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Original Article

Investigating the Effect of Health Information Literacy on Cosmetics Use Among Female Students at Arak University of Medical Sciences, Iran

Masoumeh Malekhoseini[1], Mohammad Reza Amiri[1*], Seyed Abedin Hoseini Agangari[1], Hossein Vakilimofrad[1]

[1]Department of Medical Library and Information Sciences, School of Paramedicine, Hamadan University of Medical Sciences, Hamadan, Iran

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***Corresponding author:**
Mohammad Reza Amiri,
Email: m.r.amirilib@gmail.com

Abstract

Background: Despite the detrimental effects of excessive cosmetic use on both physical and mental health, a considerable number of individuals continue to utilize these products. This study aimed to examine the level of cosmetic use among female students at Arak University of Medical Sciences in relation to their health information literacy.

Methods: To this end, 250 female students of Arak University of Medical Sciences were investigated in this cross-sectional analytical study. Following sample selection, a protocol was employed to capture demographic information, including the precise age, education level, and source of health information. Furthermore, two questionnaires were implemented to evaluate cosmetic usage and health information literacy. Finally, Pearson's correlation coefficient was implemented to analyze the correlation between cosmetic utilization and health literacy.

Results: The results revealed an inverse, though non-significant, relationship between the amount of cosmetics use and health literacy ($r=-0.087$, $P=0.235$). Similarly, the correlation between cosmetic use and the subdomains of accessibility, comprehension, decision-making, and use of health information was negative, while it was positive between the cosmetics use and reading and evaluation skills. Nevertheless, none of these correlations were statistically significant ($P>0.05$).

Conclusion: Overall, higher health literacy may be associated with lower levels of cosmetic use, although this relationship was not statistically significant. Given that cosmetic usage patterns are directly related to health, it is recommended that further research focus on this issue.

Keywords: Cosmetic products, Health literacy, Female medical students

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Introduction

Difficulty in understanding health information, limited knowledge about diseases, and poor adherence to medication regimens can be linked to inadequate health literacy, thereby contributing to inefficient use of healthcare services, increased healthcare costs, and health disparities (1). Low health literacy is a major public health concern that compromises health outcomes and affects a substantial portion of the population. In addition, poor ability to interpret health and medical information is associated with reduced capacity for managing long-term illnesses, such as cancer (2-5).

One relevant example is the adverse effects of using cosmetic products, which, similar to drug side effects, represent a significant health concern closely related to health literacy. Cosmetics enter the human body in various forms, including sprays, powders, creams, and liquids. These products are commonly utilized for cleansing, improving appearance (beautification), enhancing attractiveness, or altering appearance. In recent years, the global cosmetics market has expanded at an alarming rate (6), driven by increasing consumer concern with personal appearance.

Several studies have confirmed an association between the frequent use of cosmetic and hygiene products and characteristics such as higher education and better economic status, especially among young women (7,8). While cosmetics may help users feel more attractive, they can also pose health risks due to a variety of factors related to their ingredients and methods of use (9-11).

To mitigate such risks, regulatory authorities in the food, drug, and cosmetics sectors continuously advise manufacturers to conduct thorough testing in order to ensure product safety. Similarly, consumers are encouraged to observe safety precautions, including checking expiration dates and ingredient labels, avoiding the use of shared products, opting for simpler formulations, and purchasing products from reliable sources (12-14). Accordingly, higher levels of health literacy may improve women's awareness and health-related decision-making.

However, it is noteworthy that general literacy does not necessarily equate to health information literacy (15). Women's health information literacy can significantly influence their healthcare outcomes and overall health status (16).

Despite the documented negative consequences of excessive cosmetic use on physical and mental health, many individuals continue to use these products. The widespread and often excessive use of cosmetics—given its associated health risks—has emerged as a public health issue. Therefore, the present study aims to examine the effect of health information literacy levels on the extent of cosmetic use among female students studying at Arak University of Medical Sciences.

Materials and Methods

This cross-sectional analytical study was conducted among female students at Arak University of Medical Sciences. The participants were assured of data confidentiality, and all procedures and objectives were thoroughly conveyed to them at the outset of the study. In addition, the study was wholly voluntary, and participants were free to withdraw at any time without incurring any repercussions.

Based on a previous study reporting a 39.6% rate of cosmetic use (17), the minimum required sample size was calculated to be 243 participants using a 95% confidence level ($Z = 2$).

The inclusion criterion for the study was being a student of Arak University of Medical Sciences. On the other hand, the only exclusion criterion was a lack of willingness to participate in the study. A convenience sampling method was used to select participants from all six faculties of the university who met the eligibility criteria. Then, their essential demographic information (i.e., exact age, academic level, and primary source of health information) was collected using a checklist. Next, the participants were asked to complete two questionnaires designed for assessing health information literacy and evaluating cosmetic use, respectively.

Montazeri et al (18) developed the Health Literacy Questionnaire, which comprises 33 items across five dimensions: access (items 1–6), reading skills (items 7–10), comprehension (items 11–17), evaluation (items 18–21), and decision-making and application of health information (items 22–33).

All items are directly scored on a five-point Likert-type scale (always/very easy = 1, often/easy = 2, sometimes/difficult = 3, rarely/very difficult = 4, and never/neither easy nor difficult = 5). The validity and reliability of this instrument were confirmed by Montazeri et al through expert review by 15 professionals from various health-related disciplines (18). Necessary revisions were applied based on their feedback. The questionnaire was finalized with 33 items, and its construct validity (using exploratory factor analysis) and internal consistency (Cronbach's alpha) were assessed in a sample of 336 individuals randomly selected from 22 municipal districts of Tehran. The five-factor structure with 33 items was supported by the final factor analysis, accounting for 53.2% of the total variance. Cronbach's alpha values were within the range of 0.72–0.89, suggesting satisfactory reliability (18).

A 20-item questionnaire developed by Basharpoor et al was implemented to evaluate the use of cosmetics. This tool assesses the degree of cosmetic product usage and is scored on a five-point Likert-type scale ranging from "never" (score 1) to "very much" (score 5), with higher scores indicating more frequent use. A Cronbach's alpha of 0.93 was obtained to verify internal consistency (19).

The obtained data were summarized through descriptive statistics, including frequencies, means, and standard deviations. Pearson's correlation coefficient was utilized to examine the correlation between health literacy and cosmetic utilization, as both variables were quantitative and normally distributed (as verified by the Kolmogorov–Smirnov test). In addition, a one-way analysis of variance (ANOVA) test was performed to compare the mean scores of health literacy and cosmetic use among various variables. Further, Tukey's post hoc test was used for additional analysis in case the results of the ANOVA were statistically significant. Eventually, Stata (version 11) was employed to conduct all statistical analyses with a 95% confidence level.

Results

The mean age of the participants was 23.36 ± 4.01 years (ranging from 18 years to 49 years). Regarding educational status, 181 participants (72.4%) were undergraduate students, 23 (9.2%) were pursuing a master's degree, and 46 (18.4%) were enrolled in a professional doctorate program. A total of 88 individuals (35.2%) reported television as their main source of health information, 123 (49.2%) indicated the internet, and 39 (15.6%) used both. Additionally, 78 participants (31.2%) reported using other sources, such as books, newspapers, magazines, and academic materials, alongside TV or the internet.

Table 1 provides descriptive statistics related to overall health literacy and its dimensions, as well as the score for cosmetic product usage.

Based on these findings, the overall mean score of health literacy and the mean score of cosmetic use were 63.65 ± 15.25 and 34.95 ± 8.77, respectively.

Table 2 presents the mean scores of health literacy, its subdomains, and cosmetic usage according to age groups, education level, and source of health information. A

significant inverse relationship was found between age and health literacy (r = -0.298, $P < 0.001$). There was also a weak inverse correlation between age and cosmetic use (r = -0.078, $P = 0.221$), which was not statistically significant.

The mean scores of health literacy, its dimensions, and cosmetic use according to age, educational status, and source of health information were compared using ANOVA (Table 2). When ANOVA results were statistically significant, Tukey's post hoc test was used to identify differences between groups. The mean scores of health literacy and its dimensions, as well as cosmetic use, significantly differed across age groups. Tukey's test results revealed that the mean scores of the overall health literacy and the dimensions of access, reading, comprehension, and decision-making/application of health information were significantly lower in participants over the age of 25 compared to those aged 20–25 and under 20 ($P < 0.05$). In contrast, the mean scores for the evaluation dimension and cosmetic use were significantly lower in participants under the age of 20 in comparison to other age groups ($P < 0.05$).

There were also significant differences in the mean scores of health literacy and the reading and evaluation dimensions based on educational level. Based on the results of Tukey's test, the overall health literacy score in master's students was significantly lower than in undergraduate students ($P = 0.028$) and professional doctorate students ($P = 0.042$). Likewise, the reading and evaluation subdomain scores were significantly lower in the master's group compared to both the undergraduate ($P = 0.004$) and doctorate ($P < 0.001$) groups. Other differences were not statistically significant.

Additionally, the results confirmed that the mean scores of health literacy and the reading, comprehension, and decision-making/application dimensions were significantly different based on the source of health information. Specifically, participants who obtained their health information primarily from television had significantly lower scores in these dimensions compared to those who used the internet ($P < 0.001$).

The results of the correlation test to examine the relationship between cosmetic product use and health literacy and its dimensions are presented in Table 3.

The correlation between overall health literacy and cosmetic use was negative (r = -0.087), but not statistically significant ($P = 0.235$), indicating no significant association. Similarly, there were negative correlations between cosmetic use and the subdomains of access, comprehension, and decision-making/application, while correlations with the reading and evaluation dimensions were positive; nonetheless, none of these were statistically significant.

Table 1. Mean Scores of Health Literacy and Its Dimensions and the Rate of Use of Cosmetics

Variable	Mean	SD	Minimum	Maximum
Health literacy	63.65	15.25	33	108
Access	10.97	3.24	6	19
Reading	7.8	3.22	4	20
Comprehension	10.78	3.57	7	28
Evaluation	7.85	2.52	4	14
Decision-making and use of health information	26.22	7.96	12	52
Use of cosmetics	34.95	8.77	15	64

Note. SD: Standard deviation.

Discussion

Cosmetic product use in Iran is notably high according to

Table 2. Mean Scores of Health Literacy, Its Dimensions, and Use of Cosmetics by Age, Education Level, and Source of Health Information

Variable	Health Literacy	Access	Reading	Comprehension	Evaluation	Decision Making	Use of Cosmetics
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Age group							
<20	65.9 ± 15.6	11.2 ± 3.4	8.0 ± 2.8	11.9 ± 3.7	7.9 ± 2.5	26.9 ± 7.4	30.8 ± 9.2
20–25	65.5 ± 14.5	11.3 ± 3.2	8.2 ± 3.2	10.1 ± 3.4	8.1 ± 2.5	27.0 ± 7.7	35.7 ± 8.7
>25	54.4 ± 15.1	9.5 ± 2.9	6.0 ± 2.8	9.5 ± 4.0	8.6 ± 2.1	22.6 ± 8.6	33.1 ± 8.6
P-value	<0.001	0.006	0.001	0.024	0.002	0.004	0.028
Education level							
Bachelor's degree	64.3 ± 15.5	11.1 ± 3.3	8.0 ± 3.2	11.0 ± 3.6	8.0 ± 2.6	26.2 ± 8.2	34.1 ± 8.8
Master's degree	55.8 ± 11.1	10.2 ± 2.8	5.6 ± 2.5	9.5 ± 2.9	6.5 ± 1.7	23.8 ± 5.9	33.9 ± 6.4
Professional doctorate	65.0 ± 15.2	10.1 ± 3.1	8.0 ± 3.3	10.6 ± 3.6	7.9 ± 2.4	27.6 ± 7.8	36.2 ± 9.5
P-value	0.031	0.412	0.003	0.185	0.028	0.168	0.513
Source of health information							
TV	58.6 ± 13.9	10.9 ± 3.2	7.3 ± 3.1	9.9 ± 3.4	7.4 ± 2.5	23.0 ± 7.3	34.7 ± 8.9
Internet	67.9 ± 15.1	11.2 ± 3.2	8.4 ± 3.4	11.3 ± 3.7	8.2 ± 2.4	28.8 ± 7.9	35.5 ± 8.9
Both	61.5 ± 14.8	10.9 ± 3.2	6.9 ± 2.7	10.8 ± 3.6	7.8 ± 2.7	25.4 ± 7.0	33.9 ± 8.9
P-value	<0.001	0.249	0.010	0.027	0.072	<0.001	0.572

Note. CI: Confidence interval; SD: Standard deviation; ANOVA: Analysis of variance. *P value was calculated using ANOVA at a 95% CI level.

Table 3. The Rate of Cosmetic Use and the Relationship Between Health Literacy and Its Dimensions

Variables	Correlation Coefficient	Significance Level
Health literacy	-0.087	0.235
Access	-0.052	0.412
Reading	0.023	0.719
Comprehension	-0.040	0.532
Evaluation	0.066	0.300
Decision-making and use of information	-0.002	0.972

Note. *Significance level was calculated using the Pearson correlation test at a 95% confidence level.

existing statistics. Iran ranks as the third largest consumer and the seventh largest importer of cosmetics globally, with an estimated annual consumption of approximately one billion dollars' worth of cosmetic products (20). Unlike European societies, where older women are the primary consumers of cosmetics, in Iran, young women and girls exhibit high rates of usage (21). Given that the excessive use of these products can lead to various health problems, it is essential to pay attention to different demographic groups and preventive strategies. One critical factor in health is health literacy, which was examined in relation to cosmetic usage in the present study.

The overall mean health literacy score in our study was 63.65, which can be considered relatively low, especially given that the participants were female students at a medical university, where higher health literacy would generally be expected. For instance, in a study by Lakbala et al, health literacy across all dimensions demonstrated no significant improvement from the first to the third semester but notably increased from the fourth semester onward (22). However, in the current study, health literacy scores in both the professional doctorate and undergraduate students were higher than those in master's students. Other studies similarly reported that a considerable proportion of medical students had insufficient health literacy (23-27), which conforms to the findings of this study.

This study examined whether the amount of cosmetic use was correlated with the level of health literacy, and the results revealed only a weak correlation between these two variables. Although the correlation coefficient indicated a weak inverse relationship, implying that higher health literacy was associated with lower cosmetic use, this was not statistically significant. It is noteworthy that correlation significance can be influenced by sample size, and larger samples may yield different results. Research on the relationship between health literacy and cosmetic use is limited. For example, a study investigating social and relational factors influencing the use of smuggled cosmetic and hygiene products reported a significant negative Pearson correlation ($r = -0.304$) between health literacy and cosmetic use, representing that individuals with higher health literacy used fewer cosmetic and hygiene products (28). This finding aligns with the non-significant inverse association observed in the present study. Additionally, Clarita et al, analyzing the relationship between religiosity, customer knowledge, attitudes toward halal cosmetics, and purchase intentions, found an association between health literacy and cosmetic use (29), which conforms to the results of Sama and Trivedi (17).

Likewise, Abdolalizadeh Torkamani et al (28) concluded that gender, socioeconomic status, domestic and foreign media usage, social media engagement, and status-seeking significantly affected the consumption of smuggled cosmetic and hygiene products. Given that the young population of Iran is among the highest consumers of cosmetics and hygiene products, improving the quality of life and health and reducing healthcare costs largely depend on enhancing health literacy. The abovementioned researchers also highlighted the positive impact of domestic media on health literacy (28). Two review studies by Aramide et al and Tiourin et al emphasized the role of media in promoting skin care practices and cosmetic surgery (16, 30). Similarly, the findings of this study confirmed that health literacy was higher among those who obtained health information via the internet, underscoring the role of increased media access in improving health literacy. Therefore, it is essential to utilize media to raise public awareness about cosmetic product use.

Another critical discovery was the substantial variation in the mean health literacy score and its components among various age categories. A significant inverse correlation was discovered between age and health literacy, suggesting that health literacy decreased among the participants with an increase in their age. This finding is in line with the results of Molakhalili et al (26). However, some studies reported a positive correlation between age and health literacy (7,31), and three other studies generally indicated that health literacy increases with age (32-34). This positive correlation is often explained by greater experience with healthcare systems among older individuals, which enhances their ability to control healthcare and communicate with providers, thereby increasing awareness of health promotion resources and confidence (30,34). Conversely, one study found no relationship between health literacy and age (35). The inverse relationship observed in this study may be due to the younger students mostly being newly admitted and thus more familiar with basic health courses taught in medical university, which likely resulted in higher health literacy compared to older students. The educational level analysis also confirmed this pattern, with undergraduate students demonstrating a higher level of health literacy than their master's counterparts.

Regarding the relationship between age and cosmetic product usage, the correlation was not significant. However, comparison by age groups showed that the youngest group (< 20 years) used significantly fewer cosmetics than other groups, with the highest usage found in the 20–25 age group, followed by a decline after age 25.

Similarly, Akbari et al reported a significant difference in cosmetic use by age, with the 20–25 age group having the highest usage (36), consistent with the present findings. One explanation is that many young women use cosmetics to appear older than their adolescent years and defy societal and familial restrictions, a tendency that diminishes with age (21).

Additionally, substantial variations in health literacy scores were identified, particularly in the reading, comprehension, and decision-making/application dimensions, as a result of the source of health information. Participants who primarily relied on television had significantly lower scores compared to those who utilized the internet. A study assessing the health status of paramedical students also revealed that the internet was the main health information source (22), which corroborates the current findings. This likely reflects the accessibility and frequency of internet use and highlights its important role in enhancing health literacy.

Higher health literacy can positively affect various aspects of health. To the best of our knowledge, this investigation was the first to examine the correlation between cosmetic product utilization and health literacy, which was one of its strengths. However, the limited sample size was a notable limitation, potentially affecting the statistical significance of the results.

Limitations of the Study

Given that convenience sampling was used in this study, the results cannot be generalized to all students.

Conclusion

Given that the excessive use of cosmetic products can lead to various health problems, attention to preventive strategies is essential. Health literacy is one of the important factors in health. Despite the lack of a significant correlation between health literacy and the amount of use of cosmetic products, our findings demonstrated a weak correlation between these two variables. Given the importance of health literacy, it is recommended that further research consider different groups to examine the relationship between health literacy and the use of cosmetic products.

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Authors' Contribution

Conceptualization: Masoumeh Malek Hoseini, Mohammad Reza Amiri.
Data curation: Masoumeh Malek Hoseini.
Formal analysis: Mohammad Reza Amiri.
Investigation: Masoumeh Malek Hoseini, Mohammad Reza Amiri.
Methodology: Mohammad Reza Amiri, Seyed Abedin Hoseini Agangari.
Resources: Masoumeh Malek Hoseini, Hossein Vakili Mofrad.
Software: Hossein Vakili Mofrad.
Supervision: Mohammad Reza Amiri.
Validation: Mohammad Reza Amiri, Seyed Abedin Hoseini Agangari, Hossein Vakili Mofrad.
Visualization: Masoumeh Malek Hoseini, Mohammad Reza Amiri.
Writing–original draft: Masoumeh Malek Hoseini, Seyed Abedin Hoseini Agangari, Hossein Vakili Mofrad.
Writing–review & editing: Mohammad Reza Amiri, Seyed Abedin Hoseini Agangari, Hossein Vakili Mofrad.

Competing Interests

The authors declare that there is no conflict of interests in this study.

Ethical Approval

This study was ethically approved by the Ethics Committee of Hamadan University of Medical Sciences (IR.UMSHA.REC.1402.274).

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