Original Article

Access this article online

Quick Response Code:

Website: www.jehp.net

DOI: 10.4103/jehp.jehp_22_20

Exploring the educational opportunity and implementation of CARE among dental students in India

Soni Rajput, Amit Kumar[1], Manjunath P. Puranik[2], Namita Shanbhag[2]

Department of Community Dentistry, Goa Dental College and Hospital, Bambolim, Goa, [1]Oral Health Sciences Centre, PGIMER, Chandigarh, [2]Department of Public Health Dentistry, Government Dental College and Research Institute, Bengaluru, Karnataka, India

Address for correspondence:
Dr. Soni Rajput, No. 8, Department of Community Dentistry, Goa Dental College and Hospital, Bambolim - 403 202, Goa, India.
E-mail: sonirajput1190@gmail.com

Received: 07-01-2020
Accepted: 17-05-2020
Published: 28-09-2020

Abstract:

CONTEXT: Empathy is considered to be backbone of the patient–physician relationship. The consultation and relational empathy (CARE) measure is widely used internationally to measure empathy. However, no validated tool is available to gather patient feedback on dentists' empathy in India.

OBJECTIVE: The objective of this study was to explore the reliability and validity of a CARE measure and to assess the factors influencing CARE score and to determine if there was an association between their CARE score and satisfaction of the patient.

SETTING AND DESIGN: A cross-sectional study was done in dental colleges.

SUBJECTS AND METHODS: A questionnaire study was carried out among 100 patients from 6 dental colleges in Bangalore using validated CARE measure.

STATISTICAL ANALYSIS: Internal consistency of items was evaluated by the Cronbach's alpha, and construct validity was assessed by confirmatory factor analysis. Satisfaction was assessed by a question response on 5-point Likert scale. Descriptive and inferential statistics were performed with significance set at 5%.

RESULTS: The mean CARE score was 43.80 ± 5.36. Internal reliability was high (Cronbach's alpha: 0.859) and was reduced by the removal of any of 10 items. High corrected item-total correlations ranged from 0.752 to 0.847. Factor analysis showed a single solution with high item loadings (>0.80). Self-perception of overall health (odds ratio [OR] = 3.78), relationship with family (OR = 4.61) and friends (OR = 3.78), and previous dental experience (OR = 16.00) were more likely, whereas dentist-provided treatment (OR = 0.20), number (OR = 0.07) and dental treatment taken (OR = 0.13), presence of anxiety (OR = 0.03), and fear (OR = 0.05) were less likely to have CARE score. The satisfaction of the patient regressed significantly with the relationship with family members (ß = 0.77) and CARE score (ß = 0.21).

CONCLUSION: This study confirms the educational opportunity and implementation of CARE in dental students. CARE scores among patients varied depending on personal factors and dental treatment-related factors. The satisfaction of the patient was influenced by the relationship with family members and CARE scores.

Keywords:

CARE measure, dentist, empathy, factor analysis, India, students

Introduction

Empathy plays an important role in enhancing doctor–patient relationships, better handling of patients,[1] patient satisfaction, and clinical outcomes.[2] It is a cognitive model of understanding and involves understanding the feelings of others.[3] In health-care settings, empathy is viewed as a cognitive and behavioral attribute that has the ability to understand the patient's experiences and feelings.[4]

How to cite this article: Rajput S, Kumar A, Puranik MP, Shanbhag N. Exploring the educational opportunity and implementation of CARE among dental students in India. J Edu Health Promot 2020;9:249.

Evaluation of physician empathy from the patients' perspective plays a vital role in providing feedback and achieving improvement in the patient's health.[5] Tools available to assess feedback from patients are Jefferson Scale of Patient Perceptions of Physician Empathy, self-report measuring for cognitive and attitude factors, consultation and relational empathy (CARE), a patient rating system that measures physician communication skills and attitudes; the Roter Interaction Analysis System, an observer rating that measures empathy skills; and Tape-Assisted Recall method, which measures the development of a long working relationship.[6]

CARE measure was developed in the UK as a measure to evaluate empathy from the patient's perspective for general practitioners.[5,7] It has been translated and fully validated in German,[8] Chinese,[9] Croatian,[10] and Japanese[11] and is being widely used in general practitioners[10,12] and primary care setting.[9,11] These studies have also addressed the relationship between empathy (measured by CARE) and satisfaction of the patient.[11,12] However, little attention has been paid to contextual components in empathy development and examined a limited number of circumstantial factors that may influence patients' perspective empathy toward their health-care provider. Furthermore, previous studies suffer from limitations inherent to convenience sampling.[8-11,13,14]

There is only one study conducted in a primary oral health-care setting, which supported CARE as a measure of feedback to dental students on their empathy when interacting with the patients.[13] However, there is no valid and reliable method to evaluate dentists' empathy from the patients' perspectives in India. The present study aimed to explore the validity CARE questionnaire and assess the factors that influence patients' empathy and satisfaction toward their dentist using CARE.

Subjects and Methods

A cross-sectional study was conducted over a period of 2 months, August and September 2017, in Bangalore city after obtaining approval from the institutional ethics committee and review board. Permission was obtained from the principals of the dental colleges that participated in the study. Written consent was obtained from the study participants. The study was conducted in full accordance with the World Medical Association Declaration of Helsinki.

English version of CARE was translated in Kannada, and its cross-cultural validation was done by means of a back-translation procedure.[15] A pilot study was conducted to test the readability and comprehension in a group of 20 patients, and modifications were made as necessary. These patients were recalled after 1 week to check for test–retest reliability. Considering the proportion of participants with empathy (83%) in pilot study, 80% power of study, 10% margin of error, and the significance level of 0.05%, the sample size was estimated to be 96, which was rounded off to 100.[16]

The study tool consisted of a self-administered questionnaire with two parts. The first part measured demographic, personal, and dental treatment-related factors. The second part included ten-item CARE questionnaire[5] with domains of connecting (items 1–3), assessing (item 4), responding (items 5 and 6), and empowering (items 7–10) rated on a 5-point Likert scale ranging from "poor" to "excellent." In addition, one question was asked on patient overall satisfaction with their dentist, which was assessed through a 5-point Likert scale.

A list of dental institutions in Bengaluru was obtained from the website of Rajiv Gandhi University of Health Sciences, Karnataka, which served as a sampling frame.[17] Six dental colleges (one government and five private dental colleges) were included based on simple random sampling for the purpose of the study. Study participants were patients aged 18 years and above who can read and understand Kannada/English.

Data were collected from the patients who visited the outpatient clinics of different clinical dental departments. After undergoing treatment, patients were asked to complete the questionnaire, and confidentiality was assured. Care was taken to include patients undergoing treatment from different dentists (50 interns and 50 postgraduates). Questionnaires were collected back immediately and were checked for completeness. The majority of participants took 5–10 min to complete the questionnaire.

The data were entered into Microsoft Excel spreadsheet. AMOS 19 software was used to validate the CARE questionnaire. SPSS version 22.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. To test the reliability Cronbach's alpha, corrected item-total correlation (CITC) and Cronbach's alpha if item deleted was calculated. Test and retest reliability was assessed by Pearson's correlation test. Confirmatory factor analysis was conducted to examine the item homogeneity and construct validity by an orthogonal varimax rotation of factors and an eigenvalue cutoff set at 1. Varimax rotation was not needed as all items loaded in a single factor. The measurement of model fit with the data was checked with model Chi-square goodness-of-fit and approximate fit indices (root mean square error of approximation [RMSEA], root mean squared residual [RMR], goodness-of-fit index [GFI],

adjusted GFI [AGFI], normed fit index [NFI], relative fit index [RFI], incremental fit index [IFI], Tucker–Lewis fit index [TFI], and comparative fit index [CFI]). Item discrimination was done by means of part-whole corrected discrimination indices.

For CARE questionnaire analysis, the overall scores were obtained by adding the 10 items (score range: 10–50). Higher score denotes higher patient-perceived empathy. Descriptive statistics with frequency, mean, and standard deviation were computed. Questions which had options from very good to poor were dichotomized as "good" (very good and good) and "poor" (fair, poor, and very poor). CARE score was dichotomized according to the median (44) and was analyzed for its association with demographic, personal, and dental treatment-related factors using Chi-square test. These variables were considered in binary logistic regression. Stepwise multiple regression was performed as empathy (CARE) as the dependent variable. Hierarchical regression was conducted considering patient satisfaction as the dependent variable. A *P* value was considered significant at <0.05, with a 95% confidence interval.

Results

The mean age of the participants was 33.77 ± 9.74 years. Forty-two percent belonged to 28–37 years' age group and 38% in upper-middle class. Nearly equal distribution of gender was observed [Figure 1].

The mean CARE score was 43.80 ± 5.36. The range of recorded scores was 29–50. The mean score of items ranged from 4.25 ± 1.07 (item 2) to 4.50 ± 0.64 (item 10) and 28% rated the maximum possible score of 50. The option not applicable was observed for all items except items 1, 3, 5, and 10, wherein the other items up to 2% of study participants chose not applicable response.

Homogeneity analysis showed that all 10 items loaded highly (>0.80) ranging from 0.801 (item 4) to 0.896 (item 2). All part-whole corrected discrimination indices were positive and more than 0.20 [0.28 (item 5)–0.34 (item 1)].

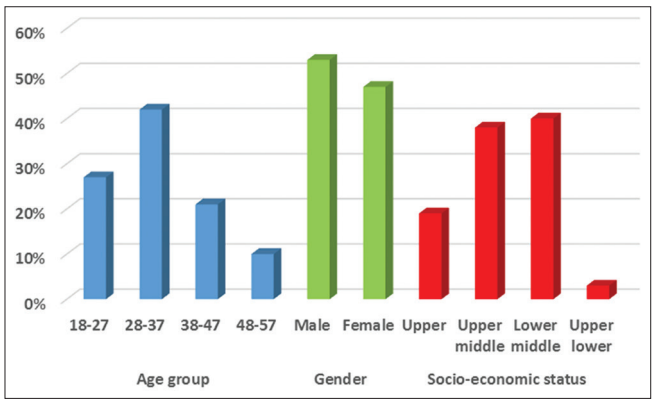

Figure 1: Demographic characteristics of patients in study (*n* = 100)

The correlations of test and retest for CARE ranged from 0.79 to 0.82 ($P < 0.05$). The reliability of CARE was found to be high (Cronbach's alpha = 0.859) and did not increase "if item deleted" for any 10 items. The CITC values ranged between 0.752 and 0.847. On analysis of factorial validity, the principal component analysis (Kaiser-Meyer-Olkin test [KMO] = 0.879, Bartlett's test of sphericity: $P < 0.001$, $\chi^2 = 2076.84$) revealed one factor explaining 61% of the total variance and displaying a satisfactory simple structure. Approximate fit indexes (RMSEA = 0.049, RMR = 0.027, GFI = 0.941, AGFI = 0.902, NFI = 0.931, RFI = 0.911, IFI = 0.943, TFI = 0.950, and CFI = 0.957) showed acceptable model fit [Table 1].

The presence of medical condition and depression, self-perception of overall health, relationship with family members and friends, dentist-provided care, the number of dentist visits, nature of treatment taken, previous dental experience, and presence of dental anxiety and fear were significantly associated with CARE measure.

Self-perception of overall health (odds ratio [OR] = 3.78), relationship with family (OR = 4.61) and friends (OR = 3.78), and previous dental experience (OR = 16.00) were more likely, whereas dentist-provided treatment (OR = 0.20), the number of dental visits (OR = 0.07) and dental treatment taken (OR = 0.13), presence of anxiety (OR = 0.03), and fear (OR = 0.05) were less likely to rate their dentist high empathy scores [Table 2].

Independent variables such as age, gender, medical condition, self-perception of health, and relationship with family members explained 46% of the variance in empathy (CARE) [Table 3].

The satisfaction of the patient regressed significantly with "relationship with family members" (ß = 0.77) and "CARE score" (ß = 0.21). The coefficient of determination (R^2) of the final model was 0.57. Change in R^2 (0.12) was significant ($P = 0.002$) [Table 4].

Discussion

The health professions have been described as an amalgam of clinical competence and service orientation toward caring. Propensities for service and caring may be reflected by their empathy toward patients they treat.[3,18] It is very difficult for the health professionals to fully understand each patient, but by showering empathy, make patients "feel, heard and cared" might strive them to know their patients in depth and enhances therapeutic efficacy including satisfaction.[3]

Table 1: Internal structure and reliability and homogeneity of consultation and relational empathy measure

Item	Factor loadings	Scale mean if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
1. Making you feel at ease	0.844	39.39	0.795	0.842
2. Letting you telling your story	0.896	39.55	0.847	0.840
3. Really listening	0.825	39.37	0.776	0.843
4. Being interested in you as a whole person	0.801	39.49	0.752	0.846
5. Fully understanding your concerns	0.835	39.41	0.786	0.825
6. Showing care and compassion	0.894	39.37	0.845	0.838
7. Being positive	0.821	39.38	0.772	0.834
8. Explaining things clearly	0.861	39.46	0.812	0.841
9. Helping you to take control	0.857	39.48	0.808	0.842
10. Making a plan of action with you	0.829	39.30	0.780	0.837
Total Cronbach's alpha			0.859	

Table 2: Association and multivariate analysis between sociodemographics, personal and dental treatment related factors (independent variables), and consultation and relational empathy (dependent variables) (*n*=100)

Category	Variable	Low empathy	High empathy	Adjusted odds
Age group	18-27	13	14	1
	28-37	20	22	1.02 (0.38, 2.68)
	38-47	09	12	1.23 (0.39, 3.90)
	48-57	07	03	0.39 (0.08, 1.87)
Gender	Male	24	29	1
	Female	25	22	0.72 (0.33, 1.60)
Medical condition	No	39	47	1
	Yes	10	04	0.33 (0.09, 1.14)
Depression	No	42	50	1
	Yes	07	1	0.12 (0.01, 1.01)
Self-perception of overall health	Poor	25	11	1
	Good	24	40	**3.78** (1.58, 9.05)
Relationship - family	Poor	30	13	1
	Good	19	38	**4.61** (1.96, 10.82)
Relationship - friends	Poor	25	11	1
	Good	24	40	**3.78** (1.58, 9.05)
Dentist-provided treatment	Intern	15	35	1
	PG	34	16	**0.20** (0.08, 0.47)
Number of dental visit	One	09	17	1
	Two	19	31	0.86 (0.32, 2.32)
	Three or more	21	03	**0.07** (0.02, 0.32)
Treatment taken	Non-invasive	04	07	1
	Invasive	17	04	**0.13** (0.03, 0.69)
Previous experience	Poor	18	03	1
	Good	03	08	**16.00** (2.63, 19.18)
Anxiety	Absent	29	50	1
	Present	20	1	**0.03** (0.01, 0.22)
Fear	Absent	35	50	1
	Present	14	1	**0.05** (0.02, 0.39)

*Bold-significant

Studies have concentrated on empathy, its association with demographic factors,[8,14] and personal factors,[7,9-11] while it is not clear whether empathy perceived by patients toward their dentist has an impact on their satisfaction. Hence, this study sought to determine whether sociodemographic, personal, and dental treatment-related factors (independent variable) affected CARE scores (dependent variable) and whether CARE score (independent variable) affected satisfaction of the patient (dependent variable).

Results suggest that CARE is a valid and reliable tool with robust internal consistency. The low number of not applicable responses for CARE justifies its validity and its relevance in the Indian dental setting.

CARE measure was previously tested in medical,[7-11] nursing,[12] dentist,[13] and therapist[14] in Croatia, Germany, the UK, Hong Kong, Japan, Malaysia, and New Zealand, respectively. All former studies reported

Table 3: Stepwise multiple regression analysis with empathy (consultation and relational empathy) as dependent variable

Model	*R*	R^2	Adjusted R^2	SE of estimate	*P*
Age	0.005	0.000	−0.033	6.104	0.977
Age+gender	0.032	0.001	−0.068	6.205	0.864
Age+gender+medical condition	0.332	0.110	0.015	5.960	0.074
Age+gender+medical condition+self-perception of health	0.542	0.293	0.189	5.408	**0.013**
Age+gender+medical condition+self-perception of health+relationship with family members	0.681	0.463	0.360	4.804	**0.008**

*Bold – significant. SE=Standard error

Table 4: Multivariate regression with satisfaction as outcome variable

Independent variable	Standardized regression coefficients			
	Model 1	Model 2	Model 3	Model 4
Age	0.03 (−0.01, 0.05)	0.06 (−0.01,0.07)	0.07 (−0.01,0.08)	0.07 (−0.01,0.08)
Gender	0.19 (−0.16, 0.54)	0.04 (−0.15,0.24)	0.03 (−0.17,0.24)	0.06 (−0.15,0.26)
Medical condition		−0.12 (−0.49,0.23)	−0.13 (−0.53,0.24)	−0.12 (−0.51,0.24)
Self-perception of health		−0.13 (−0.49,0.23)	−0.12 (−0.51,0.25)	−0.11 (−0.49,0.26)
relationship with family members		**0.80** (0.54,0.93)	**0.92** (0.25,0.94)	**0.77** (0.19,0.81)
Number of dental visits			−0.06 (−0.21,0.14)	−0.01 (−0.18,0.16)
Nature of treatment			0.07 (−0.36,0.50)	0.04 (−0.38,0.46)
CARE				**0.21** (0.15,0.32)
R^2	0.04	0.38	0.45	**0.57**
Change in R^2		**0.34**	0.07	**0.12**

*Bold – significant. CARE=Consultation and relational empathy, Model 1=Age, gender, Model 2=Medical condition, self-perception of health, relationship with family members controlling age, gender, Model 3=Number of dental visits, nature of treatment controlling age, gender, medical condition, self-perception of health, relationship with family members, Model 4=CARE score controlling age, gender, medical condition, self-perception of health, relationship with family members, number of dental visits and nature of treatment

loading of ten items into a single factor with good internal consistency (above 0.80) except for one study which reported extraction of two factors and internal consistency of 0.75.[10] Similar factor loading was observed in this study, displaying that they capture the same construct.

Item 2 has the highest (2%) nonapplicable response in this study and was similar to a study.[11,13] Other studies have reported in the range of 3%–8.2%.[7-10] In the UK[7] and Hong Kong,[9] items 4, 9, and 10 had the highest numbers of "not applicable" items.

The mean CARE score was 43.80 ± 5.36. This demonstrates that Indian dentists were having empathy toward their patients. A similar mean was reported in a couple of studies,[13,14] while other studies reported lower (31–38)[9-11] and higher (45)[12] means.

Health improves an individual's competency and compassion and nurtures their coping ability.[19] Our results showed that participants who perceived their health as "good", rated high empathy scores. On the contrary, a study reported higher empathy scores among patients with worse self-reported overall health.[8]

From infancy, relationships are vital for survival that can be fulfilled by social institutions such as family and friends. In other words, the root of empathy is the tendency to seek human connections and relationships.[20] The present study revealed that participants whose relationships were good with family and friends scored high for CARE. Investigations have linked mirror neuron function with empathic ability. Anxiety and fear can significantly reduce the signal rate of mirror neurons which, in turn, reduce the ability to empathize as reported in this study.[21]

With respect to dental treatment factors, increasing number of dental visit, and treatment by postgraduates, students brought about low empathy toward their dentist. One study reported the influence of dental visits on patient's empathy scores.[13] Studies have found that empathy diminishes during postgraduation/residency[13,22] One possible explanation for this decline might be that postgraduates are under constant distress due to high remaining task at hand, absence of a social emotionally supportive network, burnout, reduced quality of life, melancholy,[23,24] diminishing of estimation of optimism, excitement, and humanity.[25] Their focus shifts to technology and objectively as opposed to the humanistic parts of the profession.[23] This can essentially lessen the signal rate of mirror neurons which is linked with empathic capacity.[20,21]

Invasive procedures such as root canal treatment and extraction may bring discomfort to the patient, which might have resulted in decreased CARE score. On the

other hand, pleasant dental experience will bring a sense of compliance, satisfaction, and trust toward their dentist and reduce fear, which might have attributed to the increased CARE score in this study.

CARE measure scores were unaffected patients' demographics such as age, gender, and socioeconomic factors and was similar to other studies.[7,9] This may suggest the applicability of CARE across any age, gender, or social class, whereas in medical conditions, self-perception of overall health and relationships influenced empathy scores in dental settings.

In multivariate regression, the CARE score contributed to 57% of the satisfaction of the patient. Empathy is the way by which health professionals can stimulate the feelings of patients and get detailed information which helps in recognizing the patient's concerns. This empathic skill, in turn, builds up trust and long-standing patient-health professional relationship that encourages professionals to resonate with patient emotionally. This shows the promising role of empathy in building the satisfaction of the patients.

To best our knowledge, this is the first study validating CARE questionnaire in Indian dental setting which adds to the knowledge and its application across health-care disciplines. Since data were collected soon after treatment, and the dentist was unique for the given participant; recall bias was minimum. Unlike most of the studies done in a single institution, this study was done in multiple dental colleges and included diverse patients in terms of their demographic and socioeconomic status. Hence, the findings of this study may have better external validity.

The study had several limitations. A cross-sectional study design limits the causal inference of the relationships. The psychology of the patient was not assessed. Responses are the self-reported measurements of empathy. Moreover, no standard questionnaire was used to assess satisfaction which would have overestimated the findings. It may have suffered from a similar weakness as other rating scales such as social desirability bias, central tendency bias, and acquiescence bias. Participation was voluntary, which might have resulted in high CARE score.

This study has certain clinical applications. By assessing empathy of the dentist from patients' perceptive, will provide them with direct feedback on relational empathy. Also, it will help in professionals' change in their consulting behaviors. It serves as a tool for self-audit.[7,12] Empathy can be improved by targeted educational activities, which provides opportunities to enhance empathy during education.

Further research is needed on the practical use of empathy in dental practice, with a focus on the effect expectations of patients and dentists. Follow-up studies are recommended to assess the empathy on the long-term effect of satisfaction.

Conclusion

This study validated CARE measure in dental settings which, in turn, open the gate for its implementation in India. Self-perception of overall health, relationship with family and friends, and dental treatment characteristics influenced the patient's CARE. The relationship with family members and CARE score contributed to the satisfaction of the patients. Hence, understanding the patient's perspective of dental care and empathy is critical for the successful dental practice.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References

1. Mercer SW, Reilly D, Watt GC. The importance of empathy in the enablement of patients attending the Glasgow Homoeopathic Hospital. Br J Gen Pract 2002;52:901-5.
2. Roter DL, Stewart M, Putnam SM, Lipkin M Jr, Stiles W, Inui TS. Communication patterns of primary care physicians. JAMA 1997;277:350-6.
3. Halpern J. What is clinical empathy? J Gen Intern Med 2003;18:670-4.
4. Sherman JJ, Cramer A. Measurement of changes in empathy during dental school. J Dent Educ 2005;69:338-45.
5. Mercer SW, Maxwell M, Heaney D, Watt GC. The consultation and relational empathy (CARE) measure: Development and preliminary validation and reliability of an empathy-based consultation process measure. Fam Pract 2004;21:699-705.
6. Derksen F, Bensing J, Lagro-Janssen A. Effectiveness of empathy in general practice: A systematic review. Br J Gen Pract 2013;63:e76-84.
7. Mercer SW, McConnachie A, Maxwell M, Heaney D, Watt GC. Relevance and practical use of the consultation and relational empathy (CARE) measure in general practice. Fam Pract 2005;22:328-34.
8. Neumann M, Wirtz M, Bollschweiler E, Mercer SW, Warm M, Wolf J, *et al*. Determinants and patient-reported long-term outcomes of physician empathy in oncology: A structural equation modelling approach. Patient Educ Couns 2007;69:63-75.
9. Fung CS, Hua A, Tam L, Mercer SW. Reliability and validity of the Chinese version of the CARE measure in a primary care setting in Hong Kong. Fam Pract 2009;26:398-406.
10. Hanževački M, Jakovina T, Bajić Ž, Tomac A, Mercer S. Reliability and validity of the croatian version of consultation and relational empathy (CARE) measure in primary care setting. Croat Med J 2015;56:50-6.
11. Aomatsu M, Abe H, Abe K, Yasui H, Suzuki T, Sato J, *et al*. Validity and reliability of the Japanese version of the CARE measure in a general medicine outpatient setting. Fam Pract 2014;31:118-26.
12. Bikker AP, Fitzpatrick B, Murphy D, Mercer SW. Measuring

empathic, person-centred communication in primary care nurses: Validity and reliability of the consultation and relational empathy (CARE) measure. BMC Fam Pract 2015;16:149.
13. Babar MG, Hasan SS, Yong WM, Mitha S, Al-Waeli HA. Patients' perceptions of dental students' empathic, person-centered care in a dental school clinic in Malaysia. J Dent Educ 2017;81:404-12.
14. Kersten P, White PJ, Tennant A. The consultation and relational empathy measure: An investigation of its scaling structure. Disabil Rehabil 2012;34:503-9.
15. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine (Phila Pa 1976) 2000;25:3186-91.
16. Lwanga SK, Lemeshow S. Sample Size Determination in Health Studies: A Practical Manual. Geneva: World Health Organization; 1991. 25p.
17. List of Dental Colleges in Karnataka. Available from: http://www.rguhs.ac.in/institutions_rguhs.html. [Last accessed on 2017 Aug 06].
18. Frankel RM. Empathy research: A complex challenge. Patient Educ Couns 2009;75:1-2.
19. Shanafelt TD, West C, Zhao X, Novotny P, Kolars J, Habermann T, *et al*. Relationship between increased personal well-being and enhanced empathy among internal medicine residents. J Gen Intern Med 2005;20:559-64.
20. Neumann M, Bensing J, Mercer SW, Ernstmann N, Pfaff H. Analyzing the "nature" and "specific effectiveness" of clinician empathy: A theoretical overviewand contribution towards a theory-based research agenda. Patient Educ Couns 2009;74:339-46.
21. Neumann M, Edelhäuser F, Tauschel D, Fischer MR, Wirtz M, Woopen C, *et al*. Empathy decline and its reasons: A systematic review of studies with medical students and residents. Acad Med 2011;86:996-1009.
22. Hojat M, Mangione S, Nasca TJ, Cohen MJ, Gonnella JS, Erdmann JB, Veloski J. The Jefferson scale of empathy: Development and preliminary psychometric data. Educ Psychol Meas 2001;61:349-65.
23. Hojat M, Mangione S, Nasca TJ, Rattner S, Erdmann JB, Gonnella JS, *et al*. An empirical study of decline in empathy in medical school. Med Educ 2004;38:934-41.
24. Newton BW, Barber L, Clardy J, Cleveland E, O'Sullivan P. Is there hardening of the heart during medical school? Acad Med 2008;83:244-9.
25. Chen D, Lew R, Hershman W, Orlander J. A cross-sectional measurement of medical student empathy. J Gen Intern Med 2007;22:1434-8.