

Knowledge and Attitude of Dental Interns about Management of Tooth Avulsion: A Comparative Cross - Sectional Study

Research Article

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Abstract

Objectives: This study aimed to assess the knowledge and attitude of Saudi and Egyptian dental interns about management of avulsed teeth and to compare between them.

Methods: This cross sectional study was conducted during the period from October, 2019 till December, 2019 after obtaining ethical approval from the institutional research committee in Faculty of Dentistry, Mansoura University. A well-designed questionnaire consists of two parts; part I about demographic data and part II about knowledge of interns was distributed. Data from questionnaires was collected and analyzed using SPSS version 21.0. Chi square test was used to assess percentage and frequencies of independent variables and the relation between the knowledge and the independent variables was estimated.

Results: 324 dental interns out of 415 with response rate 78% participated in the study and returned the completed questionnaires on the same day. Dental interns with more than 6 months' experience and prior knowledge about management of avulsed tooth were better in answering the questions. Dental interns who had not attended an educational program regarding traumatic injuries to teeth showed significant incorrect answers. There were no significant differences between Saudi and Egyptian dental interns in answering 5 from 8 questions related to knowledge about avulsion tooth. Also, there were no significant differences between male and female dental interns who answering 6 from 8 questions correctly.

Conclusion: The Saudi and Egyptian dental interns had sufficient level of knowledge about most items regarding tooth avulsion management.

Introduction

Avulsion is defined as a condition where tooth is completely lost from its socket. It is known as the most serious form of Traumatic Dental Injuries (TDIs) and represents 1%-16% of all dental injuries [1, 2]. Permanent dentition is affected by TDIs more than primary dentition (58.6% vs 36.8% respectively), and the maxillary anterior teeth are the most affected [3]. Most cases with tooth avulsion occur between ages 8 and 11 years [4, 5].

Tooth avulsion management depends on the dentition's type. Replantation of primary teeth is not recommended as it may affect their permanent successors, and the only treatment option is clinical and radiographic follow up of these teeth until eruption of their permanent successors [4, 5]. However, management of permanent tooth avulsion has different protocol as the tooth should be handled from the crown, and if it is contaminated, it must be cleaned using normal saline or cold running water before reposi-

tioning, after that the avulsed tooth is repositioned, and patient should bite gently on a handkerchief to secure it in its socket, if repositioning was not possible, the avulsed tooth must be stored in a physiological medium such as milk, saliva, or saline. Tooth should not be stored in water. Finally, the patient must visit the dentist immediately [6].

It is known that, the main factors that affect success rate of tooth replantation are; factors which directly affect the viability of periodontal ligament cells such as transportation method and media and time period takes place outside the socket [7]. The American Academy of Pediatric Dentistry (AAPD) and the International Association for Dental Traumatology (IADT), recommended immediate replantation of an avulsed tooth to get better prognosis [2, 8]. Previous studies denoted that, tooth should be stored in a storage media if it cannot be replanted within 5 minutes [9-11] as the risk of ankylosis after replantation of avulsed tooth increased with increasing the time of dryness over 20 min [12-14].

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The incidence of dental trauma in Saudi Arabia is higher than that of other countries [15, 16]. Regarding the prevalence of TDI in Saudi Arabia, it was 34% among 12-14 years old [16]. However, in Egypt it was reported to be 14.6% among 8-12 years old children [17], and 13.6% among 11-14 years [18].

Dental trauma should be taught as a first aid condition and an emergency treatment is needed as early as possible. Peoples consider interns and newly undergraduate dental students as dentists, and they may ask them for help in incidence of dental trauma [19]. Various studies all over the world pointed that interns or general practitioners have insufficient knowledge in treating dental trauma [20-24]. The current study aimed to assess and compare the knowledge and attitude of dental interns toward management of avulsed teeth among Egyptian and Saudi dental interns.

Subjects And Methods

This cross sectional study was conducted in Egypt and Saudi Arabia from October to December, 2019. A well-structured close ended questionnaire was constructed using my Google drive forms ([https://docs.google.com/forms/d/1yqlfqcLtwG20nZMyiaqiJRAhty-W0XBr\]wLMv3LFkY8/edit](https://docs.google.com/forms/d/1yqlfqcLtwG20nZMyiaqiJRAhty-W0XBr]wLMv3LFkY8/edit)). The questionnaire was sent through WhatsApp to intern students' coordinators in several dental colleges (public and private) in Egypt (Mansoura Dental College and Delta Private Dental College), and Saudi Arabia (Al-Farabi private college, King Saud Dental College, Dar El Olum private Dental College) who then sent it to their students via the internship's groups.

The questionnaire was validated and used in previous studies [25-29]. It was in English language and consists of 18 questions divided into two parts; part I about demographic data and knowledge of interns regarding the country, age, gender, months of internship experience, if they attended any educational program about management of dental trauma, and whether if they could differentiate between primary and permanent teeth. Part II is used to assess the interns' knowledge and attitude about management of avulsed teeth.

Ethical approval was obtained from the institutional research committee in Faculty of Dentistry, Mansoura University. A brief description about the purpose of the study was sent to the interns along with the questionnaires to get their consents.

Statistical analysis

Data from questionnaires was collected, organized, tabulated, coded and analyzed using SPSS version 21 (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). Chi square test was used to assess percentage and frequencies of independent variables. The relation between the knowledge and the independent variables was estimated. The p value was considered statistical significant at $p \leq 0.05$.

Results

324 dental interns out of 415 (92/ out of 130 Saudi and 232/ out of 285 Egyptian) with response rate 78% (70.8% for Saudi and 81.4% for Egyptians) participated in the study and returned the

completed questionnaires on the same day. There were statistically significant differences between Saudi and Egyptian dental interns regarding age ($p=0.004$), months of internship experience ($p=0.000$), attendance of educational program related to traumatic injuries ($p=0.000$) and seeing a patient with an avulsion of a tooth ($p=0.000$) (Table 1).

Table 1. Demographic Characteristics and Prior Exposure Related to Avulsion Tooth of Dental Interns.

Questionnaire items	Saudi No(%)	Egyptian No (%)	Total No (%)
Gender			
Male	32 (34.8)	64 (27.6)	96 (29.6)
Female	60 (65.2)	168 (72.4)	228 (70.4)
P	0.225		
Age groups (years)			
Less than 25 years	68 (74)	204 (87.9)	272 (84)
More than 25 years	24 (26)	28 (12.1)	52 (16)
P	0.004		
Months of internship experience			
> 6 months	68 (74)	216 (93.1)	284 (87.7)
≤ 6 months	24 (26)	16 (6.9)	40 (12.3)
P	0.000		
Prior knowledge about management of avulsed tooth			
Yes	80 (87)	212 (91.3)	292 (90.1)
No	12 (13)	20 (7.8)	32 (9.9)
P	0.224		
Can you differentiate between the primary and permanent teeth?			
Yes	92 (100)	232 (100)	324 (100)
No	0 (0)	0 (0)	0 (0)
P	-----		
Did you attend any educational program regarding traumatic injuries to teeth?			
Yes	56 (60.9)	76 (32.8)	132 (40.7)
No	36 (39.1)	156 (67.2)	192 (59.3)
P	0.000		
Did you ever see a patient with an avulsion of a tooth?			
Yes	36 (39.1)	44 (18.9)	80 (24.7)
No	56 (60.1)	188 (81.1)	244 (75.3)
P	0.000		
TOTAL	92 (100)	232 (100)	324 (100)

No (%) = number and percentage, p = p value of comparison between Saudi and Egyptian dental intern, all comparisons calculated using Chi square test and 2-sided p value.

Comparison between Saudi and Egyptian dental interns indicated that, there were statistically significant differences for answering all questions related to knowledge of management of avulsion tooth ($p=0.000$) except question about what should you do when found the knocked out tooth and it is dirty ($p=0.100$) and should primary tooth be replanted ($p=0.737$) (Table 2).

Table 2. Knowledge of dental interns related to management of avulsion tooth.

Questionnaire items	Saudi No (%)	Egyptian No (%)	Total No (%)
What is avulsion of tooth?			
Tooth dislodgement of intact tooth out of its socket, due to any trauma	80 (87)	232 (100)	312 (96.3)
Dislodgement of fractured segment of the tooth due to any trauma	12 (13)	0 (0)	12 (3.7)
P	0.000		
Can an avulsed permanent tooth be replanted in all cases			
Yes	28 (30.4)	28 (12.1)	56 (17.3)
No	64 (69.6)	204 (87.9)	268 (82.7)
P	0.000		
What is the ideal time for the re plantation of an avulsed tooth?			
15 minutes	20 (21.8)	120 (51.9)	140 (43.2)
30 minutes	40 (43.5)	54 (23.3)	94 (29)
45 minutes	0 (0)	8 (3.4)	8 (2.5)
1 hour	32 (34.7)	50 (21.4)	82 (25.3)

P		0.000		
You found the knocked-out tooth and it is dirty, will you.....				
Rinse the tooth gently under running tap water for a few seconds without scrubbing it	80 (87)	72 (91.4)	292 (90.1)	
No need to clean the tooth because it is useless	12 (13)	16 (6.9)	28 (8.6)	
Clean the tooth with a toothbrush	0 (0)	4 (1.7)	4 (1.2)	
P		0.100		
What would be the best medium selected to preserve the tooth before getting professional care?				
Patient saliva	12 (13)	111 (47.9)	123 (38)	
Milk	78 (84.8)	109 (47)	187 (57.7)	
Saline	2 (2.2)	12 (5.1)	14 (4.3)	
P		0.000		
What is the most critical factor in the outcome of replanted tooth?				
Extra alveolar dry time	68 (74)	180 (77.6)	248 (76.5)	
Storage media	12 (13)	12 (5.2)	24 (7.4)	
Splinting period	0 (0)	24 (10.4)	24 (7.4)	
Not sure	12 (13)	16 (6.9)	28 (8.6)	
P		0.000		
Type of splint used is.....				
Flexible	36 (39.1)	108 (46.1)	144 (44.4)	
Rigid	52 (56.5)	56 (24.1)	108 (33.3)	
Anyone	4 (4.4)	8 (3.4)	12 (3.7)	
Not sure	0 (0)	60 (25.9)	60 (18.5)	
P		0.000		
Splinting period is for				
2 weeks	40 (43.4)	109 (47)	149 (46)	
4 weeks	33 (35.8)	48 (20.7)	81 (25)	
6 weeks	15 (16.3)	16 (6.9)	31 (9.6)	
Not sure	4 (4.4)	59 (25.4)	63 (19.4)	
P		0.000		
Which one has better prognosis?				
Open apex (immature tooth)	56 (60.9)	84 (36.2)	140 (43.2)	
Closed apex (mature tooth)	36 (39.1)	148 (63.8)	184 (56.8)	
P		0.000		
Should primary tooth be replanted?				
Yes	16 (17.4)	36 (15.6)	52 (16)	
No	76 (82.6)	196 (84.4)	272 (84)	
P		0.737		
Total	92 (100)	232 (100)	324 (100)	

No (%) = number and percentage, p = p value of comparison between Saudi and Egyptian dental intern, all comparisons calculated using Chi square test and 2-sided p value.

Experience level of the dental interns was based on months of internship period and the more the experience, the better the response. This was statistically significant in question regarding;

what should you do when found the knocked out tooth and it is dirty (p=0.026), type of splint used (0.000), splinting period (p=0.000) and whether primary teeth should be replanted or not (p=0.003). Respondents with prior knowledge about management of avulsed tooth were better in answering the questions correctly. This was statistically significant in questions on whether avulsed tooth can be replanted in all cases (p=0.000), what should you do when found the knocked out tooth and it is dirty (p=0.049), what is the most critical factor in the outcome of replanted tooth (p=0.000) and the splinting period (p =0.009). Dental interns who had not attended an educational program regarding traumatic injuries to teeth showed significant incorrect answering on splinting period (p=0.015), which tooth has better prognosis (p=0.012) and whether primary teeth should be replanted or not (p=0.001). Dental interns who had come cross with patients with avulsion tooth showed significant better results in answering correctly on question asking about whether re plantation of an avulsed tooth can be done in all cases or not (p=0.001) (Table 3).

Dental interns answered 4 questions sufficiently correct; Can an avulsed permanent tooth be replanted in all cases? (82.7%), what should you do when found knocked out tooth and it is dirty? (90.1%), what is the most critical factor in the outcome of replanted tooth? (76.5%) and Should primary tooth be replanted? (84%). On the other hand, they answered 4 questions insufficiently; what is the ideal time for the re-plantation of an avulsed tooth (43.2%), Type of splint used (44.4%), Splinting period (46%) and which tooth has better prognosis? (43.2%). There were no significant differences between Saudi and Egyptian dental interns who correctly answering questions related to knowledge about avulsion tooth except for 3 questions; Can an avulsed permanent tooth be replanted in all cases? (p=0.000), what should you do when found knocked out tooth and it is dirty? (p=0.000) and which tooth has better prognosis? (p=0.000). Also, there were no significant differences between male and female dental interns who answering questions correctly except for 2 questions; what should you do when found knocked out tooth and it is dirty? (p=0.013) and what is splinting period? (p=0.000) (Table 4).

Table 3. Association of selected factors with knowledge related to management of avulsion tooth among dental interns.

Questions	Can an avulsed permanent tooth be replanted in all cases?		You found the knocked-out tooth and it is dirty, will you.....		What is the ideal time for the re-plantation of an avulsed tooth		What is the most critical factor in the outcome of replanted tooth?		Type of splint used		Splinting period is for		Which one has better prognosis?		Should primary tooth be replanted?	
	Correct-answer No(%)	Incorrect-answer No(%)	Correct-answer No(%)	Incorrect-answer No(%)	Correct-answer No(%)	Incorrect-answer No(%)	Correct-answer No(%)	Incorrect-answer No(%)	Correct-answer No(%)	Incorrect-answer No(%)	Correct-answer No(%)	Incorrect-answer No(%)	Correct answer No(%)	Incorrect answer No(%)	Correct answer No(%)	Incorrect answer No(%)
Months of internship – Experience																
> 6 months	232 (86.6)	52 (13.4)	252 (88.7)	32 (13.7)	128 (45)	156 (55)	220 (77.5)	64 (22.5)	112 (39.4)	172 (60.6)	117 (41.2)	167 (58.8)	124 (43.7)	160 (56.3)	232 (81.7)	52 (18.3)
≤ 6 months	36 (90)	4 (10)	40 (100)	0 (0)	12 (30)	28 (70)	28 (70)	12 (30)	32 (80)	8 (20)	32 (80)	8 (20)	16 (40)	24 (60)	40 (100)	0 (0)
Prior knowledge about management of avulsed tooth																
Yes	252 (86.3)	40 (13.7)	260 (89)	32 (11)	124 (42.5)	168 (57.5)	236 (80.8)	56 (19.2)	128 (43.8)	164 (56.2)	141 (48.3)	151 (51.7)	124 (42.5)	168 (57.5)	244 (83.6)	48 (16.4)
No	16 (50)	36 (50)	32 (100)	0 (0)	16 (50)	16 (50)	12 (37.5)	20 (62.5)	16 (50)	8 (50)	8 (25)	24 (75)	16 (50)	16 (50)	28 (87.5)	4 (12.5)
Did you attend any educational program regarding traumatic injuries to teeth?																
Yes	112 (84.8)	20 (15.2)	120 (90.1)	12 (9)	52 (39.4)	80 (60.1)	100 (75.8)	32 (24.2)	48 (36.4)	64 (48.4)	68 (51.5)	68 (51.5)	68 (51.5)	64 (48.5)	100 (75.8)	32 (24.2)
No	156 (81.3)	36 (18.7)	172 (89.6)	20 (10.4)	88 (45.8)	104 (54.2)	148 (77.1)	44 (22.9)	96 (50)	96 (50)	81 (42.2)	111 (57.8)	72 (37.5)	120 (62.5)	172 (89.6)	20 (10.4)
Did you ever see a patient with an avulsion of a tooth?																
Yes	212 (86.9)	32 (13.1)	224 (91.8)	20 (8.2)	106 (43.4)	138 (56.6)	184 (75.4)	60 (24.6)	108 (44.3)	136 (55.7)	105 (43)	139 (57)	104 (42.6)	140 (57.4)	204 (83.6)	40 (16.4)
No	56 (70)	24 (30)	68 (85)	12 (15)	34 (42.5)	46 (57.5)	64 (80)	16 (20)	36 (45)	44 (55)	44 (55)	36 (45)	36 (45)	44 (55)	68 (85)	12 (15)

No (%) = number and percentage, p=association between variables and it was calculated by Chi square linear association.

Table 4. Comparison between knowledge related to management of avulsion tooth between Saudi and Egyptian & male and female dental interns.

Questions	Can an avulsed permanent tooth be replanted in all cases?			You found the knocked-out tooth and it is dirty, will you.....			What is the ideal time for the re-plantation of an avulsed tooth			What is the most critical factor in the outcome of replanted tooth?			Type of splint used			Splinting period is for			Which one has better prognosis?			Should primary tooth be replanted?		
	Variables	Cor- rect- answer No(%)	Incor- rect answer No(%)	p	Cor- rect- answer No(%)	Incor- rect- answer No(%)	p	Cor- rect- answer No(%)	Incor- rect- answer No(%)	p	Cor- rect- answer No(%)	Incor- rect- answer No(%)	p	Cor- rect- answer No(%)	Incor- rect- answer No(%)	p	Cor- rect answer No(%)	Incor- rect answer No(%)	p	Cor- rect answer No(%)	Incor- rect answer No(%)	p		
		No(%)	No(%)		No(%)	No(%)		No(%)	No(%)		No(%)	No(%)		No(%)	No(%)		No(%)	No(%)		No(%)	No(%)			
Nationality																								
Saudi = 92	64 (69.5)	28 (30.5)	0.000	80 (87)	12 (13)	0.000	20 (21.7)	72 (78.3)	0.224	68 (74)	24 (26)	0.472	36 (39.1)	56 (60.9)	0.265	40 (43.5)	52 (56.5)	0.622	56 (60.9)	36 (39.1)	0.000	76 (82.6)	16 (17.4)	0.737
Egyptian = 232	204 (87.9)	28 (12.1)		212 (91.4)	20 (8.6)		120 (51.7)	112 (48.3)		180 (77.6)	52 (22.4)		108 (46.6)	124 (53.4)		109 (47)	123 (53)		84 (36.2)	148 (63.8)		196 (84.5)	36 (15.5)	
Gender																								
Male = 96	76 (79.2)	20 (20.8)	0.334	80 (83.3)	16 (16.7)	0.013	44 (45.8)	52 (54.2)	0.542	80 (83.3)	16 (16.7)	0.064	40 (41.7)	56 (58.3)	0.542	68 (70.8)	28 (29.2)	0.000	36 (37.5)	60 (62.5)	0.219	80 (83.3)	16 (16.7)	0.869
Female = 228	192 (84.2)	36 (15.8)		212 (93)	16 (7)		96 (42.1)	132 (57.9)		168 (73.7)	60 (26.3)		104 (45.6)	124 (54.4)		81 (35.5)	147 (64.5)		104 (45.6)	124 (54.4)		192 (84.2)	36 (15.8)	
Sufficiency																								
Total = 324	268 (82.7)	56 (17.3)		292 (90.1)	32 (9.9)		140 (43.2)	184 (56.8)		248 (76.5)	76 (23.5)		144 (44.4)	180 (55.6)		149 (46)	175 (54)		140 (43.2)	184 (56.8)		272 (84)	52 (16)	

No (%) = number and percentage, p= p value calculated by Chi square test.

Discussion

After conducting comprehensive databases searching (Google Scholar, PubMed, and Medline), there were no available data about knowledge of tooth avulsion management among dental interns or dental practitioners in Egypt or data about comparison of the knowledge level between Egyptian and Saudi dental interns. So this study was conducted to explore and compare the knowledge level between them.

The finding of the present study revealed that, the majority of our participants were females (70.4%), and this could be attributed to the general behavior of females as they are usually more active and interactive than males, this finding was matched with that of Azmi and Awooda [30].

It was found that most of our participants had responded correctly to most of the questions, except that about prognosis of mature or immature teeth after replantation and the suitable type of splint, and this could be explained by the fresh knowledge that they acquired during their undergraduate study. These findings were agreed with Azmi and Awooda [30] and Alaslami et al., [31]. On the other hand, Al-Shamri et al., [32] reported low knowledge level regarding dental trauma management among their participants in Saudi Arabia.

It was found that majority of Egyptian and Saudi dental interns did not attend any educational programs related to management of dental trauma, and this was matched with Al-Shamiri et al [32], who found a significant shortage in attending courses about traumatic dental injury. Aljzairy et al., [33] reported that, no significant difference in knowledge between those who had and had not attended a continuous dental education program. This finding was not consistent with several previous studies [34-37] which reported that dentists had higher knowledge scores, had more thorough and better knowledge of dental trauma management and had more confidence in managing these patients after attended post graduate dental trauma courses.

Regarding the knowledge about management of avulsed teeth, 96.3% of our participants defined tooth avulsion correctly and this was matched with Limbu et al [38], however, 7% only of their respondents knew that not all avulsed permanent teeth can be replanted in comparison to 82.7% of our respondents.

The duration of avulsed tooth outside the socket is one of the important factors to preserve its vitality after replantation. One of the previous studies reported that teeth replanted within 5 minutes had the best prognosis [39] while other studies suggested that 20 to 30 minutes is the maximum limit [13, 14]. About 43.2% of our respondents cleared that 15 minutes is the suitable period to replant avulsed tooth, also 90.1% of our participants cleared that washing avulsed tooth under running water without scrubbing it is the ideal action after TDIs, these findings were agreed with Limbu's [38].

Several studies demonstrated that patient's saliva [27], saline [23], or milk [40-42] are the preferable or recommended storage medium. The majority of our respondents confirmed that milk is the suitable media for reserving avulsed tooth, this was matched with those of (IADT) [9], (AAPD) [8] guidelines and Al-Shamiri et al results [32].

About 76.5% of our respondents cleared that, the most critical factor in replantation success is the extra-alveolar drying time and this was agreed with several studies [43-45].

About 44.4% of our participants seen that flexible splint is the correct option and 46% of them mentioned that 2 weeks is the ideal duration for splinting. There was a controversy about that finding among several studies, as Hu et al [36] reported 59.1 % agreement among their respondents that a flexible splint should be used for fixation of avulsed teeth for 2 weeks. Also Westphalen et al [43] reported that, 73% of their respondents selected flexible splint and 64 % of them reported splinting duration of 15 days or more. On the other hand, Zhao et al [45] reported that, 49% of their respondents suggested rigid splint and 40.6% suggested splinting duration for 30 days while 10.2 % only suggested splinting for 2 weeks.

Cvek et al., [46] reported that teeth with incomplete or open apices if replanted within 60 minutes of avulsion will have higher chances of recovery by pulp revascularization and periodontal healing occurs more frequently faster than in teeth with closed apex. About 56.8% of our respondents realized that immature tooth has better prognosis than mature tooth and this was better than the results obtained by Limbu et al., [38] where only 26% of their respondents got the correct response.

Zamon and Kenny [47] expected that replantation of avulsed deciduous tooth can cause deflection, hypoplastic and morphologic abnormalities to the crown of successors, and it may also form a dental abscess or undergo ankylosis. 84% of our participants deduced that, primary teeth should not be replanted. This finding matched with the guidelines of AAPD and IADT, and the results of Limbu et al., [38] also revealed 86% agreement with our results.

Saudi and Egyptian dental interns' knowledge about management of avulsed teeth are somewhat near each other, there were no statistical significant differences between them regarding most of the questions while the Egyptian were answered correctly two questions significantly higher than Saudi and the vice versa for one question was observed (Table 4). Our results confirm and support the results obtained by Alaslami et al., [31] as Saudi dental interns replied correctly to most questions and had enough level of knowledge. However, Al-Shamiri et al, 2015 [32] concluded that, dental students had insufficient knowledge concerning dental trauma management and they recommended a variety of educational methods such as problem-based learning and powering the curriculum concerning those topics to improve the knowledge of dental students. Also, AlJazairy et al., [33] cleared that, their participants were found to have a moderate level of knowledge about tooth avulsion management. In Egypt there was no previous data about interns' or dentists' knowledge regarding management of avulsed teeth to compare with it, but our results revealed good knowledge level of Egyptian dental interns in relation to that of Saudi dental interns.

Conclusion

According to the results of this study and in relation to the previous results, the Saudi and Egyptian dental interns had sufficient level of knowledge about most items regarding tooth avulsion management. Also, the present results indicated that, the dental interns should be motivated for attending more educational program regarding traumatic injuries to teeth.

Study Limitations

It has been reported that questionnaire based cross-sectional studies are prone to limitation and bias. The results of self-reporting surveys may not necessary fully reflect student's real knowledge and daily professional practice.

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