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Knowledge and Attitudes of Health Care Professional Students at King Saud Bin Abdulaziz University (KSAU-HS) Regarding Infection Control Practices

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Abstract

Objective: The objective of the study is to explore the knowledge and attitude of health care professional students in King Saud Abdulaziz University (KSAU-HS) regarding infection control practices.

Methods: A self-administered questionnaire consisting of 17 open-and-close ended items was filled up by a randomly selected number of students in 5 health related colleges in KSAU-HS. Knowledge score was classified into four categories based on participants' answers, 10: excellent, 7-9: good, 4-6: moderate, and 1-3: poor. Results were analyzed using Statistical Package for Social Sciences (SPSS) version 22.0. Knowledge and attitude towards infection control guidelines were then compared in relationship to individual colleges, gender, age, and academic years using Mann- Whitney, Kruskal Wallis and Post hoc statistical tests.

Results: 314 students (69.4 males) participated in this study. The majority (94.7%) of College of Nursing (CON) students were satisfied from the presence of infection control guidelines in their curriculum. Practice of guidelines by supervisors was also reported to be the highest (94.7%) among CON students. The majority of students (69.1%) obtained good knowledge score, College of Dentistry (COD) was the highest. The mean rank of scores was significantly higher in females. Second academic year students mean rank of score was the highest with significant difference compared to first year. There was significant difference between College of Medicine (COM) and CON and between COM and College of Applied Medical Sciences (COAMS) in knowledge scores.

Conclusion: It is concluded that infection control guidelines and practices exist in the undergraduate curriculum of health sciences colleges. It however needs improvement and reinforcement.

Key words: Infection Control, Knowledge, Practice, Health Science students, Saudi Arabia.

Introduction

Infection Control has become a very important aspect of optimizing health care in every country. Infection control guidelines have therefore become a significant part of the curriculum of health sciences colleges. Knowledge and attitude towards these guidelines is mandatory for under- and post- graduate health care professional. Thus, educating students can play a significant role in establishing knowledge and attitude towards applying these guidelines in order to order prevent infections and promote health in hospitals. There are a few published studies that have assessed and evaluated the knowledge and attitudes regarding infection control and prevention practices among undergraduate health sciences students in Saudi Arabia[1]. The present study aims to evaluate and assess student's knowledge and attitudes towards infection control practices in five health sciences colleges: College of Medicine (COM), College of Nursing (CON), College of Dentistry (COD), College of Pharmacy (COP), and College of Applied Medical Sciences (COAMS) in King Saud Abdulaziz University for Health Sciences in Riyadh, Saudi Arabia (KSAU-HS).

Methods

Study Design and Setting

This study was conducted in COAMS in KSAU-HS, Riyadh, Kingdom of Saudi Arabia. It used quantitative cross-sectional questionnaire-based approach. This consisted of 17 open-and-closed ended items in a self-administered questionnaire filled up by a randomly selected number of students from the above mentioned 5 health sciences colleges.

Sample Size and Technique

The sample size of population of 1577 was determined to be 310 by using Roasoft with a margin of error of 5% and a 95% confidence interval[2]. 314 respondents were obtained. The sampling strategies were quota and convenience sampling. The quota sampling was used to determine the proportions of students needed from each college. The convenience strategy was used to include whoever students from each group who agreed to participate (Table 1). All students, females and males in their 1st, 2nd, 3rd, and 4th professional years during the 2016-2017 academic year were eligible to participate and were enrolled. A self-administered questionnaire consisting open-and-closed ended items, linked to the curriculum content of infection control was used for data collection (Appendix 1). A pilot study was conducted on a random sample of students to ensure reliability and validity of the questionnaire, which was modified according to the feedback. The developed questionnaire was distributed to the respondents selected for the study.

Data Management and Statistical Analysis:

The collected data were entered into MS Excel and the results were analyzed using Statistical Package for Social Sciences (SPSS) version 22.0. Data was analyzed statistically by using means, frequencies, and distributions using Mann- Whitney, Kruskal Wallis and Post hoc statistical tests[2-4]. The knowledge score was classified into four categories based on how many questioned were answered correctly by the respondents, 10: excellent, 7-9: good, 4-6: moderate, and 1-3: poor.

Ethical Consideration

Institutional Review Board (IRB) – King Abdullah International Medical Records Center (KAIMRC) approved the study. An informed written consent was obtained from all the participating students (Appendix II). They were informed that they could interview at any time, and that privacy and confidentiality was completely observed.

Results

Demographic characteristics

The demographic characteristics of the respondents are detailed in table 2. A total of 314 respondents in the study, 309 (98.4%) belonged to the age group of 20-25 years and

4 (1.3%) and 1 (0.3%) were of the 25-30 and 30-35 years respectively. 218 (69.4%) were males and the remaining 96 (30.6%) were females. 165 (52.5%) were students of the 1st, 79 (25.2%) of the 2nd, 58 (18.5%) of the 3rd, and 12 (3.8%) of the 4th professional academic year (Table 2). The majority of respondents were from COM, 218 (69.4%). This was followed by COAMS 55 (17.5%), CON 19 (6.1%), COD 15 (4.8%), and COP 7 (2.2%) (Fig 1).

Exposure of the respondents with respect to Infection Control Practices

As shown in Table 3, the majority of CON students (94.7%) were satisfied regarding the presence of infection control guidelines in their curriculum being the highest satisfied among all colleges. This was followed by COD (93.3%), COM (86.2%), COP (85.7%), COAMS (74.5%). Practice of guidelines by supervisors was also reported to be the highest among COD students (94.7%). This was followed by COD (80%), COM (79.4%), COAMS (72.7%), and COP (57.1%). 100% of the COP students were satisfied having practical sessions on infection control guidelines. Satisfaction in this parameter was 92.2%, 89.5%, 83.6%, and 80% in students from COM, CON, COAMS, and COD respectively (Table 3).

Knowledge score

Knowledge score was classified into four categories based on how many questions were answered correctly by the participating students, 10: excellent, 7-9: good, 4-6: moderate, and 1-3: poor (Table 4). The majority of students of all colleges (69.1%) scored good knowledge score (Table 4). It was noticed that students of COD scored the highest mean knowledge score (9.47) among all the colleges regarding infection control practices. This was followed by COP (9), COAMS (8.85), CON (8.63) and COM (8.06) (Fig 2).

As detailed in table 5, mean rank of knowledge scores was significantly different between males and female (p-value 0.001). The mean rank of scores was significantly higher in females (189.78) compared to males (143.28) using Mann- Whitney test (Table 5).

Table 6 shows that the number of participating students for the first, second, third, and fourth academic years were 165, 79, 58, and 12 respectively. Second year students mean rank of scores was the highest among all other academic years (195.84). Third academic year was next (173.47), then first (135.37) and fourth (132.21) followed (p-value 0.001) using Kruskal Wallis test (Table 6). As shown in table 7, Post hoc test was used for comparison of knowledge scores with academic years. The significant difference was found in comparing first and second academic years (p-value 0.001). Comparison of other academic years with each other did not show a significant difference (Table 7).

Table 8 represents the distribution of knowledge score among all different colleges of KSAU-HS. In comparison with all colleges, COD had the higher mean rank of scores (240.90). Other colleges scores were COP (209.50), COAMS (193.90), CON (181.97) and COM (138.78) (p-value 0.001) using Kruskal Wallis test (Table 8). Post hoc test was used for comparison of knowledge scores with colleges. The significant difference was found between COM and CON and between COM and COAMS (p-value 0.001). Comparison of other colleges with each other, otherwise did not show a significant difference (Table 9).

Discussion

Infection control in hospitals is very significant measure taken by all recognized hospitals and health centers worldwide. It has therefore become a very important tool used to assess any hospital or health center application to standard international quality chapters used for accreditation[5]. Infection control guidelines are available nowadays to all hospitals. They are also part of the curriculum of any health related university colleges or schools. Knowledge, understanding and observation of application of these guidelines are very significant for all

health care givers. It has therefore become important to establish such knowledge and compliance very much early in the health personnel careers. This need to start during the university undergraduate years to continue throughout their career life.

There has been an observed poverty in the literature looking at this important issue among undergraduate health sciences related colleges[6-12]. This is even more when one looks at the amount of published literature from Saudi Arabia or other Arab countries[1]. The published papers concentrated mostly on one type of undergraduate students i.e. dental, nursing, or medical[1, 6-12]. It further focused on one type of infection control modality like hand hygiene or mask usage[10]. In this study, the sample was carefully taken, considering the big differences in the number of students among different colleges so the relatively small numbers selected for some colleges were actually a reflection of the total number of students in these colleges in different academic years. COM therefore had the highest number of participating students. Males also dominated in number due to the fact that the total male numbers outweigh females. The majority of students were of the 20 to 25-year age group as this is the appropriate age for this level of education.

More than 70% of all participating students admitted that infection control guidelines existed in their curriculum. The majority (more than 90%) of CON and COD students stated this clearly compared to other colleges. This is in keeping of the results reported by Nair et al where the knowledge and attitude of nursing students were better than medical students for hand washing[10]. This is perhaps a reflection of the more focus on these guidelines in the education process provided by their teachers. This impression is strengthened by having the same observation that application of these guidelines by their seniors was better in these 2 colleges compared to the other ones. All COP students were satisfied with the practical sessions offered in their curriculum. Other colleges' satisfaction, though less, was good too as more than 80% were satisfied.

In this study the knowledge score was assessed to be good in 69.1% of all students. The knowledge score was best achieved by COD. This may also be a reflection of the factors mentioned above. Females mean knowledge score was significantly better than that for males. This gender difference was not observed by Ojulong et al from Namibia who looked at 140 students; the majority was nursing students and found no gender difference between medical, radiology and nursing students[8]. When the mean knowledge score was analyzed in connection to the individual academic years, it was noticed that the second academic year generally scored the best. This may be a reflection of the enthusiasm, students of this particular year have after passing the stressful first year. Confidence however decreases during later years. There was no significant difference between 2 senior academic years in a dental college in the United Arab Emirates in a study conducted by Betul Rhman et al who studies 119 senior dental school students in Sharjah, UAE[13]. Another factor may be the fact that the guidelines for infection control knowledge is provided in the second year curriculum. This is an obvious reason for this knowledge to be maintained with perhaps booster augmenting revision and feedback or connecting it to other parts of the curriculum so that it becomes a habit for all students to practice it. It appears that knowledge is not enough as its application in real life is even more important. Almaewery et al clearly stated that "Although the students had good knowledge and attitudes regarding infection control, the compliance and practice levels regarding the same were low". COD showed the best score among all colleges. Dental students have been the focus of many studies[1, 9, 11-14]. Next to COD was CON which was also consistent with the literature[8,10].

In conclusion, the present study shows that infection control guidelines and practice, although exist in the undergraduate curriculum in all health sciences colleges, yet they need to be strengthened and their application and practice to be implemented and continuously revisited, augmented and reinforced. Existence of infection control guidelines in their curriculum and application of these guidelines by seniors was best recognized among CON and COD students. The knowledge score was best achieved by COD students and the second academic year was the best. Infection control guidelines and practice are important for all health care providers including undergraduate students in all health sciences colleges. The results reached in this study formulate a base for reference and for further studies in the field.

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List of Figures and Tables

Table 1: Selection of respondents

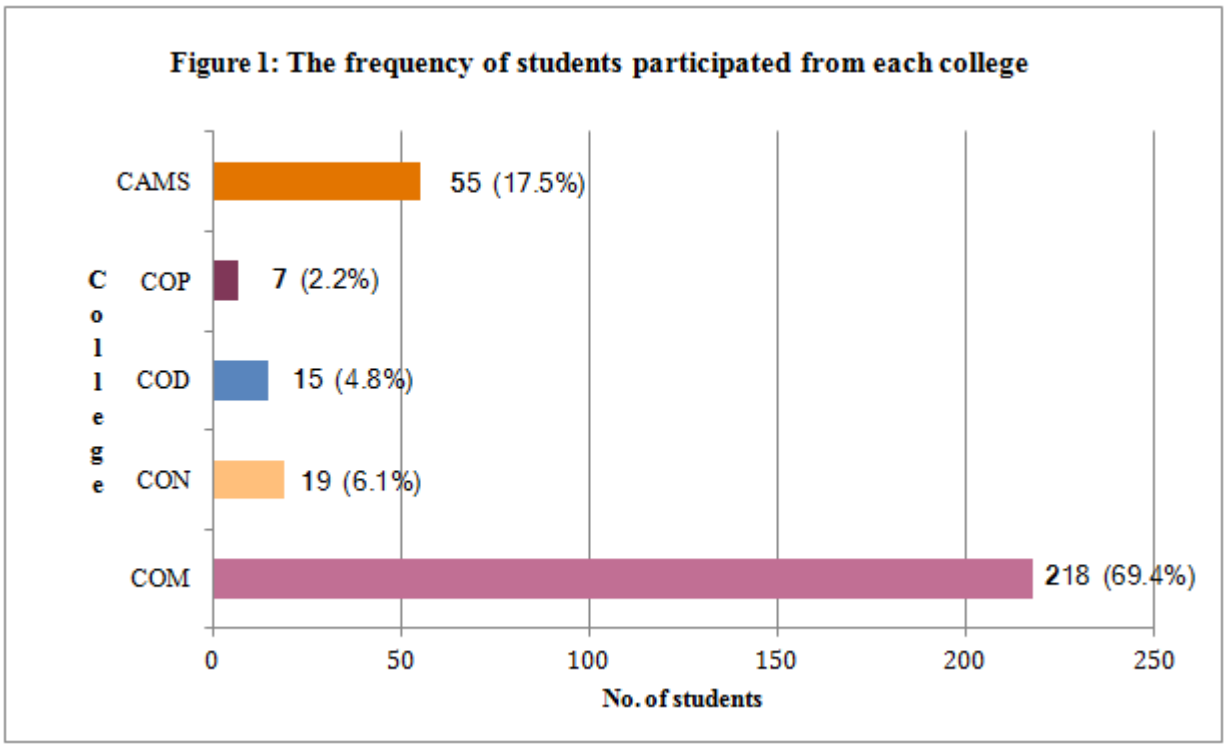
College	Total number of male students	Percentage	Number of students needed	Total number of female students	Percentage	Number of students needed
COM	550	35%	**193**	245	16%	**40**
COD	104	7%	**8**	51	3%	**2**
COP	51	4%	**3**	62	4%	**3**
COAMS	144	10%	**15**	194	13%	**26**
CON				176	11%	**20**
Total	**849**		**219**	**728**		**91**

(COM = College of Medicine, CON = College of Nursing, COD = College of Dentistry, COP = College of Pharmacy, COAMS = College of Applied Medical Sciences)

Table 2: Demographic characteristics of the respondents

Characteristics	Details of participants
	No. (%)
Gender:	
Male	218 (69.4)
Female	96 (30.6)
Age (years):	
20-25	309 (98.4)
25-30	4 (1.3)
30-35	1 (0.3)
Academic years (in years):	
1	165 (52.5)
2	79 (25.2)
3	58 (18.5)
4	12 (3.8)
Total	**314**

Figure 1: The frequency of students participated from each college.



(COM = College of Medicine, CON = College of Nursing, COD = College of Dentistry, COP = College of Pharmacy, and CAMS = College of Applied Medical Sciences)

Table 3: Exposure of the respondents with respect to infection Control Practices

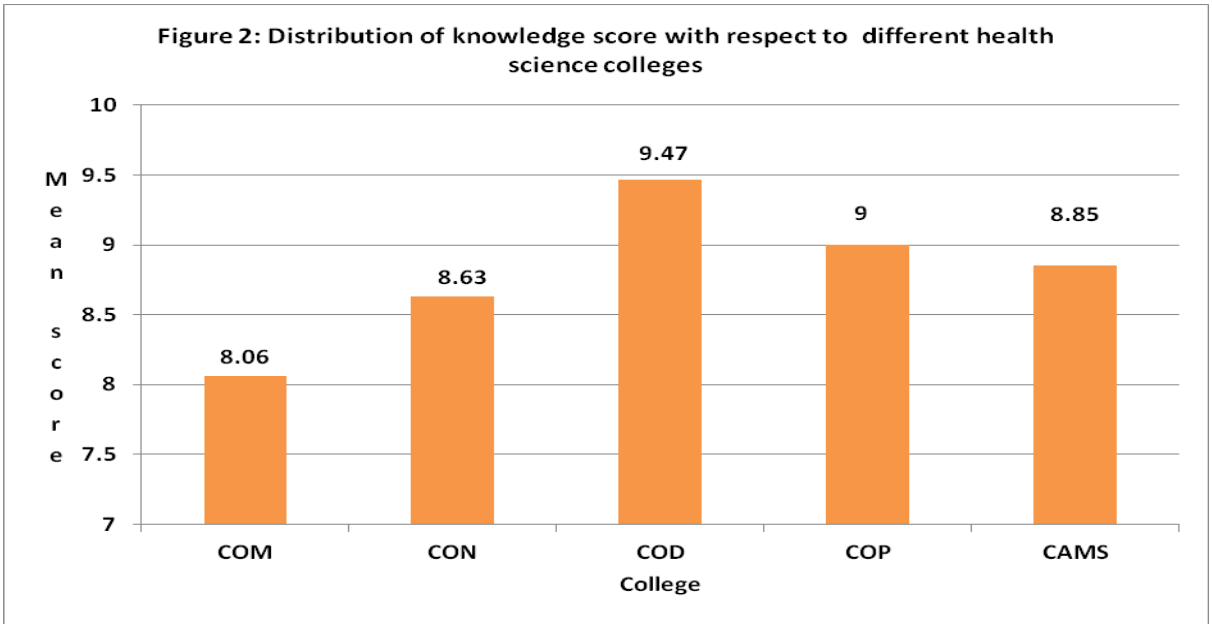
College	No. of respondents	Details of respondents (n= 314)					
		Questions					
		Infection control guidelines included in the curriculum		Practice of guidelines by supervisors		Practical sessions on Infection control given	
		Yes(%)	No(%)	Yes(%)	No(%)	Yes(%)	No(%)
COM	218	188 (86.2)	30 (13.8)	173 (79.4)	45 (20.6)	201 (92.2)	17 (7.8)
CON	19	18 (94.7)	1 (5.3)	18 (94.7)	1 (5.3)	17 (89.5)	2 (10.5)
COD	15	14 (93.3)	1 (6.7)	12 (80)	3 (20)	12 (80)	3 (20)
COP	7	6 (85.7)	1 (14.3)	4 (57.1)	3 (42.9)	7 (100)	-
COAMS	55	41 (74.5)	14 (25.5)	40 (72.7)	15 (27.3)	46 (83.6)	9 (16.4)

(COM = College of Medicine, CON = College of Nursing, COD = College of Dentistry, COP = College of Pharmacy, and COAMS = College of Applied Medical Sciences)

Table 4: Classification of knowledge scores

Score Classification	Range of Scores	No. of Respondents (%)
Excellent	**10**	**72 (22.9)**
Good	**7-9**	**217 (69.1)**
Moderate	**7-6**	**25 (8.0)**
Poor	**1-3**	**0**

Figure 2: Distribution of knowledge score with respect to different health science colleges.



(COM = College of Medicine, CON = College of Nursing, COD = College of Dentistry, COP = College of Pharmacy, and CAMS = College of Applied Medical Sciences)

Table 5: Gender distribution of knowledge score

Gender	Number of respondents	Mean rank of scores	Test Used	Value of test statistic	P value
Male	**218**	143.28	Mann-Whitney	U= 7365	**0.001***
Female	**96**	189.78			

Table 6: Distribution of knowledge score with respect to level of education

Academic year	Number of respondents	Mean rank of scores	Test Used	Value of test statistic	P value
1st	**165**	135.37	Kruskal Wallis	$X^2 = 28.17$	**0.001***
2nd	**79**	195.84			
3rd	**58**	173.47			
4th	**12**	132.21			

Table 7: Post hoc tests for comparing the Knowledge scores with level of education

Academic year	Number of respondents	Mean rank	Test statistic	P value
1st 2nd	165 79	107.08 154.70	U= 3973.5	0.001*
1st 3rd	165 58	105.07 131.71	U= 3642	0.005
1st 4th	165 12	89.22 86.04	U= 954.5	0.829
2nd 3rd	79 58	72.80 63.83	U= 1991	0.175
2nd 4th	79 12	48.34 30.58	U= 289	0.024
3rd 4th	58 12	36.93 28.58	U= 265	0.184

Table 8: Distribution of knowledge score with respect to different health science colleges.

College	**Number of Respondents**	**Mean rank of scores**	**Test Used**	**Value of test statistic**	**P Value**
COM	**218**	138.78	Kruskal Wallis	$X^2 = 36.46$	**0.001***
CON	**19**	181.97			
COD	**15**	240.90			
COP	**7**	209.50			
COAMS	**55**	193.90			

(COM = College of Medicine, CON = College of Nursing, COD = College of Dentistry, COP = College of Pharmacy, and COAMS = College of Applied Medical Sciences).

Table 9: Post hoc tests for comparing the Knowledge scores with college

College	Number of respondents	Mean rank	Test statistic	P value
COM	218	112.35	U= 622	0.001*
CON	15	184.53		
COM	218	111.5	U= 435	0.046*
COP	7	159.86		
COM	218	127.09	U= 3835	0.001*
CAMS	55	176.27		
CON	19	14.00	U= 76	0.013*
COD	15	21.93		
CON	19	12.68	U= 51	0.395
COP	7	15.71		
CON	19	35.71	U= 488.5	0.661
CAMS	55	38.12		
COD	15	12.23	U= 41.5	0.322
COP	7	9.93		
COP	7	36.00	U= 161	0.464
COAMS	55	30.93		

(COM= College of Medicine, CON= College of Nursing, COD= College of Dentistry, COP= College of Pharmacy, COAMS= College of Applied Medical Sciences)