Nursing*, *35*(2), 107–116. https://doi.org/10.1177/1059840517732125

Blom, I. M., Cohen, E. S., Eshuis, L. V., Woudstra, A. J., Snijder, M. B., Kunst, A. E., & Fransen, M. P. (2018). Ethnic differences in health literacy among young adults in Amsterdam. *HLRP: Health Literacy Research and Practice*, *2*(4), e192–e204. https://doi.org/10.3928/24748307-20180926-01

De Mateo-Silleras, B., Camina-Martín, M. A., Cartujo-Redondo, A., Carreño-Enciso, L., de la-Cruz-Marcos, S., & Redondo-Del-Río, P. (2019). Health perception according to the lifestyle of university students. *Journal of Community Health*, *44*, 74–80. https://doi.org/10.1007/s10900-018-0555-4

Deniz, S. Ş., Özer, Ö., & Sonğur, C. (2018). Effect of health literacy on health perception: An application in individuals at age 65 and older. *Social Work in Public Health*, *33*(2), 85–95. https://doi.org/10.1080/19371918.2017.1409680

DeWalt, D. A., Berkman, N. D., Sheridan, S., Lohr, K. N., & Pignone, M. P. (2004). Literacy and health outcomes: A systematic review of the literature. *Journal of General Internal Medicine*, *19*, 1228–1239. https://doi.org/10.1111/j.1525-1497.2004.40153.x

Diamond, J. J., Becker, J. A., Arenson, C. A., Chambers, C. V., & Rosenthal, M. P. (2007). Development of a scale to

measure adults' perceptions of health: Preliminary findings. *Journal of Community Psychology*, *35*(5), 557–561. https://doi.org/10.1002/jcop.20164

Duong, T. V., Aringazina, A., Kayupova, G., Nurjanah, F., Pham, T. V., Pham, K. M., Chang, P. W., Nguyen, K. T., Oo, W. M., Su, T. T., Majid, H. A., Sørensen, K., Lin, I.-F., Chang, Y., Yang, S.-H., & Chang, P. W. S. (2019). Development and validation of a new short-form health literacy instrument (HLS-SF12) for the general public in six Asian countries. *HLRP: Health Literacy Research and Practice*, *3*(2), e91–e102. https://doi.org/10.3928/24748307-20190225-01

Durusu-Tanrıöver, M., Yildirim, H. H., Demiray Ready, F. N., Cakır, B., & Akalın, H. E. (2014). *Türkiye Sağlık Okuryazarlığı Araştırması (Turkey Health Literacy Survey)*. Sağlık-Sen Yayınları-25.

Fang, S., & Mushtaque, I. (2024). The moderating role of health literacy and health promoting behavior in the relationship among health anxiety, emotional regulation, and Cyberchondria. *Psychology Research and Behavior Management*, *17*, 51–62. https://doi.org/10.2147/PRBM.S446448

He, T., Liu, L., Huang, J., Li, G., & Guo, X. (2021). The community health-supporting environments and residents' health and well-being: The role of health literacy. *International Journal of Environmental Research and Public Health*, *18* (15), 7769. https://doi.org/10.3390/ijerph18157769

Henchoz, K., Cavalli, S., & Girardin, M. (2008). Health perception and health status in advanced old age: A paradox of association. *Journal of Aging Studies*, *22*(3), 282–290. https://doi.org/10.1016/j.jaging.2007.03.002

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional c nutbeam criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Kadioglu, H., & Yildiz, A. (2012). Saglik Algisi Ölçegi'nin Türkçe Çevriminin Geçerlilik ve Güvenilirligi/Validity and Reliability of Turkish Version of Perception of Health Scale. *Türkiye Klinikleri Tip Bilimleri Dergisi*, *32*(1), 47–53. https://doi.org/10.5336/medsci.2010-21761

Kickbusch, I. S. (2001). Health literacy: Addressing the health and education divide. *Health Promotion International*, *16* (3), 289–297. https://doi.org/10.1093/heapro/16.3.289

Klein Velderman, M., Crone, M. R., Wiefferink, C. H., & Reijneveld, S. A. (2010). Identification and management of psychosocial problems among toddlers by preventive child health care professionals. *European Journal of Public Health*, *20*(3), 332–338. https://doi.org/10.1093/eurpub/ckp169

Longo, Y., Coyne, I., & Joseph, S. (2017). The scales of general well-being (SGWB). *Personality & Individual Differences*, *109*, 148–159. https://doi.org/10.1016/j.paid.2017.01.005

Longo, Y., Coyne, I., & Joseph, S. (2018). Development of the short version of the scales of general well-being: The 14-item SGWB. *Personality & Individual Differences*, *124*, 31–34. https://doi.org/10.1016/j.paid.2017.11.042

Nielsen, K. D. B., Dyhr, L., Lauritzen, T., & Malterud, K. (2004). "You can't prevent everything anyway" a qualitative study of beliefs and attitudes about refusing health screening in general practice. *Family Practice*, *21*(1), 28–32. https://doi.org/10.1093/fampra/cmh107

Nutbeam, D. (2008). The evolving concept of health literacy. *Social Science & Medicine*, *67*(12), 2072–2078. https://doi.org/10.1016/j.socscimed.2008.09.050

Nutbeam, D. (2009). Defining and measuring health literacy: What can we learn from literacy studies? *International Journal of Public Health*, *54*, 303–305. https://doi.org/10.1007/s00038-009-0050-x

Odaci, H., Kaya, F., & Kinik, Ö. (2021). Genel iyi oluş ölçeği kısa formu'nun türkçeye uyarlama çalışması. *Dokuz Eylül Üniversitesi Buca Eğitim Fakültesi Dergisi*, *52*, 97–111. https://doi.org/10.53444/deubefd.841481

Pelikan, J. M., Ganahl, K., & Roethlin, F. (2018). Health literacy as a determinant, mediator and/or moderator of health: Empirical models using the European health literacy survey dataset. *Global Health Promotion*, *25*(4), 57–66. https://doi.org/10.1177/1757975918788300

Sonnentag, S. (2015). Dynamics of well-being. *Annual Review of Organizational Psychology & Organizational Behavior*, *2* (1), 261–293. https://doi.org/10.1146/annurev-orgpsych-032414-111347

Sørensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J., Slonska, Z., Brand, H., & (HLS-EU) Consortium Health Literacy Project European. (2012). Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health*, *12*(1), 1–13. https://doi.org/10.1186/1471-2458-12-80

Tohme, P., Abi-Fadel, N., Yaktine, N., & Abi-Habib, R. (2024). Predictors of mental health literacy in Lebanese university students: A pilot study. *JMIR Formative Research*, *8*, e43770. https://doi.org/10.2196/43770

Tugut, N., Yesildag Celik, B., & Yılmaz, A. (2021). Health literacy and its association with health perception in pregnant women. *Journal of Health Literacy*, *6*(2), 9–20. https://doi.org/10.22038/jhl.2021.58949.1170

von Conrady, D. M., & Bonney, A. (2017). Patterns of complementary and alternative medicine use and health literacy in general practice patients in urban and regional Australia. *Australian Family Physician*, *46* (5), 315–324.

Yilmaz, S. K., & Eskici, G. (2021). Sağlık okuryazarlığı ölçeği-kısa form ve dijital sağlıklı diyet okuryazarlığı ölçeğinin türkçe formunun geçerlik ve güvenirlik çalışması. *İzmir Katip Çelebi Üniversitesi Sağlık Bilimleri Fakültesi Dergisi*, *6*(3), 19–25.

Zhang, F., Or, P. P., & Chung, J. W. (2021). How different health literacy dimensions influences health and well-being among men and women: The mediating role of health behaviours. *Health Expectations*, *24*(2), 617–627. https://doi.org/10.1111/hex.13208