Original Paper

Health Literacy and Its Relationship With Body Mass Index

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ABSTRACT

Introduction: Obesity is currently one of the health problems in the world, and the recent report of the World Health Organization has highlighted Health Literacy (HL) as one of the most important determinants of health.

Objective: This study aimed to investigate the HL level and its relationship with Body Mass Index (BMI) in students of Guilan University of Medical Sciences (GUMS).

Materials and Methods: This was an analytical cross-sectional study of the correlational type conducted on 583 students of Guilan University of Medical Sciences who were selected using a stratified random sampling technique. The study data were collected using a demographic form and the HL for Iranian Adults (HLIA) questionnaire. Then the collected data were analyzed using statistical tests of Friedman, ANOVA, and the Independent t-test.

Results: The Mean±SD BMI of the students was 22.66±3.01 kg/m². The HL in the areas of access, reading, understanding, appraisal and decision making, and using information were respectively favorable in 63.5%, 58.5%, 74.4%, 62.6%, and 32.9% of all cases. Moreover, 52.5% of students had a moderate level of HL. There was no significant difference between normal, overweight and obese students regarding their HL (P=0.508).

Conclusion: Although the HL level of most students was moderate, it was not correlated with their BMI. Regarding the importance of HL and its relevance to health implications, the planning for improving HL is required.

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Highlights

- The majority of the university students in this study had a good Health Literacy.

- The majority of the students surveyed had a body mass index of less than 25 kg/m2.

- There was no difference between normal, overweight, and obese students regarding their Health Literacy.

Plain Language Summary

Obesity is considered one of the most significant causes of chronic illnesses around the world. About 500 million people in the world are currently suffering from obesity. The prevalence of obesity and overweight is alarmingly rising, possibly due to the development of urbanization, changes in lifestyle and dietary, and decrease in physical activity. Health Literacy (HL) can be used as one of the active factors in designing preventive behaviors, implementing preventive health services, and increasing the people's knowledge level. This study attempted to investigate the HL level and its correlation with body mass index (BMI) in students of Guilan University of Medical Sciences. The study results indicate that the majority of students had a BMI of less than 25 kg/m^2, i.e. a normal BMI. The HL of the majority of students was favorable and the HL of obese, overweight and normal students was not significantly different. Because of no relationship between HL and BMI and the subjects' status of studying, their graduation and employment may change this association in the future. Therefore, it is suggested that further studies be conducted on the relationship between the type of occupation, HL, and BMI.

Introduction

Obesity has been considered one of the most significant causes of chronic illnesses around the world, and the greatest challenge to public health in the current century so that the health system in most countries of the world is engaged in its problems and complications [1-4]. In this regard, 18 objectives were set by the World Health Organization (WHO) under the topic of "Healthy People 2010" to this problem [3, 5]. About 500 million people in the world are currently suffering from obesity [6, 7]. It is expected that the number of overweight people reaches 1.3 billion by 2020, including 573 million people with obesity [2].

National studies conducted in different provinces of Iran have shown that 34% of women and 10% of men have abdominal obesity [8]. In a study conducted on medical students of Isfahan University of Medical Sciences, it was shown that none of the female students were overweight and obese, and only 5.31% of them had abdominal obesity. However, 5.88% of male students were overweight, 3.92% had obesity, and 4.95% had abdominal obesity [9]. In another study on 282 female medical students of Guilan University of Medical Sciences, 12.7% were overweight and 0.4% obese [10]. The prevalence of obesity and overweight is alarmingly rising in Iran, possibly due to the development of urbanization, changes in lifestyle and dietary, and decrease in physical activity [11].

Health Literacy (HL) can be used as one of the active factors in developing preventive behaviors, using preventive health services, and increasing the people's knowledge level [12]. HL is defined as the capacity of individuals to acquire, interpret, and understand basic health information and services that are necessary for making effective health decisions [13]. Various studies have shown that a low level of Health Literacy leads to a delayed diagnosis of diseases, impaired self-care skills [14], increased hospitalization rates [15], increased incidence of various illnesses, and finally higher mortality rate [16].

According to the Committee on Health Literacy of the American Medical Association, HL is a common concern in health promotion, disease prevention, early screening, health care and policy making [14]. The lower level of HL has been associated with a higher rate of hospitalization, lower preventive care, and higher health costs [17]. In a study in 2007 conducted in 5 selected provinces of Iran, the results showed that 56.6% had inadequate, 15.3% moderate, and 28.1% adequate HL [18]. Low HL can be eliminated by educating individuals and turning them into more useful resources [19, 20].

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The WHO has recently identified HL as one of the most important determinants of health. Thus HL is a critical factor in promoting community health, and further studies should be conducted to provide more information about the HL of medical students and perhaps its possible association with their BMI. This information may guide health care officials and providers. Hence, this study attempted to investigate the HL level and its correlation with BMI in students of Guilan University of Medical Sciences.

Materials and Methods

This was an analytical cross-sectional study of correlational type. The statistical population consisted of 3685 students studying in six faculties of GUMS in the 2014-2015 academic year. The samples were selected using a stratified random sampling technique. The sample size was determined as 583 based on the study of Afshari et al. the Mean and SD of HL information access score (0.8), 90% test power, and a significance level of $P < 0.05$ [21]. The inclusion criterion was having a BMI>18.5 kg/m^2. For sampling, BMI of 630 students was measured. Of this, 47 students did not meet the inclusion criterion.

To measure BMI, an Analog Scale (ASMed) and a non-elastic tape were used. Moreover, one scale was used to measure the weight of all students. Based on the students' BMI values, they divided into three groups of normal weight, overweight, and obese [2]. The data collection tools were a demographic form and the HL for Iranian Adults (HLIA) questionnaire. HLIA is a self-report inventory for measuring HL of individuals aged 18-65 years. It was developed and psychometrically evaluated by Montazeri et al. [22]. HLIA has 33 items rated based on 5-point Likert-type scale measuring HL in five areas: reading, access, understanding, appraisal and decision

making, and using health information. Results of the exploratory factor analysis in their study showed its good construct validity. The total score is between 33 and 165 where scores 33-66 indicate poor literacy; 67-132 moderate literacy; and 133-165 favorable literacy.

After the study approval by the Research Ethics Committee of GUMS (Code: 2930596724) and obtaining written informed consent from the subjects, first, the height and weight of the students were measured and then HLIA questionnaire was completed by the participants. After collecting data, they were analyzed in SPSS V. 21 using statistical tests of Friedman, ANOVA, and the Independent t-test.

Results

The study results indicate that 56.6% of the participants were female, 28.6% were medical students. About 64.3% sleep less than 8 hours per night, and 54% were undergraduate students. Most of them (22.8%) entered university in 2014. The favorite hobby of 62.3% of them was using the Internet. About 60.9% of the samples have acquired health- and disease-related information from the Internet. Regarding the education of students' parents, most of the fathers had academic education (41.2%), and most of the mothers (43.2%) had a high-school diploma. Moreover, 94.7% of mothers and 92.6% of fathers had non-medical and paramedical jobs. The family income of most of them (40.5%) was $300-600 per month.

Around 37.6% had had fast food, and 34% had drunk carbonated drinks once during the last week. About 32.1% had had breakfast and 34% snacks 2-4 times during the last week, where most of them (54.7%) had a sweet snack. About 49.4% of the samples did no ex-

Table 1. Mean±SD of health litrary score and its dimensions separately

Dimensions	Scores	N (%)			Median	Mean±SD
		Poor	Moderate	Favorable		
Access		1(0.2)	212(36.4)	370(63.5)	3.20	4.05±0.61
Reading skill		14(2.4)	228(39.1)	341(58.5)	2.88	3.88±0.81
Understanding		1(0.2)	148(25.4)	434(74.4)	3.76	4.23±0.57
Appraisal and decision making		1(0.2)	217(37.2)	365(62.6)	3.02	3.98±0.58
Decision making and using health information		2(0.3)	389(66.7)	192(32.9)	2.14	3.66±0.62
Total		1(0.2)	306(52.5)	276(47.3)	3.01	3.92±0.46

Table 2. Comparing Health Litrary and its dimensions with Body Mass Index

Dimensions HL *	BMI **	Median	Mean±SD	Min	Max	Sig.***
Reading	Normal	4.04	4±0.60	2	5	
	Overweight	4.07	4±0.67	1	5	0.248
	Obese	4.30	4.17±0.46	3.5	5	
Access	Normal	3.88	4±0.81	1	5	
	Overweight	3.82	4±0.81	1.5	5	0.473
	Obese	4.05	4.5±0.78	2	4.75	
Understanding	Normal	4.25	4.29±0.57	2	5	
	Overweight	4.16	4.29±0.61	1	5	0.424
	Obese	4.22	4±0.30	3.86	4.71	
Appraisal	Normal	3.97	4±0.58	2	5	
	Overweight	4.03	4±0.60	1.5	5	0.621
	Obese	4.09	4±0.48	3.25	5	
Decision making and using health information	Normal	3.64	3.67±0.60	1.58	5	
	Overweight	3.73	3.75±0.70	1	5	0.274
	Obese	3.75	3.83±0.42	3.08	4.25	
Total	Normal	3.91	3.94±0.44	2	4.97	
	Overweight	3.93	3.97±0.54	1.18	5	0.508
	Obese	4.03	4±0.34	3.33	4.45	

* Health Litrary; ** Body Mass Index; *** ANOVA

ercise. According to the students' views, 25% of their fathers and 37.9% of their mothers were obese. Furthermore, 81% of students had a healthy BMI, 17.2% were overweight, and 1.9% were obese. The Mean±SD weight of participants was 65.51±12.44 kg. Their Mean±SD height was 169.65±9.43 cm, and Mean±SD BMI was 22.66±3.01 kg/m^2.

The HL of subjects was favorable in terms of access (63.5% of the samples), reading (58.5% of the samples), understanding (74.4% of the samples), and appraisal and decision making (62.6% of the samples). According to Friedman test results, there was a significant difference between different dimensions of HL (P=0.0001) (Table 1). The Kolmogorov-Smirnov test results showed that the BMI of the subjects had a normal distribution. The comparison of HL level in normal, overweight, and obese groups using 1-way ANOVA showed no significant difference between them (Table 2).

The mean HL score of students was significantly different between study groups in terms of gender (P=0.046); the Internet use (P=0.014); using educational brochures, pamphlets, and manuals (P=0.011); and reading books (P=0.0001) based on the results of the Independent t-test. Also, the mean HL score of students was significantly different between study groups

in terms of knowing the source to acquire information (P=0.003), father's education (P=0.011), family income (P=0.025), having snack (P=0.004) and breakfast (P=0.001) in the last week, large snack consumption (P=0.003), and educational level (P=0.022) based on the results of 1-way ANOVA.

Discussion

The findings of this study showed that although the HL score of most students was moderate, its difference between normal, overweight and obese groups was not significant. The majority of the students had normal BMI. Likewise, the results of Rahimibashar and Maddah study on the assessment of overweight, obesity and abdominal obesity among nursing students showed that most students had average weight [23].

Mohtasham Amiri and Maddah investigated the prevalence of overweight and obesity among female medical students and reported that the BMI of most students was normal [10]. Although in the present study and other similar studies, the majority of the study participants had a normal BMI, a large percentage of students were overweight and obese. College students as a well-educated community group, are expected to pay more attention to their weight as a

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health indicator. Perhaps eating fast foods or the foods at self-service restaurants on campus is a reason for the weight gain in some students. More research is needed to identify and resolve the causes.

According to the results of this study, there was a significant difference between the mean score of HL in different dimensions. In the study of Javadzade et al. who studied HL among adults in Isfahan, about half of samples had sufficient HL [14]. Results of Nekoei-Moghaddam et al. showed that the majority of samples in urban areas of Kerman City had low HL, and the mean score of people with higher education was higher than those with lower education where the difference between them was significant [24]. Different HL levels in groups with different levels of education are not unusual, and particularly medical college students are expected to have higher HL levels.

In this study, the BMI was not significantly correlated with the HL level in total and in different dimensions. However, the study of Lam and Yang showed that obese and overweight subjects had lower HL than those with normal weight [25]. Kooshyar et al. in a study entitled "Health Literacy and its relationship with medical adherence and health-related quality of life in diabetic community-residing elderly" also reported no relationship between HL and BMI [26]. Considering these different results, it seems that lifestyle, geographical differences, and culture can be a factor affecting the relationship between HL and BMI.

In the current study, those with higher family income had better HL. Consistent with these results, Javadzade et al. study found out that low-income adults had lower HL [14]. Vozikis et al. also showed that families with low to moderate income had lower HL level [27]. People with low income may have no difficulty in understanding, reading, accessing, and evaluating, but may not afford to utilize health information in their lives. In their study, men had lower HL levels [27]. In our study, females had higher HL score, and the difference between men and women was significant. This is consistent with the result of Vozikis et al. [27] and Afshari et al. [21] studies. One of the possible reasons for the higher HL levels of women, is their higher refers to the health care centers and acquiring, understanding, and using more health information.

In the present study, age had no significant correlation with HL. In the study of Afshari et al. who studied HL in adults living in Tuyserkan city in Hamedan Province, Iran, adults aged between 40-50 years had better HL [21] . However, in Javadzade et al. study, older adults

had lower HL [14]. Perhaps because the questionnaires and the study groups were not the same in these studies, different results have been obtained.

The most important source for health-information acquisition in the current study was the Internet which is in agreement with the results of Khosravi et al. and Park and Lee in South Korea [1, 28]. However, in the study of Afshari et al. samples did not have enough access to information sources, including the Internet that is one of the most useful available sources and people can more easily collect health information through it [21].

In this study, men were more overweight than females. This finding is against the results of Madah, Dehkordi et al. and Peltzer et al. where women were more overweight [2, 29, 30]. One of the possible reasons for this difference is the lifestyle and inactivity of women and working at home which finally leads to a decrease in physical activity compared to men. Cultural and social issues may be other reasons for this difference.

According to our study results, students whose father's occupation was related to medicine and paramedics were more overweight and obese. This is inconsistent with the results of Jalilvand et al. who showed that the mean BMI of students had a significant correlation with the maternal occupation, but had no association with paternal occupation [31]. However, it is consistent with the findings of Abtahi et al. who reported a significant relationship between parents' job and overweight and obesity in children [32]. It can be said that employed fathers have less control over their children due to fatigue after a long day at work. It should also be noted that having paramedical jobs is not a reason for high HL levels.

Results of this study also showed that those whose favorite activity was browsing the Internet and watching TV were more obese and overweight that is consistent with the findings of Shakeri and Mojtahedi and Jalilvand et al. studies [3, 31]. Lack of mobility and physical activity can be a reason for having obesity. Based on the results, the college students' obesity had a significant relationship with the obesity of parents which is consistent with the results of Jalilvand et al. study [31]. This can be related to the role of genetics in determining the weight of individuals.

One of the limitations of this study was the use of the questionnaire in gathering information from the participants where the respondent's conditions may affect the reported responses. Given that there was no

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relationship between HL and BMI and considering that the subjects were still studying, their graduation and employment may change this association in the future. Therefore, it is suggested that further studies be conducted on the relationship between the type of occupation, HL, and BMI.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of GUMS (Code: 2930596724). Also the written informed consent was obtained from the subjects

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Authors' contributions

All authors contributed in designing, running, and writing all parts of the research.

Conflict of interest

The authors declared no conflict of interest.

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