Assessing dental students' professional satisfaction with operative dentistry teaching and curriculum: A study in Saudi Arabia

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Research article

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Abstract

Background Evaluating students' professional satisfaction of operative dentistry teaching and curriculum can help in identifying their educational needs and improving the quality of the education imparted. This study aimed to assess the professional satisfaction derived by undergraduate dental students in Saudi Arabia from the operative dentistry course teaching and its curriculum.

Methods A total of 193 (109 male 56.48%; and 84 female 43.52%) students participated in a survey. The respondents were at the 10^{th}, 11^{th}, and 12^{th} levels of the operational dentistry course in a ratio of 34.2%, 32.1%, and 33.7%, respectively. Data were collected from survey items (18 questions) covering six areas: Learning Objectives, Course Materials, Content Relevance, Instructor knowledge, Instructor delivery and Style, and Facility and environment. Descriptive and analytical tests were performed using SPSS Software 19 with the significance level set at 0.05.

Results A high level of satisfaction was seen among Level 10 (68.18%), Level 11 (79.03%), and Level 12 (86.15%) students. Significant statistical difference was observed among Level 10 students with a low-level of satisfaction and a high level of satisfaction ($p<0.05$). The percentage of satisfaction increased with the level. A high level of satisfaction was seen among both male (78.90%) and female (76.19%) students, with a total satisfaction level of 77.72%.

Conclusion Continuous evaluation and assessment of teaching as well as curriculum can be a tool to improve the quality of education imparted, especially in clinical courses such as operative dentistry.

Background

Any training program needs evaluation for quality assurance and further improvement.[1] Kirkpatrick's model of evaluation proposes four increasing levels to assess the impact of training programs. Level one (*reaction*) measures how the person feels about a course; level two (*learning*) measures the extent to which principles, facts, and techniques have been understood and absorbed; level three (*behavior*) measures the application of the principles and techniques acquired on the job; and level four (*results*) measures the ends, goals, and results desired.[1,2] Monitoring students' reaction to their learning experiences is an activity increasingly being undertaken by higher education institutions.[3] This initial level of evaluation should be an inherent feature of every training program because it indicates ways in which a training program can be enhanced and further developed besides building the base for higher levels of evaluation since reactions serve as a pointer to whether learning is possible.[1,2] Students' satisfaction with and attitudes toward training programs are the most common indicators used to assess reaction.[1,3] However, there is additional value in exploring graduates' reaction to training programs because they are less emotionally attached to the institution and are back at their workplaces where they can judge whether the knowledge and skills acquired during the program match their job requirements and responsibilities.

Satisfaction and attitude are two indicators which help determine education quality. Satisfaction refers to the level to which students' experiences meet their expectations.[4] However, attitudes refer to a mixture of beliefs, thoughts, and feelings that predispose graduates to respond in a positive or negative way toward institutions.[5,6] In addition to their role in ensuring learning and teaching quality standards, the two indicators serve as a guide for students to aid their decision-making at the program/institution level and to compute institutional performance indicators.[7]

The format of dental education varies across the world; while some institutions have a yearly system, others follow a semester system. Several factors affect the learning process in any course, such as the nature of the student him/herself, the quality of demonstrators and teachers, exposure to course materials, laboratory, and clinical facilities, and so on. A continuous evaluation of these factors is necessary to ascertain whether the conditions are conducive to learning in the program assessed.

One of the methods for evaluating an educational system is surveying student opinions because students experience the full effect of the teaching during the course.[8] As the main recipients of the educational system, evaluating student satisfaction is one of the significant components of assessing the quality of education.[9]

Operative dentistry is an important branch of dentistry constituting a major part of the teaching process in dental colleges. Students are introduced to operative dentistry from level 4 and this continues till level 12. There has been continuous development in the field of operative dentistry both in terms of materials and equipment as well as techniques. As with all the recent developments, continuous assessment of teaching strategy is necessary for a comprehensive evaluation of the teaching program. This study aimed to evaluate the professional satisfaction levels of undergraduate students training in operative dentistry regarding the teaching and the curriculum in the last three semesters of their dental course.

Methods

This descriptive–analytic study was conducted on level 10, level 11, and level 12 (clinical level) students from the faculty of dentistry in the academic year 2019-20. Ethical clearance for this study was obtained from the Institutional Review Board of King Khalid University College of Dentistry. The questionnaire distributed among the students consisted of six domains: Learning objectives, Course materials, Content relevance, Instructor knowledge, Instructor delivery and style, and Facility and environment. A total of 193 students participated in the survey of which 109 (56.48%) were male and 84 (43.52%) were female students. The respondents were students in levels 10, 11, and 12 of the courses and were in the ratio of 34.2%, 32.1%, and 33.7%, respectively. The participation in the study was voluntary and the students were briefed regarding the study and the questionnaire. The original questionnaire was developed by RAND staff, based on J Kirkpatrick, to evaluate the Adult Learning Principles and Training Evaluation.[10] The questionnaire used in this study was slightly modified from the original to make it compatible with respect to operative dentistry teaching in dental education. The responses were to be graded 3, 2, or 1 corresponding to Agree, Somewhat Agree, or Disagree, respectively. After the questionnaires were

collected, the data were entered into SPSS 19.0 (Inc., Chicago, Ill., USA); repeated measures test was used to evaluate the satisfaction level with education offered at different levels in operative dentistry teaching and curriculum.

Results

The results for all the six domains showed no statistical difference in responses in terms of gender ($p>0.05$) (see Table 1).

Table 1. Comparison of item responses of male and female students on the scale

Variables	Items	Male	%	Female	%	Total	%	c^2	p-value
Learning objectives	**Q1** I have understood the learning objectives of the operative course.								
	Disagree	0	0.00	0	0.00	0	0.00	0.0620	0.8030
	Somewhat agree	21	19.27	15	17.86	36	18.65		
	Agree	88	80.73	69	82.14	157	81.35		
	Q2 I have gained knowledge and skills consistent with the learning objectives.								
	Disagree	7	6.42	4	4.76	11	5.70	0.2440	0.8850
	Somewhat agree	18	16.51	14	16.67	32	16.58		
	Agree	84	77.06	66	78.57	150	77.72		
	Q3 This course has clarified my role as a student.								
	Disagree	0	0.00	0	0.00	0	0.00	0.0390	0.8430
	Somewhat agree	7	6.42	6	7.14	13	6.74		
	Agree	102	93.58	78	92.86	180	93.26		
Course materials	**Q1** The course materials (slides, lectures, assignments, quiz, etc.) are easy to follow.								
	Disagree	5	4.59	3	3.57	8	4.15	0.1240	0.9400
	Somewhat agree	14	12.84	11	13.10	25	12.95		
	Agree	90	82.57	70	83.33	160	82.90		
	Q2 The complexity and level of detail of the materials are appropriate.								
	Disagree	2	1.83	0	0.00	2	1.04	1.5580	0.4590
	Somewhat agree	5	4.59	4	4.76	9	4.66		
	Agree	102	93.58	80	95.24	182	94.30		
	Q3 The course materials, including resources, are essential to my success in operative dentistry								
	Disagree	6	5.50	3	3.57	9	4.66	0.5750	0.7500
	Disagree	8	7.34	5	5.95	13	6.74		
	Somewhat agree	95	87.16	76	90.48	171	88.60		
Content relevance	**Q1** I shall be able to apply what I learned during this course in future as a dentist.								
	Disagree	0	0.00	0	0.00	0	0.00	1.5570	0.2120
	Somewhat agree	2	1.83	0	0.00	2	1.04		
	Agree	107	98.17	84	100.0	191	98.96		
	Q2 I have obtained the necessary knowledge and skills to become a successful dentist.								
	Disagree	2	1.83	0	0.00	2	1.04	1.5580	0.4590
	Somewhat agree	5	4.59	4	4.76	9	4.66		
	Agree	102	93.58	80	95.24	182	94.30		
	Q3 I know where to find answers to questions that may arise in my role as a dentist.								
	Disagree	7	6.42	3	3.57	10	5.18	0.9760	0.6140
	Somewhat agree	8	7.34	5	5.95	13	6.74		
	Agree	94	86.24	76	90.48	170	88.08		

Instructor knowledge	**Q1** My learning was enriched by the instructor’s knowledge.								
	Disagree	4	3.67	2	2.38	6	3.11	0.2650	0.8760
	Somewhat agree	4	3.67	3	3.57	7	3.63		
	Agree	101	92.66	79	94.05	180	93.26		
	Q2 My learning was enriched by the experience of the instructor and the examples shared in the class.								
	Disagree	5	4.59	2	2.38	7	3.63	1.2280	0.5410
	Somewhat agree	7	6.42	8	9.52	15	7.77		
	Agree	97	88.99	74	88.10	171	88.60		
Instructor delivery and style	**Q1** I was well engaged during the operative course.								
	Disagree	5	4.59	3	3.57	8	4.15	0.3250	0.8500
	Somewhat agree	6	5.50	6	7.14	12	6.22		
	Agree	98	89.91	75	89.29	173	89.64		
	Q2 I found it easy to be actively involved during the learning process.								
	Disagree	5	4.59	3	3.57	8	4.15	0.1230	0.9400
	Somewhat agree	9	8.26	7	8.33	16	8.29		
	Agree	95	87.16	74	88.10	169	87.56		
	Q3 I had ample opportunity to ask questions and receive answers.								
	Disagree	2	1.83	2	2.38	4	2.07	0.0740	0.9640
	Somewhat agree	5	4.59	4	4.76	9	4.66		
	Agree	102	93.58	78	92.86	180	93.26		
	Q4 I had ample opportunity to practice and demonstrate the skills that I leant.								
	Disagree	6	5.50	9	10.71	15	7.77	1.7970	0.4070
	Somewhat agree	7	6.42	5	5.95	12	6.22		
	Agree	96	88.07	70	83.33	166	86.01		
	Q5 I was comfortable with the pace of the operative sessions in the course.								
	Disagree	7	6.42	9	10.71	16	8.29	1.1630	0.5590
	Somewhat agree	9	8.26	7	8.33	16	8.29		
	Agree	93	85.32	68	80.95	161	83.42		
	Q6 I was comfortable with the length of the operative sessions in the course.								
	Disagree	9	8.26	8	9.52	17	8.81	0.2450	0.8850
	Somewhat agree	11	10.09	7	8.33	18	9.33		
	Agree	89	81.65	69	82.14	158	81.87		
Facility and environment	**Q1** I found the operative laboratory and the operative clinic free of distractions and conducive to study								
	Disagree	1	0.92	0	0.00	1	0.52	0.8040	0.6690
	Somewhat agree	3	2.75	2	2.38	5	2.59		
	Agree	105	96.33	82	97.62	187	96.89		
	Total								

		109	100.0	84	100.0	193	100.0		

Likewise, no statistical difference in responses were seen between the levels ($p>0.05$), except for Q2 in the Learning domain (see Table 2).

Table 2. Comparison of item responses on the scale based on level

Variables	Items	10^{th} level	%	11^{th} level	%	12^{th} level	%	c^2	p-value
Learning objectives	Q1 I have understood the learning objectives of operative course.								
	Disagree	0	0.00	0	0.00	0	0.00	4.0150	0.1340
	Somewhat agree	15	22.73	14	22.58	7	10.77		
	Agree	51	77.27	48	77.42	58	89.23		
	Q2 I have gained knowledge and skills consistent with the learning objectives.								
	Disagree	9	13.64	1	1.61	1	1.54	13.6640	.008*
	Somewhat agree	11	16.67	13	20.97	8	12.31		
	Agree	46	69.70	48	77.42	56	86.15		
	Q3 The course has clarified my role as a student.								
	Disagree	0	0.00	0	0.00	0	0.00	2.9670	0.2270
	Somewhat agree	7	10.61	4	6.45	2	3.08		
	Agree	59	89.39	58	93.55	63	96.92		
Course materials	Q1 The course materials (slides, lectures, assignments, quiz, etc.) are easy to follow.								
	Disagree	5	7.58	2	3.23	1	1.54	6.9370	0.1390
	Somewhat agree	12	18.18	8	12.90	5	7.69		
	Agree	49	74.24	52	83.87	59	90.77		
	Q2 The complexity and level of detail of the materials are appropriate.								
	Disagree	0	0.00	2	3.23	0	0.00	4.9420	0.2930
	Somewhat agree	4	6.06	3	4.84	2	3.08		
	Agree	62	93.94	57	91.94	63	96.92		
	Q3 The course materials, including resources, are essential to my success in operative dentistry								
	Disagree	5	7.58	2	3.23	2	3.08	7.0210	0.1350
	Disagree	8	12.12	2	3.23	3	4.62		
	Somewhat agree	53	80.30	58	93.55	60	92.31		
Content relevance	Q1 I shall be able to apply what I learned during this course in the future as a dentist.								
	Disagree	0	0.00	0	0.00	0	0.00	1.0290	0.5980
	Somewhat agree	1	1.52	1	1.61	0	0.00		
	Agree	65	98.48	61	98.39	65	100.0		
	Q2 I have obtained the necessary knowledge and skills to become a successful dentist.								
	Disagree	1	1.52	1	1.61	0	0.00	1.0380	0.9040
	Somewhat agree	3	4.55	3	4.84	3	4.62		
	Agree	62	93.94	58	93.55	62	95.38		
	Q3 I know where to find answers to the questions that may arise in my role as a dentist.								

	Disagree	4	6.06	4	6.45	2	3.08	3.3830	0.4960
	Somewhat agree	7	10.61	3	4.84	3	4.62		
	Agree	55	83.33	55	88.71	60	92.31		
Instructor knowledge	**Q1** My learning was enriched by the instructor's knowledge.								
	Disagree	2	3.03	3	4.84	1	1.54	1.3970	0.8450
	Somewhat agree	3	4.55	2	3.23	2	3.08		
	Agree	61	92.42	57	91.94	62	95.38		
	Q2 My learning was enriched by the experience of the instructor and the examples shared in the class.								
	Disagree	4	6.06	2	3.23	1	1.54	2.2680	0.6870
	Somewhat agree	5	7.58	4	6.45	6	9.23		
	Agree	57	86.36	56	90.32	58	89.23		
Instructor delivery and style	**Q1** I was well engaged during the operative course.								
	Disagree	5	7.58	1	1.61	2	3.08	5.3830	0.2500
	Somewhat agree	6	9.09	4	6.45	2	3.08		
	Agree	55	83.33	57	91.94	61	93.85		
	Q2 I found it easy to be actively involved in the learning process of the operative course.								
	Disagree	5	7.58	1	1.61	2	3.08	5.8610	0.2100
	Somewhat agree	8	12.12	5	8.06	3	4.62		
	Agree	53	80.30	56	90.32	60	92.31		
	Q3 I had ample opportunity to ask questions and receive answers during my course.								
	Disagree	3	4.55	1	1.61	0	0.00	4.0700	0.3970
	Somewhat agree	4	6.06	2	3.23	3	4.62		
	Agree	59	89.39	59	95.16	62	95.38		
	Q4 I had ample opportunity to practice and demonstrate skills that I had learnt.								
	Disagree	7	10.61	3	4.84	5	7.69	3.1090	0.5400
	Somewhat agree	6	9.09	3	4.84	3	4.62		
	Agree	53	80.30	56	90.32	57	87.69		
	Q5 I was comfortable with the pace of the operative sessions in the course.								
	Disagree	9	13.64	3	4.84	4	6.15	6.7850	0.1480
	Somewhat agree	8	12.12	5	8.06	3	4.62		
	Agree	49	74.24	54	87.10	58	89.23		
	Q6 I was comfortable with the length of the operative sessions in the course.								
	Disagree	10	15.15	3	4.84	4	6.15	6.5150	0.1640
	Somewhat agree	8	12.12	5	8.06	5	7.69		

	Agree	48	72.73	54	87.10	56	86.15		
Facility and environment	Q1 I found the operative laboratory and the operative clinics free of distractions and conducive to study.								
	Disagree	1	1.52	0	0.00	0	0.00	3.4950	0.4790
	Somewhat agree	3	4.55	1	1.61	1	1.54		
	Agree	62	93.94	61	98.39	64	98.46		
	Total	66	100.0	62	100.0	65	100.0		

*p<0.05

It was observed that the percentage of respondents with disagreement was higher to Q2 in the Learning domain as compared to the other domains among the three levels. The results of the average total score for all questionnaire domains and comparison between genders showed that mean scores for each domain are closer to the maximum scores, respectively. Furthermore, there was no statistically significant difference in the average satisfaction scores between genders (p>0.05). (see Table 3).

Table 3. Comparison of total satisfaction and its dimensions based on gender by Mann-Whitney U test

Components	Summary	Male	Female	Total	Z-value	P-value
Learning objectives (Total score possible = 9)	Mean	8.45	8.49	8.47	-0.5718	0.5674
	SD	1.03	1.08	1.05		
Course materials (Total score possible = 9)	Mean	8.51	8.62	8.56	-0.2599	0.7949
	SD	1.16	1.02	1.10		
Content relevance (Total score possible = 9)	Mean	8.70	8.82	8.75	-0.3938	0.6937
	SD	0.92	0.58	0.79		
Instructor knowledge (Total score possible = 6)	Mean	5.73	5.77	5.75	-0.0286	0.9772
	SD	0.83	0.73	0.79		
Instructor delivery and style (Total score possible = 18)	Mean	16.94	16.76	16.87	-0.1650	0.8689
	SD	2.52	2.65	2.57		
Facility and environment (Total score possible = 3)	Mean	2.95	2.98	2.96	-0.1560	0.8761
	SD	0.25	0.15	0.21		
Total satisfaction (Total score possible = 54)	Mean	51.29	51.44	51.36	-0.3028	0.7620
	SD	5.93	5.14	5.59		

The overall results for total satisfaction and its dimensions show there that there is no statistically significant difference in average satisfaction scores among student levels ($p>0.05$). However, in the Learning domain, level 10 respondents had significantly lower total satisfaction average scores as compared to scores of respondents in other levels ($p<0.05$). (see Table 4).

Table 4. Comparison of total satisfaction and its dimensions by level using Kruskal-Wallis test

Components	Summary	10^{th} level	11^{th} level	12^{th} level	H-value	P-value
Learning objectives	Mean	8.23	8.47	8.71	4.3690	0.0370*
(Total score possible = 9)	SD	1.31	0.94	0.79		
Course materials	Mean	8.33	8.60	8.75	0.8260	0.3630
(Total score possible = 9)	SD	1.29	1.08	0.85		
Content relevance	Mean	8.68	8.73	8.85	0.1900	0.6630
(Total score possible = 9)	SD	0.86	0.91	0.57		
Instructor knowledge	Mean	5.70	5.74	5.82	0.0260	0.8730
(Total score possible = 6)	SD	0.89	0.83	0.63		
Instructor delivery and style	Mean	16.21	17.23	17.18	0.0670	0.7960
(Total score possible = 18)	SD	3.30	1.97	2.10		
Facility and environment	Mean	2.92	2.98	2.98	0.0010	0.9730
(Total score possible = 3)	SD	0.32	0.13	0.12		
Total satisfaction	Mean	50.08	51.74	52.29	3.3140	0.0690
(Total score possible = 54)	SD	7.11	4.62	4.39		

*$p<0.05$

The association between levels of satisfaction (High and Low) based on demographic profile showed statistically significant difference among the three levels (10, 11, and 12) but no difference was seen in terms of the gender of the students. ($p>0.05$) (see Table 5).

Table 5. Association between levels of satisfaction based on demographic profile

Profile	Levels of satisfaction					c2	p-value
	Low level	%	High level	%	Total		
Level							
Level 10	21	31.82	45	68.18	66	6.1993	0.0450*
Level 11	13	20.97	49	79.03	62		
Level 12	9	13.85	56	86.15	65		
Gender							
Male	23	21.10	86	78.90	109	0.2010	0.6539
Female	20	23.81	64	76.19	84		
Total	43	22.28	150	77.72	193		

*p<0.05

Discussion

Students at three different levels of the operative dentistry course in Saudi Arabia were participants of a survey on their professional satisfaction regarding the teaching and curriculum of the course. These students had already undergone preclinical training and were into clinical training. Clinical-based education is a multi-factorial process wherein the students implement the theoretical knowledge they gain in preclinical training on patients. Dentistry is an important field of medical science, and hence, enhancing the quality of dental clinical education directly improves the oral/dental health of people. Dentistry is a clinical major in which adequate skills and training are highly important in graduate students' performance, which would consequently promote the oral and dental health systems. Because the educational system, equipment, and performance of tutors are different in dental schools, the results of this study cannot be generalized to other dental schools. Therefore, surveying students' opinion about the quality of clinical education in different dentistry colleges can surely improve the educational programs and clinical training quality.

In the Kingdom of Saudi Arabia, most colleges follow the semester-type curriculum. Each year has two semesters, each comprising 14 weeks of actual teaching and 4 weeks of practical/clinical and final theory exams. Operative dentistry starts from level 4 of the dental course. Level 4 to level 6 are primarily preclinical courses where, the students are introduced to the materials they will be using and work in simulated laboratories learning different cavity design preparations and restorations with different restorative materials. In addition to these, they have E-Learning assignments on the recent advances in material sciences and techniques. The course is regularly updated in keeping with the recent trends to introduce students to the latest technology and familiarize them with the same. Levels 8, 10, 11, and 12 involve students implementing their skills on patients under the direct supervision of their supervisors. As mentioned earlier, it is very important to evaluate and assess whether the teaching methods are successful.

Each course has its own learning objectives, which are specified and described at the beginning in the course specifications. During the first lecture, the learning objectives are explained to the students and the same is evaluated at the end of the semester by testing whether students have obtained the requisite knowledge and skills consistent with the learning objectives and are clear about what is expected of them. In the current study, it was observed that most of the respondents agreed that the Learning objectives were met during the course (Tables 1 and 2).

During the course, the students are exposed to a variety of teaching materials and strategies such as lectures, power point presentations, and assessment criteria such as quizzes, online assignments, and continuous evaluation of their preclinical work/clinical work. These need to be evaluated and assessed to understand whether they are consistent with the learning objectives to achieve the intended goal. The results of this study indicated that all the three items under the Course Material domain showed that neither the level nor the gender led to any statistical difference in responses ($p>0.05$) (Tables 1 and 2).

After training, it is critical to understand the implications of how the student applies his training as a dentist in society. The aim of the learning process is to produce an independent thinking dentist who will be able to apply the necessary knowledge and skills using his or her rationale to be a successful dentist. The relevance of the course is reflected when the intended goals are achieved. The results of this study have indicated that most respondents agreed that the course training increased their level of confidence to work as an independent dentist. The results for all three items under Course Relevance domain showed no statistical difference in responses regardless of gender or level ($p>0.05$). A majority of the respondents (>88%) agreed that the course was relevant as seen from the training (Tables 1 and 2).

Instructors play an important role in the shaping the attitude and enthusiasm of the students. The knowledge and skills of the instructor along with his or her experience is a vital component of the teaching process, especially in clinical sciences. Students often get influenced and motivated by the instructor. The results of this study showed most of the respondents (>80%) had a positive opinion about the role of instructors. There was no statistical difference seen in terms of gender or level ($p>0.05$) (Tables 1 and 2).

Since operative dentistry is a clinical subject, the importance of the clinical facilities and the environment needs to be emphasized. The clinical setup, the availability of the latest materials, and the instruments and their utilization during the clinical training period plays an important role in the education of the students. Most respondents in this study agreed (>90%) that the facility and conduciveness of the operative dentistry clinics were satisfactory. There was no statistical difference based on gender or level ($p>0.05$) (Tables 1 and 2). However, it is interesting to note that at a higher level, satisfaction was greater.

Analyzing the association of between the levels of satisfaction from the perspective of gender and level, it was interesting to observe there was a statistical difference in terms of the level of the students (Table 5). Level 10 students recorded a lower level of satisfaction (31.82%) whereas levels 11 and 12 recorded a high level of satisfaction (68.18%). There was no statistical difference in the gender group ($p>0.05$) (Table 5).

Conclusions

Feedback and satisfaction of students toward the teaching they are offered in the operative dentistry course and the curriculum would be an important tool in dental education. The study findings show that most students of Levels 10, 11, and 12 were satisfied with the teaching and the curriculum of operative dentistry in Saudi Arabia. The level of satisfaction was also observed to be higher at the higher levels of the course. With rapid innovation in terms of materials and techniques in the field of operative dentistry, the curriculum needs to be updated and continuously assessed by students to understand their satisfaction as they are the final recipients of the educational process.

Declarations

Ethics approval and consent to participate: Ethical clearance for this study was obtained from the Institutional Review Board of King Khalid University College of Dentistry, Approval No IRB/KKUCOD/ETH/2019-20/012 dated 25/12/2019. Informed written consent was obtained from all the participants of the questionnaire study.

Consent for publication: Not applicable.

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