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Perceived knowledge and perceptions toward biostatistics among dental and medical undergraduate students in International Islamic University Malaysia

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Abstract

Research into dental and medical student on biostatistics may inform the educational policy changes. Therefore, it was vital to assess the level of knowledge and perception about biostatistics among dental and medical undergraduate students in order to determine their proficiency in this subject. A cross-sectional study was undertaken among dental and medical undergraduate students in International Islamic University Malaysia, Kuantan. The assessment of perceived and perception toward biostatistics was based on a 5-points Likert scale including 50 questions distributed into five domains to assess the knowledge, course value, difficulty, behavioural and expectations. A total of 158 out of 190 students responded to the questionnaire yielding a response rate of 83.2%. It was observed that more than 70% of students acknowledged that knowledge gained from biostatistics courses is useful to their future career, and almost 80% realized the relevance of biostatistics to real health issues. This study concludes that undergraduate dental students have almost similar and moderate level of knowledge in biostatistics as compared to the medical students. However, it is important to have additional practice and training through workshop to improve their level of comprehension in biostatistics.

Keywords: biostatistics, dentistry, knowledge, medicine, perception

Introduction

Biostatistics was often regarded as a field where it was limited to those who had a mathematical background just because the term 'statistics' was associated with mathematics. Only those who were related to the field of statistics and a few of the general population were aware of the important part of biostatistics in dental research and evidence-based practice in dentistry (Sujatha *et al*., 2018). In the context of health care delivery, nowadays, many clinicians and academicians believe that by reviewing articles related to one's field, it might have an impact on patient care and thus, improving the education in dental and medical research. Having said that, most of the articles to be reviewed were often accompanied by statistics. Hence, it was vital for all dental and medical undergraduate students to acquire the knowledge of

biostatistics. Moreover, the acknowledgement of evidence-based practice (EBP) in clinical studies and practice also require a thorough understanding of biostatistics knowledge among early researchers in medical or dental studies (Penmetsa *et al.*, 2017). Pimenta *et al.* (2015) states that in order to improve statistical skills and knowledge among dental students and practitioners, one should have a positive perception toward biostatistics. Dental students and medical students were very well motivated about the study of their courses but in minor branches such as biostatistics, it was often being disregarded and was insinuated as something of lesser importance (Penmetsa *et al.*, 2017). Consequently, this kind of perception towards biostatistics often leads to cutbacks of permanency in the biostatistics knowledge. Besides that, the assessment and comprehension of biostatistics perception such as general perception towards biostatistics subject, training and research among dental students and clinicians may be helpful in improving statistical skills.

A recent study in India, reported that although biostatistics was a difficult subject when placed alongside dentistry, the majority agreed that acquiring knowledge about the subject would be beneficial for their career (Batra *et al.*, 2014). Studies on postgraduate dental students showed that they had good ability to write on the statistical section in their scientific writing (Kumar *et al.*, 2014). Despite a clear acceptance of the importance of biostatistics, a study was shown that some medical professionals had a substandard knowledge of it (West & Ficalora, 2007). Statistical knowledge, when it was taught effectively, can lead to a positive attitude of students and dental professionals towards the subject. As a result, effective interpretation of scientific data could be achieved with their own capability.

Hence, the main rationale of this study was to assess the level of knowledge and perception about biostatistics among dental and medical undergraduate students in order to determine their proficiency in this subject. Evidently, in the light of these findings, we believe that it could provide the means and ways to improve the teaching methods of biostatistics. Moreover, it could enhance the awareness on the importance of biostatistics in improving one's analytical thinking ability, understanding and interpreting statistical results in scientific studies.

Materials and Methods

A cross-sectional study was carried out among year 4 and year 5 undergraduate dental students and year 4 undergraduate medical students in IIUM Kuantan Campus between March 2020 to March 2021. The study was approved by the IIUM Research Ethics Committee (IREC 2020-040). The sample size was calculated using G*Power software (Ahmad et al., 2018). The calculated sample size based on Mann-Whitney Test with power = 0.80, Alpha= 0.05 and effect size = 0.5 which lead to the minimum sample size required per group is 67. The minimum sample size required for this study is 134, however, the current study was carried out among 158 participants. The sample was selected based on the inclusion criteria which were year 4 undergraduate medical students, year 4 and year 5 undergraduate dental students and exclusion criteria for those who did not give consent for the study.

Pilot study

A pilot study was conducted among 34 undergraduate Year 2 and Year 3 medical students to check the feasibility of the questionnaire and to test the process of distribution of questionnaire as they already undergo the biostatistics lecture during year 1 of their study. Self-administered questionnaires were established by adapting questions from an existing survey (Daher & Amin, 2010). The questionnaire was given to the students via Google Form platform. The reliability of the questionnaire was then examined using Cronbach's alpha and the result was shown as in Table 1.

Table 1. Result of questionnaire reliability test

Domain	Number of Item	Cronbach's a
Knowledge	14	0.898
Domain Course Value (A)	9	0.858
Domain Difficulties (B)	11	0.694
Domain Behavior (C)	5	0.927
Domain Expectation (D)	11	0.817

Study design and questionnaire

A set of self-administered questionnaires containing consent form, questions regarding demographic details and self-assessment instrument were used for the study. The demographic details were name, age, gender, course, year and possession of personal computer, SPSS software as well as G*Power software. The perceived knowledge and perception towards Biostatistics were assessed by using a self-assessment questionnaire. The responses were graded from 5-points Likert scale. The resulting questionnaire had 50 items. The 50 questions which assessed perceived knowledge (very low =1, low = 2, moderate = 3 high = 4 and very high = 5) and perception (strongly disagree = 1, disagree = 2, neutral = 3 agree = 4 and strongly agree = 5) towards the course fell into 5 domains, namely knowledge, course value (A), difficulties (B), behavior (C) and expectation (D).

The knowledge domain was about student's current perceived knowledge regarding the course, especially on the application of biostatistics in research studies. The course value domain was about perceptions of the usefulness, relevance and worth of the subject in professional life. The difficulties domain was about the difficulties faced by the students and factors that may influence interest in the subject. The behaviour domain was about how students perceived lecturer behaviour towards them. Lastly, the expectation domain was about the possible actions that may influence the outcome of the course study. For the result, presentation and interpretation, the Likert scale for perceived knowledge was combined into very low-low, moderate, high-very high and

for perception, strongly disagree-disagree, neutral and agree-strongly agree.

Statistical Analysis

Data was analysed using IBM SPSS version 25. Categorical variables were described by frequencies and percentage. Mann Whitney U test was used to compare perceived knowledge and perception between dental and medical students. The significance level was set at 0.05. In order to classify the scores as positive or negative perception, for example the calculation for the domain C where there are five variables, the maximum score expected will be 25 (5×5) and the cut-off will be 17.5 (5×5×0.7). Any score above 17.5 was considered an indicator of positive perception.

Results

Overall, the questionnaire was a satisfactory level of consistency, reflected by the given reliability coefficient. Items of the (B) behavior domain showed the highest consistency, while the difficulties domain showed the lowest value as shown in Table 1. The characteristics of the study sample were shown in Table 2. A total of 158 out of 190 students responded to the questionnaire yielding a response rate of 83.2%. There were 57% dental students and 43% medical students participating in this study which consists of 24.7% males and 75.3% females. Almost all the students (98.1%) had a personal computer, but only 66.5% had SPSS computer software. The possession of G*Power software or other software for sample size calculation was reported to be only 12%. Other than that, 22.5% of the students know and 77.5% do not know about biostatistics prior to entering dental and medical programs in

IIUM. Among them, 41.1% were able to define biostatistics and 79.7% of the students knew the usage of biostatistics in their field. Furthermore, almost more than 70% of them did consult with their biostatistician and perceived their current level of knowledge in biostatistics was moderate.

Table 2. Characteristics of study sample

	Dental n (%)	Medical n (%)	Total n (%)
Gender			
Male	25(27.8)	14(20.6)	39 (24.7)
Female	65(72.2)	54(79.4)	119 (75.3)
Course of study	90(57)	68(43)	158(100)
Has personal computer			
Yes	88(97.8)	67(98.5)	155(98.1)
No	2(2.2)	1(1.5)	3(1.9)
Has SPSS software			
Yes	84(93.3)	21(30.9)	105(66.5)
No	6(6.7)	47(69.1)	53(33.5)
Has G*Power Software			
Yes	11(12.2)	8(11.8)	139(88)
No	79(87.8)	60(88.2)	19(12)
Do you know about Biostatistics subject prior to entering dental/medical school?			
Yes	21(23.3)	14(20.6)	35(22.2)
Maybe	8(8.9)	10(14.7)	18(11.4)
No	61(67.8)	44(64.7)	105(66.5)
Do you able to define Biostatistics?			
Yes	33(36.7)	32(47.1)	65(41.1)
Maybe	48(53.3)	32(47.1)	80(50.6)
No	9(10)	4(5.9)	13(18.2)
Do you know the usage of Biostatistics?			
Yes	66(73.3)	60(88.2)	126(79.7)
Maybe	23(25.6)	7(10.3)	30(19)
No	1(1.1)	1(1.5)	2(1.3)
Perceived current level of knowledge of Biostatistics			
Very low-Low	24(26.7%)	9(13.2)	33(20.9)
Moderate	62(68.9%)	52(76.5)	114(72.2)
Very high-High	4(4.4%)	7(10.3)	11(7)
Did you ever consult your biostatistician?			
Yes	35(38.9)	8(11.8)	43(27.2)
No	55(61.1)	60(88.2)	115(72.8)

Responses to each survey question were presented in Table 3 until Table 7. Firstly, looking at the responses regarding their perceived knowledge on biostatistics, the response can be divided into lowest response, very low-low, moderate and high-very high response. It was observed that both the dental and medical students' perceived knowledge on probability and non-probability sampling were more than 60%. However, there was a difference in term of usage of both sampling technique as the medical students perceived more than 60% compared to dental students. The usage of statistical analysis such as One-way ANOVA, Mann Whitney U test and Kruskal Wallis test presented that the dental students' perceived knowledge were less than 60% compared to medical students which were more than 60%.

Regarding the course value domain, highest response had been observed which 84.4% of students from dentistry realized the relevance of the subject to the real health issues at the end of module, 81.1% thought that the sequencing of the topic was logical and 77.8% agreed that the gained knowledge and experience were useful to their career. However, only 38.9% agreed that their skills improved in solving problems, 51.1% felt that they were confident to do basic statistical and epidemiological analysis and 50.0% felt they gained skill in designing research. On the other hand, 85.3% of medical students realized the relevance of biostatistics to the real health issues and 82.4% medical students gained skill to read scientific papers. Plus, about 79.4% of the medical students understood the main concepts of biostatistics yet only 63.2% were confident to do basic statistical analysis. About 64.7% agreed that the course focused on the concept instead of calculation and 64.7% found their skill improved in problem solving.

For the difficulties domain, most of the dental and medical students admitted liking clinical studies more than biostatistics (74.4%-77.9%) and had a lack of practicing exercise for biostatistics topics (69.1%-73.3%). They also agreed that biostatistics subjects need creative thinking (66.7%-69.1%) and must deal with numbers (57.4%-61.1%). Furthermore, most of them "strongly disagree" to "disagree" on not seeing the relation between statistics and dentistry or medicine (64.4%-72.1%) and lectures were not interesting at this level (55.6%-63.2%). However, only 35.6% of dental students and 42.6% of medical students simply were not interested in the subject. Other than that, in relation to behavioural domain as shown in the Table 6, most of the dental and medical students "strongly agree" to "agree" on lecturer were facilitator of instruction who guided the students (91.2%-93.3%) and sources of knowledge (92.6%-93.3%). Most of them also agreed that they work, and effort were acknowledged (86.7%-91.2%) and being treated with respect during of the time they were taking the biostatistics course (92.6%-95.6%), and they also believe that the responsibility of the student to initiate debate or questions during lectures (73.3%-77.9%).

Last but not least for expectation domain, most of the dental and medical students believe that they were in need of more practical and workshop for planning and data collection for the courses (76.5%-82.2%), to be provided specific textbook for biostatistics (60%-66.2%), carried out short exam quiz before the progress test (66.2%-67.8%) and lectures should be followed by smaller group session (60%-70.6%). They also agreed to emphasise on using biostatistics in their respected courses (63.3%-67.6%) by giving more time for the whole course (54.4%-57.8%) and agreed for attendance to be strictly taken during the computer lab sessions (63.3%-67.6%). Nevertheless, only 46.7-47.1% of the dental and medical students agreed to make the module pure for biostatistics so that the attention will not be withdrawn to other subjects and 42.6%-58.9% agreed to introduce this course as earlier in year two of their studies. Overall, it is observable from Table 8 that most of the dental and medical students were reflecting positive perceptions in course value, behavioural and expectation.

Table 3. Percentage of dental and medical students' response to questions on perceived biostatistics knowledge

Questions Domain: Knowledge	DENTAL			MEDICAL			*p* value
	Very Low-Low	Moderate	High-Very High	Very Low-Low	Moderate	High-Very High	
Knowledge on probability sampling method	19 (21.1%)	61 (67.8%)	10 (11.1%)	5 (7.4%)	43 (63.2%)	20 (29.4%)	0.001*
Usage of probability sampling method	29 (33.0%)	51 (58.0%)	8 (9.1%)	8 (11.8%)	43 (63.2%)	17 (25.0%)	0.000*
Knowledge on non-probability sampling method	25 (28.1%)	54 (60.7%)	10 (11.2%)	6 (8.8%)	45 (66.2%)	17 (25.0%)	0.001*
Usage of non-probability sampling method	32 (36.0%)	50 (56.2%)	7 (7.9%)	6 (13.2%)	46 (67.6%)	16 (19.1%)	0.001*
Knowledge on parametric test	17 (18.9%)	54 (60.0%)	19 (21.1%)	6 (8.8%)	46 (67.6%)	16 (23.5%)	0.214
Usage of one Sample t-test	17 (18.9%)	52 (57.8%)	21 (23.3%)	6 (8.8%)	43 (63.2%)	19 (27.9%)	0.159
Usage of independent t-test	21 (23.3%)	48 (53.3%)	21 (23.3%)	8 (11.8%)	39 (57.4%)	21 (30.9%)	0.080
Usage of paired t-test	23 (25.6%)	48 (53.3%)	19 (21.1%)	10 (14.7%)	38 (55.9%)	20 (29.4%)	0.079
Usage of Analysis of Variance (ANOVA)	32 (35.6%)	46 (51.1%)	12 (13.3%)	9 (13.2%)	41 (60.3%)	18 (26.5%)	0.001*
Knowledge on non-parametric test	28 (31.1%)	52 (57.8%)	10 (11.1%)	14 (20.6%)	45 (66.2%)	9 (13.2%)	0.179
Usage of one sample Wilcoxon test	35 (38.9%)	45 (50.0%)	10 (11.1%)	17 (25.0%)	42 (61.8%)	9 (13.2%)	0.100
Usage of Mann Whitney test	40 (44.4%)	43 (47.8%)	7 (7.8%)	13 (19.1%)	43 (63.2%)	12 (17.6%)	0.001*
Usage of Wilcoxon signed rank test	42 (46.7%)	40 (44.4%)	8 (8.9%)	22 (32.4%)	37 (54.4%)	9 (13.2%)	0.068
Usage of Kruskal Wallis test	41 (45.6%)	40 (44.4%)	9 (10.0%)	16 (23.5%)	41 (60.3%)	11 (16.2%)	0.006*

*Significant at p value less than < 0.05

Table 4. Frequency and percentage of dental and medical students' response to questions regarding biostatistics course value

Questions Domain A: Course Value	DENTAL			MEDICAL			*p* value
	Strongly Disagree-Disagree	Neutral	Agree-Strongly Agree	Strongly Disagree-Disagree	Neutral	Agree-Strongly Agree	
The course focuses on the concept of interpretation more than calculations.	0 (0.0%)	36 (40.0%)	54 (60.0%)	3 (4.4%)	21 (30.9%)	44 (64.7%)	0.708
I realized the relevance of Biostatistics to the real health issues.	1 (1.1%)	13 (14.4%)	76 (84.4%)	1 (1.5%)	9 (13.2%)	58 (85.3%)	0.892
Sequencing of topics was logical.	0 (0.0%)	17 (18.9%)	73 (81.1%)	2 (2.9%)	18 (26.5%)	48 (70.6%)	0.105
The gained knowledge and experience are useful to my career as a doctor.	0 (0.0%)	20 (22.2%)	70 (77.8%)	2 (2.9%)	13 (19.1%)	53 (77.9%)	0.942
I understood the main concepts of Biostatistics.	3 (3.3%)	34 (37.8%)	53 (58.9%)	2 (2.9%)	12 (17.6%)	54 (79.4%)	0.008*
I gained skills to read scientific papers.	7 (7.8%)	23 (25.6%)	60 (66.7%)	1 (1.5%)	11 (16.2%)	56 (82.4%)	0.021*
My skills improved in solving problems.	6 (6.7%)	49 (54.4%)	36 (38.9%)	3 (4.4%)	21 (30.9%)	44 (64.7%)	0.002*
I gained skills to design research.	4 (4.4%)	41 (45.6%)	45 (50.0%)	3 (4.4%)	17 (25.0%)	48 (70.6%)	0.014*
I gained confidence in my ability to do basic statistical analysis.	7 (7.8%)	37 (41.1%)	46 (51.1%)	3 (4.4%)	22 (32.4%)	43 (63.2%)	0.116

*Significant at *p* value less than < 0.05

Table 5. Frequency and percentage of dental and medical students' response on difficulties of biostatistics

Questions Domain B: Difficulties	DENTAL Strongly Disagree-Disagree	Neutral	Agree-Strongly Agree	MEDICAL Strongly Disagree-Disagree	Neutral	Agree-Strongly Agree	p value
Lack of practicing exercise for these topics.	7 (7.8%)	17 (18.9%)	66 (73.3%)	6 (8.8%)	15 (22.1%)	47 (69.1%)	0.571
Too many lectures for one day.	33 (36.7%)	45 (50.0%)	12 (13.3%)	23 (33.8%)	33 (48.5%)	12 (17.6%)	0.540
Subjects need creative thinking.	6 (6.7%)	24 (26.7%)	60 (66.7%)	4 (5.9%)	17 (25.0%)	47 (69.1%)	0.738
Lectures are difficult to understand.	23 (25.6%)	36 (40.0%)	31 (34.4%)	28 (41.2%)	32 (47.1%)	8 (11.8%)	0.002*
I like clinical studies more than biostatistics.	4 (4.4%)	19 (21.1%)	67 (74.4%)	6 (8.8%)	9 (13.2%)	53 (77.9%)	0.749
Lectures are lengthy.	25 (27.8%)	47 (52.2%)	18 (20.0%)	24 (35.3%)	37 (54.4%)	7 (10.3%)	0.121
There are no specific references.	18 (20.0%)	42 (46.7%)	30 (33.3%)	28 (41.2%)	22 (32.4%)	18 (26.5%)	0.025*
I must deal with numbers.	7 (7.8%)	28 (31.1%)	55 (61.1%)	9 (13.2%)	20 (29.4%)	39 (57.4%)	0.491
I am simply not interested in this subject.	21 (23.3%)	37 (41.1%)	32 (35.6%)	14 (20.6%)	25 (36.8%)	29 (42.6%)	0.407
I cannot see the relation between statistics and dentistry/medicine at this level.	58 (64.4%)	23 (25.6%)	9 (10.0%)	49 (72.1%)	12 (17.6%)	7 (10.3%)	0.378
Lectures are not interesting.	50 (55.6%)	33 (36.7%)	7 (7.8%)	43 (63.2%)	18 (26.5%)	7 (10.3%)	0.463

*Significant at p value less than < 0.05

Table 6. Frequency and percentage of dental and medical students' response on their behaviour towards biostatistics

Questions Domain C: Behavioural	DENTAL Strongly Disagree-Disagree	Neutral	Agree-Strongly Agree	MEDICAL Strongly Disagree-Disagree	Neutral	Agree-Strongly Agree	*p* value
Lecturer is the facilitator of instruction & guiding students.	0 (0.0%)	6 (6.7%)	84 (93.3%)	2 (2.9%)	4 (5.9%)	62 (91.2%)	0.582
Lecturer is the source of knowledge.	0 (0.0%)	6 (6.7%)	84 (93.3%)	2 (2.9%)	3 (4.4%)	63 (92.6%)	0.830
I am treated with respect.	0 (0.0%)	4 (4.4%)	86 (95.6%)	2 (2.9%)	3 (4.4%)	63 (92.6%)	0.416
My work and efforts are acknowledged.	0 (0.0%)	12 (3.3%)	78 (86.7%)	1 (1.5%)	5 (7.4%)	62 (91.2%)	0.400
It is the responsibility of the students to initiate debate/question during lectures.	2 (2.2%)	22(24.4%)	66 (73.3%)	2 (2.9%)	13(19.1%)	53 (77.9%)	0.536

Table 7. Frequency and percentage of dental and medical students' expectations regarding biostatistics

Questions Domain D: Expectations	DENTAL			MEDICAL			p value
	Strongly Disagree-Disagree	Neutral	Agree-Strongly Agree	Strongly Disagree-Disagree	Neutral	Agree- Strongly Agree	
Need more practical, workshop for planning and data collection to have real experience in dealing with data.	0 (0.0%)	16 (17.8%)	74 (82.2%)	2 (2.9%)	14 (20.6%)	52 (76.5%)	0.333
Provide specific textbooks for biostatistics.	2 (2.2%)	34 (37.8%)	54 (60.0%)	5 (7.4%)	18 (26.5%)	45 (66.2%)	0.613
Carry out shorts exam (quiz) before the progress test to evaluate the understanding of the student.	5 (5.6%)	24 (26.7%)	61 (67.8%)	5 (7.4%)	18 (26.5%)	45 (66.2%)	0.785
The lecture should be followed by smaller grouping session.	4 (4.4%)	32 (35.6%)	54 (60.0%)	3 (4.4%)	17 (25.0%)	48 (70.6%)	0.194
Give more time for the whole course.	7 (7.8%)	31 (34.4%)	52 (57.8%)	9 (13.2%)	22 (32.4%)	37 (54.4%)	0.511
Emphasize on using biostatistics in your courses.	5 (5.6%)	28 (31.1%)	57 (63.3%)	4 (5.9%)	18 (26.5%)	46 (67.6%)	0.611
Attendance to be strictly taken during the computer lab session.	5 (5.6%)	27 (30.0%)	58 (64.4%)	4 (5.9%)	22 (32.4%)	42 (61.8%)	0.737
Make the module pure for biostatistics, so the attention will not be withdrawn to other subjects.	11 (12.2%)	37 (41.1%)	42 (46.7%)	13 (19.1%)	23 (33.8%)	42 (47.1%)	0.696
Introduce this course earlier in year two.	15 (16.7%)	22(24.4%)	53 (58.9%)	5 (7.4%)	34(50.0%)	29 (42.6%)	0.248
I must study at home before class meetings.	4 (4.4%)	31 (34.4%)	55 (61.1%)	4 (5.9%)	20 (29.4%)	44 (64.7%)	0.716
Disconnect the internet during the lab session to avoid distraction.	29 (32.2%)	32 (35.6%)	29 (32.2%)	24 (35.3%)	28 (41.2%)	16 (23.5%)	0.362

Table 8. Frequency distribution of positive perception

| | Positive perception | |
	No	Yes
A: Course Value		
Dentistry	23(25.36)	67(74.4)
Medical	14(20.6)	54(79.4)
B: Difficulties		
Dentistry	71(78.9)	19(21.1)
Medical	54(79.4)	14(20.6)
C: Behavioral		
Dentistry	6(6.7)	84(93.3)
Medical	4(5.9)	64(94.1)
D: Expectation		
Dentistry	35(38.9)	55(61.1)
Medical	30(44.1)	38(55.9)

Discussion

The significance of biostatistics was recognized completely in different dental and medical schools in both developed and developing countries (Chaoubah, 2021; Bourzgui *et al.*, 2019; Sami, 2010). Nevertheless, there are a variety of existence biostatistics in dental and medical from school to school with respect to the distributed time, scope and topic covered. In this study, the level of perceived knowledge and perception of dental and medical students regarding biostatistics was assessed and compared among the dental and medical undergraduate students. In the present study, a significant difference was seen among dental and medical students for the level of perceived knowledge in biostatistics. It was observed that medical students had slightly better perceived knowledge about biostatistics than the In this study, there was also a significant difference among IIUM dental and medical undergraduate students for the level of perception in the course value domain. Majority of the medical students showed positive perception regarding course value compared to dental students in understanding the main concepts of the course, reading scientific papers, designing research and improved skill in solving problems. This result was also in agreement with a study done by Daher & Amin (2010)

dental students in the knowledge of probability, non-probability sampling method and usage of probability sampling, non-probability sampling, ANOVA, Mann Whitney U test and Kruskal Wallis test. However, there were no significant differences observed for the others' perceived knowledge and usage on statistical analysis. As an insight, the medical students were exposed to the biostatistics course during year 1 block four of their study where for the whole 4 weeks, they focused only on biostatistics which include both theory and practical. In contrast, the dental students were exposed to a biostatistics course for the whole year 4. However, there was no designated week where they would be focusing on biostatistics only. The study also in line with previous research that medical students had perceived better biostatistics knowledge (Ercan *et al*., 2008).

and Abou Dargham *et al.* (2021) where more than half of undergraduate medical students showed they understood the main concept of the courses. However, the skill to design research, read scientific papers and solve the problem for the medical students were consistent with our current study for the dental students (Daher & Amin, 2010; Abou Dargham et al. 2021). Nevertheless, more than half of the dental (51.1%) and medical (63.2%) students gained confidence in their ability to do basic statistical analysis

compared to other studies by Daher & Amin (2010) and Abou Dargham *et al*. (2021) which are less than 40%.

Other than that, there was a significant difference among dental and medical students for difficulties in understanding the lectures where 34.4% of the dental students agreed that lectures were difficult to understand. In contrast, only 11.8% of medical students agreed that the lectures were difficult to understand. This was in line with the other study where 61.6% of the medical students stated it were difficult to understand the lectures (Daher & Amin, 2010). From the current findings, students found there were no specific references may be due to lack of resources that were suggested by the lecturers for the students to refer to. Thus, this had caused the students to rely solely on what the lecturer provided. It was also reported by the other studies that more than 50% of the students agreed that no specific references were provided (Daher & Amin, 2010; Abou Dargham *et al*., 2021).

Moreover, there was no significant difference observed between dental and medical students in behaviour and expectation domain. As both dental and medical students showed positive perception as the lecturer was the facilitator and source of knowledge for them. They also agreed that their work and effort are acknowledged and treated with respect during the courses. This study was also coherent with the other studies (Daher & Amin, 2010; Abou Dargham *et al*., 2021). Furthermore, for the expectation domain most of the dental and medical students need more practical classes in dealing with the data, the need to provide specific textbooks and carry out short quizzes while the lecturer should follow up by creating small grouping sessions and giving more time for the whole courses. The finding of this study was also in line with other studies by Shetty *et al*. (2015), Chima *et al*. (2015) and Hood & Neummann (2013).

Limitation

There were several limitations of this study. Firstly, although there were slight differences in the level of perceived knowledge between IIUM undergraduate dental and medical students, there was no relation to the students' academic performances. This may have a possible effect on the reported perception. Second, there were no open comments given. This feature of open comments may allow improvements to be done on our ends by looking from the students' perspectives thus, improving the exposure of biostatistics to the students.

Conclusion

In a nutshell, this study concludes that undergraduate dental students have almost similar and moderate level of knowledge in biostatistics as compared to the medical students However, it is important to have additional practice and training through workshop to improve their level of comprehension in biostatistics.

Conflict of interest
There is no conflict of interest.

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