

## Developing and validating a questionnaire to Measure Ethical Sensitivity of Freshly Graduated Dentists

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### Abstract

**Objective:** To develop an instrument for assessing the ethical sensitivity of freshly graduated dentists.

**Methods:** This instrument development study was done at Sardar Begum Dental College, Peshawar, Pakistan, from September 2014 to April 2015. The instrument developed was the Dental Ethical Sensitivity Scale in accordance with the guidelines for the development of educational instruments. Data was obtained from freshly graduated dentists through the instrument containing vignettes related to three domains of ethics; beneficence, autonomy and confidentiality. Content validity index and Angoff's method were used to determine the validity and cut-off passing score respectively. Reliability analysis comprised internal consistency and test re-test.

**Results:** Of the 138 house officers approached, 107(77%) responded. Of them, 37(34.5%) were males and 70(65.4%) were females. The overall mean age was  $23.7 \pm 1.1$  years. Overall, 51(47.6%) subjects were ethically sensitive whereas 50(46.7%) were partially sensitive and 6(5.6%) were insensitive. The CVI for the instrument was 0.8; cutoff score was 83%; internal consistency was 0.63; and test re-test reliability was 0.71. Relation between ethical sensitivity, gender and class attendance of the participants was insignificant ( $p > 0.05$  each).

**Conclusion:** Dental Ethical Sensitivity Scale was found to be effective in providing a valid and reliable assessment instrument for measuring ethical sensitivity of freshly graduated dentists.

**Keywords:** Instrument development, Validity, Ethical, sensitivity, Scale, Reliability (JPMA 69: .518; 2019)

### Introduction

The Bachelors of Dental Surgery (BDS) is a four years programme in Pakistan. The instructional strategy mostly used to teach dental ethics is conventional lectures and the mode of assessment is short-answer questions which usually are at recall and comprehension level of Blooms Taxonomy.<sup>1</sup> But in clinical practice, these graduates are presented with a variety of ethical issues and dilemmas which may not be probably addressed in the curricula. They need higher order thinking to solve these issues. Therefore, medical and dental ethics courses need to be assessed regularly in terms of their contents, teaching methodology and change in behaviour; and revised accordingly, so dental graduates can reflect ethical sensitivity in their clinical practice.<sup>2</sup>

Teaching professional ethics in dentistry is important in order to facilitate the personal and professional

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development of aspiring dentists into socially and professionally responsible human beings.<sup>3</sup> Freshly graduated dentists at times face conflicts related to ethical situation during transition from dental school to dental clinic.<sup>4</sup> This is probably because of the focus on the theoretical aspects of ethics.<sup>5</sup> Only memorisation of ethical theories and codes may not be enough to solve ethical dilemmas.<sup>4</sup> Emphasis on developing ethical practical knowledge of dental graduates can be more effective by fostering personal reflection about individual's own practice.<sup>4</sup> Due to known association between ethics and patient care, it is important to assess ethical sensitivity and behaviour of the students before they begin their clinical experiences.<sup>6</sup> Hence, to foster quality of ethical dental practices, there is a need to evaluate the ethical sensitivity of our freshly graduated dentists to improve dental ethics evaluation.

There are different instruments designed for the ethical sensitivity evaluation since long time ago such as Defining Issues test (DIT) measured transitions in moral development from early adolescence to adulthood.<sup>7</sup> The

Dental Value Scale (DVS) was developed to evaluate values of the dental students and practitioners with particular focus on conscientiousness, altruism and personal satisfaction.<sup>8</sup> More recently, a vignettes-based instrument was designed to assess the ethical issues in dental practice but primary focus was overtreatment in dentistry.<sup>9</sup> Many of these instruments were found to be good from the perspective on which they were based, like ethical values, morality and professionalism. However, none of these instruments was exactly fulfilling all the requirements of our study. Also these instruments were designed in developed countries that have already adopted the basics of ethics in their practices to most extent through adaptation of different teaching strategies.<sup>10</sup> Whereas in Pakistan, ethics teaching has still not found its way in formal medical and dental curricula.<sup>11</sup> Due to this cultural and educational mismatch, the current study was planned to design a new research tool according to the needs of Pakistani dental community and practice patterns.

## Materials and Methods

The instrument development study was done at Sardar Begum Dental College (SBDC), Peshawar, Pakistan, from September 2014 to April 2015 after approval was taken from SBDC administration and from the ethics board of Khyber Medical University, Peshawar. The 7-steps guideline for educational instrument development given in the AMEE Guide 87: Developing questionnaires for educational research,<sup>12</sup> was used to develop Dental Ethical Sensitivity Scale (DESS).

Step 1 was literature search to define the construct and to determine if the measures related to this construct already existed.<sup>12</sup> There was limited literature on vignette-based instrument to assess ethical sensitivity among the dentists and dental students. Also, ethical sensitivity has not been evaluated in Pakistani dentists before, so we could not find any questionnaire appealing the cultural issues. Therefore, it was decided to construct a research instrument portraying the local ethical issues that dentists face in every-day clinical practice. Ethical sensitivity encompasses many issues, so we focussed only on the principles of autonomy, beneficence and confidentiality.

Step 2 involved focus group discussion (FGD) to design a valid questionnaire. FGD had five members having knowledge in bioethics and medical education besides being dentists. Steps 3 and 4 were synthesis of vignettes, based on the literature search information and

the FGD. A total of nine clinical scenarios were developed according to the vocabulary of the target population. The FGD identified three medical educationists having experience in ethics teaching and professionalism. They provided guidance during FGD in the process of validating the questionnaire. Finally, all the group members agreed on the nine vignettes to measure the ethical sensitivity of freshly graduated dentists.

The 5th step involved validation, and the instrument for its face validity was sent via e-mail to four leading dentists of Pakistan having experience in dental education of more than 10 years, and the vignettes were further refined based on their feedback. Each vignette was scored as 2 for the best probable option, 1 for the second to best probable option, and 0 for the least probable option; with a maximum score of 18 for all nine vignettes and lowest score being 0.

Step 6 was establishment of content validity in which a content validation form was designed to get quantitative data from the experts regarding inclusion and exclusion decision about the individual test vignette. Ten experts, including FGD members, participated in this activity. Each expert read out the instrument and provided feedback related to the test vignette as either 'essential', 'important' or 'not important'.

Content Validity Index (CVI) was calculated for each test vignette through the formula derived by Lawshe.<sup>13,14</sup> The cut-off pass score for each vignette was estimated through the Angoff's method to establish a passing standard.<sup>15</sup>

Step 7 was to pilot-test the instrument for which data was collected from freshly graduated dentists working as house officers at SBDC after graduating from there and having studied ethics at the same institution (either at 1st year or at the start of 2nd year) with three months' experience in clinics. Data from each participant was obtained through a standardised questionnaire containing vignettes, and assuring confidentiality.

The questionnaire was pre-tested on 8 participants for response process validity i.e. to assess how participants interpret the test items. It went through minor modifications based on feedback from the pre-test. The standards formulated were: Ethically Sensitive - dentists who scored 15 (83% cut-off) or above out of 18; Partially Sensitive - those who scored 10-14 (56-78%) out of the total score; and Insensitive - those who scored 9 (50%) or less. The data was analysed using SPSS 16. Mean along

**Table-1:** Pass Score estimation through Angoff's method.

Vignette/testing item	Judge 1	Judge 2	Judge 3	Judge 4	Judge 5	Average
1	71	79	85	82	73	78
2	85	85	85	84	86	85
3	85	81	85	83	84	83
4	76	82	85	80	75	79
5	73	77	83	85	73	78
6	82	84	82	84	86	83
7	90	91	95	82	95	90
8	84	86	82	87	86	85
9	86	85	85	87	87	86
Percent Passing Score						83%

with standard deviation (SD) were calculated for age and ethical sensitivity score. Frequencies and percentages were calculated for variables such as gender and class attendance. The attendance was obtained from the college and hospital after informed consent from the participants. Chi-square test was applied to determine association between ethical sensitivity score, gender and class attendance. Test-retest reliability of the instrument was evaluated through Pearson Correlation coefficient whereas the internal consistency was determined using Cronbach alpha test.

The construct validity of the questionnaire was checked with key check and item analysis by measuring the difficulty index, discrimination index and distractor analysis.<sup>16,17</sup> Test re-test reliability was estimated by administering the same vignette-based questionnaire to the same participants at two different occasions with a time span of four days. Internal consistency of DESS was measured through Cronbach's alpha.<sup>17</sup>

**Results**

Of the 138 house officers approached, 107(77%) responded. Of them, 37(34.5%) were males and 70(65.4%) were females. The overall mean age was 23.7±1.1 years. The CVI was 0.8 for nine vignettes. The cut-off pass score for each test vignette, and the finalised passing score was

**Table-2:** Difficulty and Discrimination index of each test item.

Vignette No	No of dentists who chose correctly	Difficulty Index	Difficulty Level	Discrimination index for the test item	Level of Discrimination
Item No 1	51	0.87	Easy	0.4	Excellent Discriminator
Item No 2	26	0.44	Medium to Moderately difficult	0.56	Excellent Discriminator
Item No 3	35	0.60	Medium to Moderately difficult	0.46	Excellent Discriminator
Item No 4	41	0.70	Medium to Moderately difficult	0.6	Excellent Discriminator
Item No 5	27	0.46	Medium to Moderately difficult	0.54	Excellent Discriminator
Item No 6	31	0.53	Medium to Moderately difficult	0.66	Excellent Discriminator
Item No 7	30	0.51	Medium to Moderately difficult	0.8	Excellent Discriminator
Item No 8	34	0.58	Medium to Moderately difficult	0.4	Excellent Discriminator
Item No 9	42	0.72	Medium to Moderately difficult	0.54	Excellent Discriminator

**Table-3:** Index of Effectiveness evaluated for distractor analysis.

No Item of Test	Index of Effectiveness (I.E) of Distractor1	Status of effectiveness Distractor 1	Index of Effectiveness (I.E) of Distractor 2	Status of effectiveness Distractor 2
Item No 1	-0.03	P/R E*	-0.16	P/R E
Item No 2	-0.13	P/R E	-0.2	P/R E
Item No 3	-0.1	P/R E	-0.1	P/R E
Item No 4	-0.13	P/R E	-0.16	P/R E
Item No 5	-0.16	P/R E	-0.13	P/R E
Item No 6	-0.13	P/R E	-0.2	P/R E
Item No 7	-0.06	P/R E	-0.33	P/R E
Item No 8	-0.06	P/R E	-0.1	P/R E
Item No 9	-0.06	P/R E	-0.03	P/R E

P/R E\*=Plausible /Reasonably Effective

83% (Table 1).

The construct validity of questionnaire was checked (Tables 2-3). Test re-test reliability estimated for DESS was 0.71 which showed moderate reliability. Internal consistency of DESS was measured through Cronbach's alpha which was 0.63; again showing a moderate reliability.

Overall, 51(47.6%) subjects were Ethically Sensitive whereas 50(46.7%) were Partially Sensitive and 6(5.6%) were insensitive.

Among the male participants, 15(40.5%) were Ethically Sensitive, 22(59.4%) were Partially Sensitive and none was Insensitive. Among the females, corresponding numbers were 36(51.4%), 28(40%) and 6(8.5%). The association between the gender and ethical sensitivity score was insignificant (p=0.10). Similarly, the association between ethical sensitivity and attendance was also insignificant (p=0.5) (Table 4).

**Discussion**

According to a general consensus, when the raters are more than five, content of the testing items is considered essential or valid if the overall CVI is >0.78.<sup>14</sup> The CVI for DESS in the current study was 0.8.

**Table-4:** Association of gender and class attendance with ethical sensitivity of the participants.

Variable		Ethically sensitive subjects	Participants Partially sensitive to ethics	Participants insensitive to ethics	Total No within the gender groups of the participant	p-value
<b>Gender</b>	Male	15(40.5%)	22(59.4%)	0(0%)	37(100%)	0.10
	Female	36(51.4%)	28(40.0%)	6(8.5%)	70(100%)	
<b>Attendance groups</b>	Subjects having attendance between 51-75%	12(44.5%)	15(55.5%)	0(0%)	27(100%)	0.5
	Subjects having attendance between 76-100%	39(48.7%)	35(43.8%)	6(7.5%)	80(100%)	

According to Considine J et al., when test items have one most probable option and two distractors, then construct validity needs to be checked with key check and item response analysis such as difficulty index, discrimination index and distractor analysis.<sup>16</sup> Regarding discrimination capacity of the testing items of this scale, the results of the current study are in agreement with the values presented in another study according to which test items are considered to be excellent discriminators if the discrimination index is more than 0.35 which was the case with all the testing items in the current study.<sup>17</sup> Similarly, this instrument is acceptable in terms of level of difficulty ranging between 0.15 and 0.7 except for one item. A good distractor is considered to be the one which is selected by the participants who perform poorly whereas ignored by the good performers.<sup>17</sup> The items in our study also showed good distractor analysis. Overall, test-re-test reliability of DESS evaluated through Pearson correlation coefficient was 0.71 which shows that this is a reliable instrument.<sup>17,18</sup>

It is also important to identify internal consistency or item correlation through Cronbach alpha estimation of the instruments.<sup>19</sup> In this regard, the current study showed internal consistency to be 0.63 which was in agreement with the range identified earlier according to which values within range of  $0.6 \leq \alpha < 0.7$  are considered acceptable.<sup>20</sup>

This study provides baseline information regarding ethical sensitivity of freshly graduated dentists. Among these, almost half were found to be Ethically Sensitive whereas the rest of the dentists needed some training in understanding ethical situations. Introducing and integrating ethical training throughout the four years of dental education may help. Our results are in agreement with previous studies<sup>18,20</sup> reporting decline in knowledge of ethics of house officers with further progression to postgraduate years. In other words, these values decreased over time compared to those held by the dentists;<sup>8</sup> however, the study had sampling limitations. Relation between gender and ethical sensitivity score was

insignificant in our study and the findings were similar to previous studies.<sup>19,21</sup> However, exploration of the complex relation between gender and ethical sensitivity is still not clear.<sup>20</sup>

We also found insignificant results between ethical sensitivity and classroom attendance. Reason might be, as mentioned in literature, that hiding of ethics within other courses may result in students perceiving ethics as unimportant.<sup>22</sup> This also has been claimed earlier that occasional lectures spread over four years give message to students that it is an unimportant subject.<sup>23</sup> In this study through the use of vignettes, we addressed only a portion of cognitive component of ethics, and an ability to recognise ethical issues required to act appropriately in practice.<sup>20</sup>

## Conclusion

The validity and reliability of the newly-developed Dental Ethical Sensitivity Scale was established in terms of measuring ethical sensitivity of freshly graduated dentists. The scale can be used in the local setting to assess new graduates and to improve their ethical cognitive decision-making skills.

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## References

1. Nkanginieme KEO. Clinical diagnosis as adynamics process: Applications of Blooms Taxonomy for educational objectives in the cognitive domain. *Med Educ Online* 1997; 2: 1-6.
2. Asghari F, Mirzazadeh A, Samadi A, Safa AN, Jafarian A, Farahani AV, et al. Reform in medical ethics curriculum: a step by step approach based on available resources. *J Med Ethics Hist Med* 2011; 4: 8.
3. Nash DA. On the ethics in the profession of dentistry and dental education. *Eur J Dent Educ* 2007; 11: 64-74.

4. Ardenghi DM. Dentists ethical practical knowledge: a critical issue for dental education. *Eur J Dent Educ* 2009; 13: 69-72.
  5. Bertolami CN. Why our ethics curricula don't work. *J Dent Educ* 2004; 68: 414-25.
  6. Berk NW. Teaching ethics in dental schools; trends, techniques and targets. *J Dent Educ* 2001; 65: 744-50.
  7. Bebeau MJ. The Defining Issues Test and the Four Component Model: contributions to professional education. *J Moral Educ* 2002; 31: 271-95.
  8. Langille AD, Cantano VM, Boran TL, Cunningham DP. The Dental Values Scale: Development and Validation. *J Dent Educ* 2010; 74: 1282-93.
  9. Kazemian A, Berg I, Finkel C, Yazdani S, Zeilhofer HF, Juergens P, et al. How much dentists are ethically concerned about over treatment; a vignette-based survey in Switzerland. *BMC Med Ethics* 2015; 16: 43-8.
  10. Lantz MS, Bebeau MJ, Zarkowski P. The status of ethics teaching and learning in US Dental Schools. *J Dent Educ* 2011; 75: 1295-309.
  11. Jafarey AM. Bioethics and Medical education (Editorial). *J Pak Med Assoc* 2003; 53: 12-3.
  12. Artino Jr AR, Rochelle JSL, Dezee KJ, Gehlbach H. Developing questionnaires for educational research: AMEE Guide No 87. *Med Teach* 2014; 36: 463-74.
  13. Lawshe CH. A quantitative approach to content validity. *Personnel Psychol* 1975; 28: 563-75.
  14. Lynn MR. Determination and Quantification of Content Validity. *Nurs Res* 1986; 35: 382-5.
  15. Downing SM, Tekian A, Yudkowsky R. Procedures for establishing defensible absolute passing scores on performance examinations in Health professions Education. *Teac Learn Med* 2006; 18: 50-7.
  16. Considine J, Botti M, Thomas S. Design, Format, Validity and Reliability of multiple choice questions for use in nursing research and education. *Collegian* 2005; 12: 19-24.
  17. Linn RL Gronlund NE. *Measurement and Assessment in Teaching*. 8th ed. New Jersey: Prentice Hall; 2000.
  18. Sulmasy D, Geller G, Levine D, Faden R. Medical house officers knowledge, attitudes and confidence regarding medical ethics. *Arch Intern Med* 1990; 150: 2509-13.
  19. Self DJ, Wolinsky FD, Baldwin DJ. The effect of teaching medical ethics on medical students moral reasoning. *Acad Med* 1989; 64: 755-9.
  20. Hébert P, Meslin EM, Dunn EV. Measuring the ethical sensitivity of medical students: a study at the University of Toronto. *J Med Ethics* 1992; 18: 142-7.
  21. Berseth CL, Durand R. Evaluating the effect of human values seminar series on ethical attitudes towards resuscitation among pediatric residents. *Mayo Clin Proc* 1990; 65: 337-43.
  22. Petterson EO. Ethics courses in the dental curriculum. *J Amer Coll Dent* 1974; 41: 249-48.
  23. Ozar DT. Formal instructions in dental professional ethics. *J Dent Educ* 1985; 49: 696-701.
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