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Predictors of Health Literacy among Adolescents Aged 15–18: The Role of Media Literacy and Demographic Factors

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Background and Objectives: Health and healthy lifestyles are influenced by a range of factors, including health literacy and media literacy, both of which play important roles in health-related decision-making and behaviors. This study aimed to determine the predictive role of media literacy and demographic factors in health literacy among adolescents aged 15–18 years in Mashhad, Iran.

Materials and Methods: This research was a cross-sectional study with 400 subjects of male adolescents aged 15–18 years in Mashhad, Iran. The data collection tools used in this study included demographic questionnaire, health literacy of adolescent's questionnaire, and media literacy questionnaire. Data were analyzed by using SPSS 25.0. To examine the associations between demographic characteristics and media literacy with health literacy, a multiple linear regression model was employed.

Results: Approximately 58% of adolescents fell into insufficient levels of health literacy. In contrast, about 60% were in the moderate range for media literacy. Among the demographic variables examined, none showed a statistically significant effect on health literacy, except birth order. Most notably, media literacy emerged as a very strong predictor of health literacy, with a standardized beta coefficient of 0.611 ($p<0.001$).

Conclusion: Socioeconomic status was not significantly associated with health literacy, whereas birth-order dynamics may play a nuanced role. These findings suggest that integrating media literacy within universal health education may strengthen adolescents' health information competencies. Given the limited association observed with socioeconomic status, universal media-literacy initiatives may warrant consideration, alongside further examination of family processes. Future research could employ longitudinal designs, multi-method assessments, and evaluate the impact of media-literacy–enhanced health education on health-related outcomes.

Keywords: Health literacy, Media literacy, Adolescents

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Introduction

Health literacy is defined as the ability of individuals to obtain, process, and understand fundamental health information and services needed to make appropriate health decisions (1, 2). In the modern digital era, this is increasingly inseparable from media literacy—the capacity to access, analyze, evaluate, and create media messages critically (3). For adolescents, these literacies are not merely academic skills but essential tools for navigating a landscape where media acts as a "super peer," shaping health norms and behaviors (4). From a theoretical perspective, media literacy serves as a foundational cognitive resource; according to the Health Literacy Skills Framework, the ability to critically deconstruct media messages is a prerequisite for effective health information processing, especially in digital environments where information is often unregulated (5).

Globally, the levels of these literacies among adolescents vary significantly, yet a trend of declining health literacy is observed in many high-income and developing nations, leading to increased healthcare disparities (6, 7). In Iran, findings from several provinces show that only a small portion of the population has adequate health literacy, while the majority falls into inadequate or limited levels (8). However, data regarding the levels of both health and media literacy among adolescents in Mashhad remain scarce. Given the widespread use of digital media among Iranian adolescents, investigating the relationship between these two literacies in Mashhad, as a large metropolitan city, is warranted. Existing Iranian studies have often focused on general adult populations or university students, with limited evidence on late adolescents in urban school settings (9,10).

The impact of these literacies on adolescent health is profound. High levels of health and media literacy are correlated with better adherence to medical advice, increased physical activity, and superior dietary choices (2, 11). Conversely, the inability to critically evaluate media content can lead to the adoption of risky behaviors and the internalization of unhealthy social norms promoted through digital channels (4, 5). Ignoring the interplay between media literacy and health literacy poses severe public health risks: it can lead to the rapid spread of health misinformation, increased susceptibility to harmful advertising, and a higher prevalence of chronic diseases and behavioral-emotional problems among the youth (12, 13). Such complications ultimately escalate healthcare costs and diminish the overall quality of life for the next generation.

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Despite the recognized importance of these skills, a significant research gap remains. While some studies have examined these variables in adult populations in Iran, there is a substantial lack of empirical evidence focusing on adolescents—a developmental stage characterized by rapid cognitive growth and high levels of media exposure (5, 14). Current statistics indicate that Iranian youth spend between 30% and 50% of their waking hours engaged with media; however, there is insufficient localized evidence to determine whether this exposure translates into the critical literacy skills necessary to protect and promote their health (5, 15). Therefore, identifying the predictors of health literacy, particularly the role of media literacy and demographic factors, is essential for informing targeted preventive strategies and public health policies. This study aimed to determine the predictive role of media literacy and demographic factors in health literacy among adolescents aged 15–18 years in Mashhad, Iran.

Materials and Methods

Study design and setting

This descriptive-analytic, cross-sectional study surveyed male adolescents aged 15–18 years in Mashhad, Iran. A multi-stage random sampling approach was employed to ensure geographic and socioeconomic representation across the city. From the seven educational districts of Mashhad, four districts were randomly selected to represent diverse urban sectors. Within each of these selected districts, two secondary boys' high schools were chosen. Subsequently, one class per school was randomly selected for participation, and questionnaires were administered in person. This sampling framework was designed to capture a broad cross-section of the adolescent population across different parts of the city.

After obtaining approvals from the Education Organization of Mashhad and informing school authorities, classroom visits were conducted. Participants were briefed on the study aims and confidentiality, and written informed consent was obtained before participation. Inclusion criteria were: (1) being officially enrolled as a student in a high school in Mashhad, (2) willingness to participate, and (3) being aged 15–18 years. Exclusion criteria included incomplete questionnaires.

Study participants and sampling

Using the Moore–Morton (Morgen) approach and an infinite population assumption, the minimum sample size was calculated to be 384. Accounting for a 20% attrition/nonresponse rate, a total of 400 participants were planned for the study.

Data collection tool and technique

Demographic Questionnaire

A demographic questionnaire was developed to gather a range of demographic information from participants, including age, educational level, household income level, mother's occupation, father's occupation, mother's education, father's education, number of children, birth order.

Health Literacy of Adolescents Questionnaire

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The Health Literacy of Adolescents questionnaire is a standardized self-report instrument designed to assess an individual's skills in accessing and processing health information to support health-related decision-making. Developed and psychometrically evaluated by Ghanbari et al, the instrument comprises 44 items across eight domains (16). The domains include accessibility (5 items), Reading Information (5 items), Understanding Information (10 items), Evaluating Information (5 items), Using Health Information (4 items), Communication (8 items), Self-Efficacy (4 items), and Calculation (3 items). Respondents rate each item on a five-point Likert scale from 1 (Never) to 5 (Always). The total score thus ranges from 44 to 220.

Media Literacy Questionnaire

The Media Literacy Questionnaire, developed by Falsafi et al (13) and validated for content and construct, comprises 20 items across five domains: understanding content of media messages, awareness of hidden intents in media messages, conscious selection of media messages, critical viewing of media messages, and analysis/interpreting media messages. Responses are rated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), yielding a total score range of 20 to 100.

Analysis

In this study, the normality of the distribution of continuous variables was assessed using the Shapiro–Wilk test. To examine the associations between demographic characteristics and media literacy with health literacy, a multiple linear regression model was employed. All analyses were conducted using SPSS, version 25. Significance was set at α=0.05.

Table 1 reports the internal consistency of the questionnaires using Cronbach's alpha.

Table 1. Cronbach's Alpha reliability of health literacy and media literacy questionnaires

Domain / Questionnaire	Cronbach's Alpha
Self-Efficacy	0.71
Accessibility	0.74
Reading Information	0.83
Understanding Information	0.89
Evaluating Information	0.77
Using Health Information	0.73
Communication	0.81
Calculation	0.74
Health Literacy (Total)	0.94
Understanding the Content of Media Messages	0.62
Awareness of Hidden Intents in Media Messages	0.67
Conscious Selection of Media Messages	0.61
Critical Viewing of Media Messages	0.62
Analysis/Interpreting Media Messages	0.72
Media Literacy (Total)	0.88

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Most health literacy subscales demonstrated high reliability, with alpha values ranging from 0.71 to 0.89, and the overall health literacy scale achieved excellent reliability (α=0.94). In contrast, the Cronbach's alphas for the media literacy subscales ranged from 0.61 to 0.72, which, while acceptable, are notably lower than those for health literacy. Nevertheless, the total media literacy scale showed good reliability (α=0.88), indicating adequate overall measurement reliability for this instrument in the present study.

Results

Table 2 shows that the study sample comprised 352 male adolescents aged 15–18 years, with a mean age of 15.99 years. Socioeconomic indicators indicated that most families fell within the middle-income category (66.5%), with mothers predominantly homemakers (78.7%) and fathers largely employed in self-employed or freelance work (56.0%). Parental education was mainly at the high school level (34.5%) or university level (34.0%). Regarding family size, the largest groups were two children (45.2%) and three children (45.7%), and over half of the participants were firstborn (59.0%).

As shown in **Table 3**, health literacy across its dimensions indicated that the overall health literacy score for students was 66.153, reflecting a relatively satisfactory level for this age group. The assessment of media literacy yielded an overall mean score of 62.59; the highest score was observed in the dimension of conscious selection of media messages, while the lowest was in the analysis of media messages.

Based on the classification used, approximately 58% of adolescents fell into the not-sufficient or insufficient levels of health literacy, with only about 10% achieving a high level **(Table 4).** In contrast, about 60% were in the moderate range for media literacy, and more than one-third of participants demonstrated high media literacy.

Table 5 presents the results of a multiple regression analysis. Among the demographic variables examined, none showed a statistically significant effect on health literacy. The only exception was birth order, which significantly and inversely predicted health literacy scores. Most notably, media literacy emerged as a very strong predictor of health literacy, with a standardized beta coefficient of 0.611 ($p<0.001$), indicating a substantial and significant role in determining adolescents' health literacy.

Table 2. Demographic and socioeconomic characteristics

Variable		Mean ± Standard Deviation (% frequency) Number
Age	15.99 ± 1.24	
Family income level	Low	(4.3) 15
	Medium	(66.5) 234
	High	(29.3) 103
Mother's occupation	Housewife	(78.7) 277
	Government employee	(8.8) 31
	Retired	(2.0) 7

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	Worker	(0.9) 3
	Office worker	(1.7) 6
	Freelancer	(5.1) 18
	Other	(2.8) 10
Father's occupation	Government employee	(20.2) 71
	Retired	(5.1) 18
	Freelancer	(56.0) 197
	Worker	(8.8) 31
	Office worker	(3.4) 12
	Unemployed	(1.7) 6
	Other	(4.8) 17
Mother's education	Less than high school	(29.0) 102
	High school diploma	(34.7) 122
	University degree	(36.4) 128
Father's education	Less than high school	(29.8) 105
	High school diploma	(35.2) 124
	University degree	(34.9) 123
Number of children	One	(9.1) 32
	Two	(45.2) 159
	Three or more	(45.7) 161
Birth order	First	(59.1) 208
	Second	(28.7) 101
	Third or more	(12.2) 43

Table 3. Means and Standard deviations of health literacy and media literacy dimensions

Dimension	Items	Mean ± Standard Deviation	Median	Range (Min-Max)
Self-Efficacy	4	13.67±3.31	14	4–20
Accessibility	5	17.87±4.32	18	5–25
Reading Information	5	17.68±5.01	18	5–25
Understanding Information	10	37.25±8.23	38	10–50
Evaluating Information	5	16.63±4.14	17	5–25
Using Health Information	4	12.61±3.85	12	4–20
Communication	8	26.34±6.44	26	8–40
Calculation	3	11.57±3.77	12	3–15
Health Literacy (Total)	44	153.66±28.84	153	44–220
Understanding the Content of Media Messages	4	13.13±3.34	14	4–20
Awareness of Hidden Intents in Media Messages	4	13.15±3.40	13	4–20
Conscious Selection of Media Messages	4	13.32±3.32	14	4–20
Critical Viewing of Media Messages	4	11.71±3.45	12	4–20
Analysis/Interpreting Media Messages	4	11.26±3.39	11	4–20
Media Literacy (Total)	20	62.59±13.61	63	20–100

Table 4. Distribution of health literacy and media literacy levels

Variable	Category	Frequency (n)	Percent (%)
Health Literacy	Inadequate	75	21.3

	Not quite adequate	129	36.6
	Satisfactory	114	32.4
	Excellent	34	9.7
Media Literacy	Low	10	2.8
	Moderate	211	59.9
	High	131	37.2

Table 5. Regression model: predictors of health literacy based on demographic variables and media literacy

Variable	B	SE(B)	Standardized B	t	*p*-value
Grade level	-0.527	0.753	-0.038	-0.699	0.485
Family income	-0.620	0.501	-0.020	-0.414	0.679
Mother's education	-0.205	0.550	-0.023	-0.373	0.710
Father's education	-0.681	0.545	-0.077	-0.250	0.212
Number of siblings	-0.796	0.890	-0.097	-0.018	0.044
Media literacy	0.611	0.058	0.507	4.710	0.001

Discussion

In this study, approximately 58% of adolescents fell into not-sufficient or insufficient health literacy levels. By contrast, about 60% were in the moderate range for media literacy, and more than one-third demonstrated high media literacy, indicating a dissociation between health literacy and media literacy within this population, with media literacy relatively more developed. These patterns align with Parandeh Afshar and colleagues' findings from Kerman, Iran, where more than half exhibited insufficient health literacy, yet nearly three-fifths had high media literacy (17). In examining the relationship between media literacy and health literacy among adolescents, Sotoudehrad et al. reported a mean media literacy score of 70.26/100, indicating a high level of media literacy; the higher mean was driven by two dimensions—media message content perception and conscious choice of media messages—relative to other dimensions, suggesting particular attention to media selection and content processing (18). Comparative Iranian studies show variability likely due to differing populations and instruments. Akbarinejad et al. reported a lower mean media literacy score than in the present study, despite using the same instrument, which may reflect population differences (teens aged 15–18 vs adult women) (19). In health literacy, Parandeh Afshar et al. found 53.2% had inadequate health literacy, while Panahi et al. reported 42.6% of college students with inadequate health literacy and 27.6% with insufficient health literacy, diverging from the present findings (20).

Higher media literacy may enhance individuals' ability to access, appraise, and interpret health information encountered in media, facilitating healthier decisions even when health literacy is not uniformly high. Critical media analysis skills could act as a protective factor by enabling more accurate source evaluation, risk perception, and uptake of evidence-based health messages. Adolescents are in a dynamic stage of cognitive and psychosocial development, which may shape health literacy acquisition differently from media literacy. The relatively higher media literacy levels might reflect greater exposure to diverse media

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environments and familiarity with media literacy practices in youth culture, while health literacy may lag without targeted education.

A granular analysis of the literacy dimensions (Table 3) provides deeper insight into the disconnect between media engagement and health proficiency. Our findings reveal a pattern where functional competencies—such as Accessibility (M=17.87) and Reading Information (M=17.68)—outperform critical competencies. This discrepancy is mirrored in the media literacy dimensions, where Critical Viewing (M=11.71) and Analysis/Interpreting (M=11.26) yielded notably lower means compared to the ability to understand content. This suggests that while adolescents are 'digitally fluent' in terms of navigating and consuming content, they lack the 'critical fluency' required to deconstruct the underlying biases or motivations of health-related messages. This explains why media literacy serves as a predictor of health literacy, yet fails to guarantee it: the predictive power of ML is likely driven by the shared requirement for cognitive processing, but the 'insufficient' health literacy observed in 58% of the sample may stem specifically from a deficit in the evaluative and analytical dimensions of both literacies. In essence, adolescents are consuming health information more rapidly than they are critically processing it.

Our analyses showed that media literacy emerged as a strong predictor of health literacy among adolescents. However, this predictive association should not be interpreted as causal. Given the cross-sectional nature of the study, the direction of influence cannot be determined, and longitudinal designs are needed to clarify whether media literacy leads to changes in health literacy over time. This finding suggests that the ability to access, interpret, and critically evaluate media messages is closely tied to understanding and applying health information. In the current information environment, adolescents are constantly exposed to health-related content through social media, television, online news, and digital platforms. When such information is accurate and appropriately interpreted, media literacy can strengthen health awareness and support informed decision-making. However, when media messages are misleading, incomplete, or false, limited media literacy may contribute to misunderstanding, poor judgment, and unfavorable health behaviors. In this sense, media functions as a double-edged sword: it can promote health literacy when it delivers reliable content and when individuals possess the skills to critically assess it, but it can also undermine health decisions when misinformation is accepted uncritically (21). Therefore, media literacy education may play an important role in helping adolescents evaluate information more critically and make healthier decisions in the face of competing messages (22).

Our findings are consistent with several previous Iranian and international studies that have reported a positive association between media literacy and health literacy. For example, Montazeri et al. found that higher media literacy was associated with healthier behaviors, whereas lower media literacy was linked to riskier behaviors such as smoking (23). Similarly, Akbarinejad and Mahmoudi reported a direct positive correlation between the two literacies

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(19, 24). Parandeh Afshar et al. identified media literacy as an important determinant of health literacy in Kerman (17). Sotoudeh Rad et al. also observed a direct relationship between mean media literacy and health literacy across most dimensions, although some variation was noted in how media literacy translated into health literacy (18). In addition, Quinn et al. reported a significant association between health literacy and both media and information literacy, and most participants stated that media literacy helped them make better health decisions (25). Taken together, these findings support the view that media literacy and health literacy are complementary competencies, and that strengthening both may improve adolescents' ability to navigate today's complex information environment (26, 27).

At the same time, it is important to note that not all studies necessarily report a strong or direct connection between these two constructs. In some settings, the relationship between media literacy and health literacy may be weak, indirect, or no significant. Such differences may be explained by variation in age groups, cultural context, measurement tools, sample characteristics, or the specific type of media environment being studied. For example, a population with greater access to digital resources may show a stronger relationship than one with limited exposure to online health information. Similarly, studies that use different instruments to measure media literacy or health literacy may capture different dimensions of these concepts, which can lead to inconsistent findings (28, 29). Therefore, discrepancies in the literature do not necessarily contradict the importance of the relationship; rather, they suggest that the strength and nature of this association may depend on context and methodological factors. This makes it especially important to interpret the present findings in light of the characteristics of Iranian adolescents and their media environment.

Among the demographic variables examined, only birth order significantly predicted health literacy, and the association was inverse, meaning that later-born children had lower health literacy. This finding suggests that health literacy in our sample is not simply explained by family income or parental education, but may also reflect subtler family dynamics. For example, first-born children may receive more parental attention, more direct health guidance, or greater responsibility in family communication, which could contribute to stronger health-related knowledge and skills. In contrast, later-born children may experience less individualized health communication or less structured exposure to health-related behaviors. Another possible explanation is that birth order may reflect unmeasured family factors such as parental health literacy, time availability, or household communication patterns. The lack of significant associations with family income and parental education suggests that health literacy interventions should not be limited only to socioeconomically disadvantaged groups, but rather should be designed as broad educational strategies for adolescents. Future studies should examine possible mediators and moderators, such as

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parental communication, access to health resources, digital literacy, and gender, to better understand how family structure influences adolescent health literacy development.

Our findings indicate that media literacy may substantially contribute to the development of health literacy among students. This has important implications for education and public health policy. Integrating media literacy into school curricula may help adolescents become more critical consumers of health information and reduce the harmful effects of misinformation. Such interventions may be especially valuable during public health emergencies, when young people are exposed to large volumes of conflicting messages. Practical strategies may include teaching students how to evaluate media sources, distinguish reliable health information from misinformation, understand how media influence health perceptions, and even create appropriate health-related content themselves. Strengthening both media literacy and health literacy may therefore support healthier choices, improve public awareness, and contribute to long-term community well-being.

Study Limitations and Strengths: Several limitations should be acknowledged. Measurement limitations may affect accuracy, as self-report instruments can be influenced by social desirability bias and may not capture nuanced competencies; objective or multi-method assessments (e.g., performance tasks or observational measures) may yield different estimates. The cross-sectional design also limits causal inference regarding the relationship between health literacy and media literacy and does not allow conclusions about directionality; longitudinal studies would help clarify temporal and potentially bidirectional relationships. Selection bias may have occurred because participation was voluntary, potentially over representing individuals with greater interest in literacy-related topics. Cultural and linguistic factors beyond general background characteristics were not systematically assessed; therefore, potential differences among subgroups defined by ethnicity, language proficiency, or migration background may not have been detected. In addition, school- or classroom-level factors (e.g., curriculum focus, teacher training, or educational resources) were not examined and may have influenced the observed associations. The analysis relied on specific measurement instruments, and different validated tools could yield somewhat different results, highlighting the need for cross-instrument replication. Furthermore, technology access and aspects of the digital divide were not directly assessed; disparities in internet access, device availability, and digital skills may influence both media literacy and health literacy. Finally, generalizability is limited to adolescents with similar educational and sociocultural contexts. Most notably, because the sample consisted exclusively of male adolescents, the findings may not be fully generalizable to female adolescents, who may exhibit different patterns of media consumption, developmental characteristics, and health information-seeking behaviors. Future studies should include gender-balanced samples to explore potential gender-based differences in these relationships. Additionally, although the sampling strategy aimed to achieve broad

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geographic coverage across Mashhad by selecting schools from multiple educational districts, the study did not stratify results by specific geographic sectors (e.g., north, south, east, and west). Future research could adopt geographically stratified sampling to better identify urban areas that may require targeted health literacy and media literacy interventions.

Conclusion

This study demonstrates that while media literacy is a robust predictor of health literacy among adolescents, the two constructs do not develop in lockstep; approximately 58% of participants possessed insufficient health literacy despite having relatively more developed media literacy skills. This dissociation suggests that the technical ability to navigate media does not automatically translate into the capacity to apply health information effectively. While our findings align with existing literature regarding the positive link between these literacies, the discrepancies noted across various studies suggest that the strength of this relationship is context-dependent, influenced by digital environments and measurement methodologies. Furthermore, the lack of association with socioeconomic status, contrasted with the inverse relationship with birth order, indicates that health literacy may be shaped more by nuanced family dynamics and socialization processes than by financial resources alone.

Consequently, these findings suggest that universal educational approaches—rather than solely targeted interventions—may be more effective. Integrating media and health literacy within a unified curriculum could potentially strengthen adolescents' capacity to critically engage with health information. Such frameworks may benefit from emphasizing adolescents' ability to critically appraise the motivations and accuracy of health-related media, which could help reduce vulnerability to misinformation. Given the complexities identified, future research should employ longitudinal designs to clarify causal pathways and investigate how moderating factors—such as parental communication styles and digital access—influence the alignment or divergence of these two essential competencies.

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Consent for publication: Not applicable.

Ethics approval and consent to participate: The study was approved by the university ethics board (Number: IR.MUMS.FHMPM.REC.1403.024). In this study, the principles of the Declaration of Helsinki have been followed. A written consent was obtained from all participants after explaining the aim of the study.

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