HEALTH AWARENESS AMONG FEMALE UNDERGRADUATE MEDICAL STUDENTS IN SAUDI ARABIA

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Abstract. This study was conducted to assess the level of health awareness (HA) among students attending three undergraduate programs in the Colleges of Applied Medical Sciences (CAMS) in Riyadh, Saudi Arabia (SA). A modified self-reported survey was utilized to measure HA demonstrating four domains: Nutrition (NU), Personal Health (PH), Physical Exercise (PE), and Body Build (BB). The questionnaire was distributed to 302 female students attending the first semester of the academic year 2014-2015 BS degree in Radiology Sciences (RS), Clinical Laboratory (CL), and Health Education (HE) departments. Bloom's taxonomy was utilized to describe the three cognitive levels. Synthesizing, creating, and evaluating were grouped to represent high level indicators; applying cognitive skills only revealed an intermediate level; while memorizing and listing demonstrated low levels. In a 5-point Likert scale, the overall mean (M) of HA among CAMS students was 3.82 with the highest among students attending HE (M=3.89). The domain of PH ranked first with a high average (M=4.30). There were significant differences (α=0.05), in the level of HA in PH and BB domains, among students in terms of program specialty only, but no such significant differences were found for other characteristics. The study recommended incorporating health promotion concepts within teaching curricula and conducting health and education campaigns by health education institutions.

Keywords: female undergraduates, health awareness, health curricula, health education, medical students, Saudi Arabia

INTRODUCTION

Where effective public healthcare systems enforce both, curing and caring are two strategic approaches employed to increase wellness among societies (Kohn *et al*, 2000). One approach to maintain effective health performance is promoting health awareness (HA) among community through introducing health knowledge in health schools curricula (Drain *et al*, 2007). Consequently, mortality and morbidity rates, as well as the country's health expenditures, should be reduced significantly (Hejaili *et al*, 2007). In most countries, including Saudi Arabia (SA), governments spend an extravagant budget to improve citizens' health and

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wellbeing. Thus, the role of public health institutions in sustaining effective awareness among the population is based on the impact of such endeavors, especially in medical educational perspectives.

Historically, one central resource of knowledge is still attending formal schools where materials and settings offer a major impact in building based-knowledge community (Shulman, 1987). In healthcare services, professionals encounter knowledge from theory and experience, but the role of training is critical (Westin *et al*, 2015).

Health Awareness comprises knowledge and beliefs formed by individuals about health issues and problems: diseases, and chronic health problems, such as smoking, addiction, and obesity (Madeo *et al*, 2008). It includes the ability and willingness of the person to change her lifestyle and behavioral habits to increase wellbeing (Heimlich and Ardoin, 2008; Bartholomew-Eldridge *et al*, 2011; Jiang and Leung, 2012).

Therefore, HA is not limited to a particular aspect of health behavior, as its scope includes all the elements that are necessary for humans to be in a completely healthy state. These elements are interrelated and affect each other; especially partnerships with institutions that render education and assess outcomes (Videto and Hodges, 2009).

Educational institution rules

While educational institutions are key to creating HA capacity among students, there are limited numbers of studies available to measure HA among university students in the gulf countries. However, the findings of available studies have shown variations. For example, a descriptive study of HA levels and sources of health information among students of Al-Balqa Applied University in Jordan indicated that students' awareness ranged between low to medium levels. Additionally, there were some statistically significant differences among the variables of the study in terms of some demographic characteristics (Bany Sayd, 2014).

Conversely, Ashraah *et al* (2013) found that the degree of HA among students was lower than the acceptable level for a college student, also with some demographic differences among groups. Among 240 medical students, the insulin function was not properly addressed in educating patients with diabetes (Latifeh and Khalidi, 2012), but the results of knowledge regarding diabetes were higher for Bachelor's than diploma students in another study (Nashash, 2013). To increase healthy activities, the main learning incentives should be how the course syllabus is designed and delivered.

Health knowledge on specific disease

Few studies have assessed HA levels among students on knowledge and symptoms of specific diseases. A recent study conducted among female students at the College of Pharmacy at the University of Sharjah, United Arab Emirates (UAE), concluded that high incidence of breast cancer in the UAE may be attributed to the low level of awareness of the disease among females attending official schools (Abduelkarem *et al*, 2015).

In Saudi Arabia, a study among female university students indicated that respondents have low knowledge of breast cancer symptoms and management, and they were not clear about the etiology and risk factors associated with breast cancer (Latif, 2014). Another study among Saudi female university students showed that there was a lack of knowledge regarding cervical cancer, Pap smear, and HIV as a major risk factor for cancer of the cervix

(Mohammed *et al*, 2014). In contrast, Zakai and Zakai (2015) assessed the level of HA about osteoporosis among university students in SA, and found that more than two-thirds were able to identify the risks associated with it. With regard to awareness of tuberculosis, a cross sectional study conducted among King Saud University in Riyadh SA, students established poor level of awareness of tuberculosis (Alsalem *et al*, 2015). Knowledge about tuberculosis was significantly higher amongst the track of Health Colleges enrollees (46.7%) compared with the track of Science (27.2%) and the track of Humanitarian students (26%). Thus, the literature review has not been fully comprehensive when measuring HA among female students attending health sciences colleges, especially when they are currently undertaking essential health courses.

Bloom's taxonomy of educational objectives focuses on the mastery of the intended issues and the promotion of, either, higher forms of critical thinking and ability to meet the desired outcomes (the highest level) or a utilitarian approaches that simply transfer of facts are involved (the lowest level). Medical schools encourage students to apply health education tools to enhance quality of care (Vichayanrat and Kositpumivate, 2014).

This study aimed to assess HA level among female students in three medical program tracks in Radiology Sciences, Clinical Laboratory, and Health Education (RS, CL, and HE, respectively), and explore differences in the level of HA ascribed to various factors based on Bloom's taxonomy of educational aims.

MATERIALS AND METHODS

The measurement of HA level was based on Bloom's cognitive taxonomy approach through reporting four health domains: Nutrition (NU), Personal Health (PH), Physical Exercise (PE), and Body Build (BB).

Respondents and setting

The population of this study was 1,152 first-year female students enrolled in the Academic Year 2014-2015 BS degree at CAMS. A sample of 302 students was drawn from the population using stratified random sampling that created strata according to the departments and then using simple random sampling within strata of RS, CL, and HE departments. Accordingly, 70 students of RS department, 134 students from CL department, and 98 from HE departments participated in the study.

Variables

While the independent variables included specialization, academic level, GPA, and marital status, the dependent variables used in the study were Nutrition (NU), Personal Health (PH), Physical Exercise (PE), and Body Build (BB).

Ethical considerations

The Institutional Review Board of CAMS at King Saud University approved this study (Unnumbered document provided as verification; 2015 Jan 03).

Instruments and data collection

With minor modifications, the study adopted surveys designed to measure students' HA level with respect of their daily nutrition, personal health, sportive activities, and body domains (Abd Al-Haqq *et al*, 2012; Ashraah *et al*, 2013). The study tool consisted of 31 items distributed on four domains: NU (8 items), PH (5 items), PE (8 items), and BB (10 items). The answer scale was Likert fivefold scale. Five experts in the field of public health judged the validity of the tool, while minor modifications took place.

Table 1
Demographic characteristics of the female students.

Variables	Baseline characteristics	*n* (%)
Specialization	RS	70 (23.2)
	CL	134 (44.4)
	HE	98 (32.4)
Academic level	Freshmen	96 (31.8)
	Sophomore	80 (26.5)
	Junior	49 (16.2)
	Senior	77 (25.5)
GPA	Excellent	197 (65.2)
	Very good	104 (34.4)
	Good	1 (0.4)
Marital status	Single	283 (93.7)
	Married	16 (5.3)
	Other	3 (1.0)

RS, Radiology Sciences; CL, Clinical Laboratory; HE, Health Education.

The study tools were prepared in Arabic language and distributed to 330 students selected among female students of the academic year of 2014-2015. The questionnaires were distributed to students in their respective classes before the start of lectures and collected from them after the end of classes.

Statistical analysis

The data for the study were analyzed using the SPSS version 21 (IMB, Armonk, NY). The statistical analysis included descriptive statistics to perform demographic analysis of the sample and to explore the level of HA among female students. The mean rules were used to determine the HA level considering that the maximum answer in the scale was 5 and the minimum was 1. A further statistical analysis was employed through inferential analysis including one-way ANOVA and Tukey tests to test statistically significant differences in the level of HA ascribed to the variables of specialization, academic level, GPA, and marital status.

RESULTS

After cross checking the questionnaire, four questionnaires were not fully answered, and 24 of them were not answered at all. Only 302 surveys were fully answered and used for analysis.

The value of Cronbach's alpha coefficient was 0.815. A scale of 0.6 was considered to be poor, 0.7 range was acceptable, and those over 0.8 were good (Sekaran, 2000).

Demographic analysis

The study sample consisted of 302 students from three groups: RS department (70 students representing 61.4% of all RS students), CL department (134 students representing 64% of all CL students), and 98 students from HE department (representing 68% of all HE students). The sample represented 26.2% of the study population. Table 1 shows the frequencies and percentages of students according to their specialization, academic level, GPA, and marital status.

Table 2
Correlation between the study variables.

Domain		NU	PH	PE	BB	HA Level
PH	Pearson correlation	0.147[a]				
	Sig. (2-tailed)	0.010				
PE	Pearson correlation	0.402[b]	0.334[b]			
	Sig. (2-tailed)	0.000	0.000			
BB	Pearson correlation	0.397[b]	0.345[b]	0.477[b]		
	Sig. (2-tailed)	0.000	0.000	0.000		
HA level	Pearson correlation	0.684[b]	0.536[b]	0.772[b]	0.840[b]	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000

[a]Correlation is significant at the <0.05 level (2-tailed). [b]Correlation is significant at the <0.01 level (2-tailed). PH, Personal Health; PE, Physical Exercise; BB, Body Built; NU, Nutrition; HA, health awareness.

Table 3
Results of one-sample *t*-tests.

Health domain	*t*	df	Sig (2-tailed)	Mean difference	95% Confidence interval of the difference	
					Lower level	Upper level
CAMS HA Level	34.272	301	0.000	0.77419	0.7297	0.8186
NU	15.734	301	0.000	0.44868	0.3926	0.5048
PH	44.408	301	0.000	1.30397	1.2462	1.3618
PE	22.148	301	0.000	0.66970	0.6102	0.7292
BB	25.723	301	0.000	0.85331	0.7880	0.9186

CAMS, Colleges of Applied Medical Sciences; HA, health awareness.

The correlations of the four factors of the model with the HA level of the respondents were analyzed to examine the existence of any relationships. The results of the analysis are presented in Table 2; all correlations are significant at the 5% level.

Table 3 shows the results of the one-sample *t*-tests applied on students' awareness data. As the HA level and all awareness factors showed significant value, the students' awareness level and their perceptions towards NU, PH, PE, and BB were positive, as they are significantly higher than the mean level.

Level of health awareness

Table 4 shows that the level of HA among students was intermediate, with an average of 3.82. The domain of PH ranked first with a high average of 4.30, followed by the domain of BB that had an intermediate average of 3.85. The PE domain ranked third with a medium average of (3.67). Finally, the NU domain ranked last with a medium average of (3.45).

One-way ANOVA of each domain in accordance with the independent variables showed that there were significant differences in the level of HA ($\alpha = 0.05$)

Table 4
The level of health awareness among female students at CAMS.

Domain	Mean	SD	Awareness level[a]
PH	4.30	0.51	Advanced
BB	3.85	0.58	Intermediate
PE	3.67	0.53	Intermediate
NU	3.45	0.50	Low
Average	3.82	0.38	Intermediate

[a]Based on the mean of the results, for the first level, the value above 3.90 was advanced, for the second level, the value of 3.67-3.90 was intermediate, and the value below 3.67 was low.

Table 5
One-way ANOVA analysis on health awareness ascribed to independent variables.

Domain	Source of variance	Sum of squares	df	Mean square	F	*p*-value
HA level	Between groups	1.466	2	0.733	4.880	0.008
	Within groups	44.921	299	0.150		
	Total	46.387	301			
NU	Between groups	0.991	2	0.496	2.032	0.133
	Within groups	72.932	299	0.244		
	Total	73.923	301			
PH	Between groups	2.957	2	1.478	5.861	0.003
	Within groups	75.419	299	0.252		
	Total	78.375	301			
PE	Between groups	1.588	2	0.794	2.913	0.056
	Within groups	81.527	299	0.273		
	Total	83.115	301			
BB	Between groups	2.245	2	1.122	3.432	0.034
	Within groups	97.787	299	0.327		
	Total	100.032	301			

regarding the variable of specialization. However, no significant differences were found in the academic level, Grade Point Average (GPA), and marital status variables, as shown in Table (5).

Table 6 shows the HA level based on specialization. Students of all departments had immense knowledge about PH, followed by BB domains. However, the knowledge regarding these domains is much higher among students of HE department than the rest of the participants.

HA level data was tested for normality. It was observed that the data could be approximated to normal distribution, based on the shape of the histogram, the normal Q-Q plots, and the normality tests. Therefore, application of ANOVA is valid. In the cases of significant differences, Post Hoc analysis using Tukey HSD was car-

Table 6
Health awareness level differences according to specialization.

Domain	RS (*n*=70)		CL (*n*=134)		HE (*n*=98)	
	Mean	SD	Mean	SD	Mean	SD
NU	3.55	0.58	3.41	0.51	3.44	0.41
PH	4.31	0.57	4.21	0.49	4.43	0.46
PE	3.69	0.52	3.59	0.51	3.76	0.54
BB	3.91	0.57	3.76	0.54	3.95	0.61
Overall	3.86		3.74		3.89	

Table 7
Homogeneous subsets based on multiple comparisons using Tukey HSD – (Tukey HSD a, b).

CAMS Department	*n*	Subset for alpha = 0.05		
		1	2	Significance
HA Level				
CL	134	3.6967		
RS	70	3.8235	3.8235	3.8450
HE	98		0.0660	0.9240
PH Level				
CL	134	4.2045		
RS	70	4.3143	4.3143	4.4327
HE	98		0.2930	0.2410
BB Level				
CL	134	3.7582		
RS	70	3.9057		
HE	98	3.9459		0.0650

Means for groups in homogeneous subsets are displayed.
a. Uses harmonic mean sample size=93.889.
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type error levels are not guaranteed.

ried out. The results of this analysis were presented in Table 7.

DISCUSSION

The results of the study indicated that the students' awareness level and their perceptions towards NU, PH, PE, and BB domains were intermediate, and they were significantly higher than the mean level. Based on Bloom's taxonomy of learning, CAMS students showed intermediate forms of critical thinking based on their levels of analysis and synthesis. As the domain of PH ranked first with a high average, followed by the domain

of BB, this result can be justified by the notion that females were more caring for their physical appearance than others, undertake various hygiene activities, and adopt behaviors that help them to improve their PH and BB (Khataibeh and Rawashdeh, 2003).

According to the World Health Organization (WHO, 2009), physical inactivity is globally more prevalent among women than their male counterparts. The findings of the study were not comparable with other studies related to physical activity among university students in Saudi Arabia (Khalaf *et al*, 2013; Awadalla *et al*, 2014). A review of the evidence of physical activity among men and women in the countries of the Gulf Cooperation Council found that the prevailing climate conditions, high dependency on automobiles, as well as the employment of domestic helpers, seemed to contribute to low levels of activity in daily life (Jafar *et al*, 2012).

However, domains of PE and the NU ranked as medium averages. The findings of the study were compatible with other studies related to nutrition and dietary habits among female university students in Saudi Arabia (Konczos *et al*, 2012; Desouky *et al*, 2014). Physical inactivity and bad dietary habits attribute to increasing prevalence of cardiovascular diseases risk factors. Screening and interventions programs to raise awareness about specific disease may be needed rather than maintaining only course training.

The study also showed that there were significant differences regarding the variable of specialization, but significant differences were not found in the academic level, GPA, and marital status variables. The Sidak test for post comparisons showed statistically significant differences in the level of HA between the HE and CL departments, which favored HE department over the CL department regarding the PE and BB domains. However, HE and RS department subjects did not show any statistically significant differences in the level of HA.

Thus, the study indicated there were significant differences in specialization of HE students who scored the highest (mean) level of HA among the three groups. Based on Bloom's taxonomy of education, the outcomes of HE program demonstrated higher forms of learning in terms of medical awareness and evaluation than the other groups. This is justified by the nature of their specialization and course objectives. The HE department is concerned with motivating and enabling individuals and society to assume responsibility for their health by adopting behaviors and supporting social policies that can promote and maintain health. Consequently, HE students are expected to have a higher level of knowledge, skills, and positive attitudes about health, and they are the ones who will be responsible for HA programs at the society level. The finding of this study was similar to the other studies (Abd Al-Haqq *et al*, 2012; Konczos *et al*, 2012) regarding the level of HA among university students and finding differences in HA level by specialization.

The study was limited to the female students in CAMS who were attending the academic year of 2014-2015 at RS, CL, and HE departments. Conducting a similar study by including both males and females will enable identifying genders differences. Further, sample size in this study limits the scope of large-scale applicability of the results. Data gathered from a larger sample size may be useful to further validate the results. For general-

ization of the results, similar studies may be conducted among medicine and nursing students. The findings of this study assist the faculty and academic affairs to review and modify current curricula of the BS degree programs to include health topics that enforce the students' HA and encourage their critical thinking abilities and meet health outcomes.

Further studies highlighting the impact of certain pedagogical programs, especially case studies and practical sessions among different students, may also be initiated. Methodologically, other researchers could validate the scale with its correspondence values, especially when employing Bloom's taxonomy measurements. Conducting health awareness campaigns in collaboration with reputed health organizations is recommended to take place especially in medical institutions.

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