

Development and Validation of Questionnaire to Assess the Faculty Perception on the Dental Public Health Curriculum in India

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Abstract

Background: The dental academicians being in a unique central position between the students and the decision makers play a significant role in translating the advocacy efforts of the dental council to policy actions. The academicians' opinions, inputs, and their perspectives will help to recognize the strengths and weaknesses in the curriculum. However, this requires a reliable measurement tool to assess and document/report the current gaps in the curriculum in a systematic way. Hence, the present study aims to develop and validate an instrument for the assessment of faculty perception on undergraduate dental public health curriculum.

Subjects and Methods: The Development and validation of the questionnaire was conducted in three phases with 5 academic dental public health (DPH) professionals using mixed-method approach, combining quantitative-qualitative methodologies. First, the conceptual framework was designed using the themes derived from the focus group discussion (FGD) and followed by identification of domains and item pool generation for the instrument. This resulted in a preliminary version of the questionnaire with 6 domains and a section on internal evaluation of teaching and learning practices followed at individual dental institutions, totally comprising of 83 items. Second, an assessment of face and content validity, readability of the core set of the items was performed. The final questionnaire was an online version for pilot testing before actual field implementation.

Results: The new semi-structured, validated questionnaire was developed with 76 items, which was objectively tested and rated as having "very good" face validity with a score of 3.5 out of 4. The content validity was confirmed using Aiken's index for adequacy of the domains coverage (6 domains establishing the comprehensiveness of the new questionnaire) with sufficient number of items to adequately measure the domain of interest.

Conclusion: A new valid instrument for the assessment of faculty perception on undergraduate DPH curriculum has been developed. The use of this type of questionnaire appears to be a valuable tool for dental curriculum research.

Key words: Curriculum, Dental faculty, Questionnaire, Validation studies

INTRODUCTION

Though public health dentistry has a historical significance of emerging in India way back in 1970 as a post-graduate subject, it was officially considered as a subject in the undergraduate (UG) curriculum in 1983 by Dental Council of India (DCI).¹ Even after several decades of its

emergence, the subject still encounters a wide spectrum of problems, which are detrimental to satisfactorily fulfill the objectives of the curriculum, to name a few, (a) Poor manpower policy, (b) lack of supportive infrastructure, (c) low priority for research, (d) lack of methods of logistical and financial support, networking, grant seeking mechanisms are not at all covered in curriculum, (e) poor evaluation system with low priority for core dental public health (DPH) competencies. There is a perceived gap between the curriculum mandated by the dental council and the ground reality in the country.

Five major reforms have taken place in the dental curriculum in the last three decades, which were initiated by DCI and Regional Health University. However, yet

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these reforms did not culminate in providing the globally competent UG DPH curriculum.

The dental academicians are in a unique central position between the students and the decision makers and work in highly complex ways of developing and implementing the curriculum. They are expected to take leadership roles to modulate the UG DPH curriculum and play an important role in translating the advocacy efforts of the dental council to policy actions.

Administrators, policymakers, and faculty members interested in curricular reform process need a reliable measurement tool to assess the current DPH curriculum and thus document/report the current gaps in the curriculum in a systematic way. These can be measured by obtaining the faculty members opinions, inputs, and their perspectives to recognize the strengths and weaknesses in the curriculum, thus helping to create evidence-based document with a strong DPH perspective for effective curricular reforms.

In this context, an extensive search in six renowned electronic databases such as PubMed, Medline, Cochrane, Science Direct, Google Scholar, and EMBASE revealed that no standardized questionnaire was available to assess the faculty perceptions on the DPH curriculum.

Only a few studies have reported on the isolated components of dental curriculum, measuring faculty perceptions on implementation of problem-based learning in UG dental curriculum,^{2,3} objectively structured clinical examination,⁴ extramural rotations and underrepresented minority/low-income students to community-based dental education program⁵ and curriculum innovations,⁶ there was no exclusive DPH curriculum evaluation questionnaire available in the literatures of either in western countries or in the Indian context.

To address this gap, the present study was taken up to develop, validate and pilot-test the questionnaire. Then, we used the questionnaire to survey research-related issues in regional dental colleges in India in order to gather data that could act as a forerunner to a nationwide study.

SUBJECTS AND METHODS

This study uses a mixed method design, conducted in one of the private dental institution in India. The ethical clearance was obtained from the Institutional Review Board.

Faculty with post-graduation qualification in the subject of public health dentistry having a minimum of 3 years

of teaching experience was involved to participate in the study and those not available on the day of the study were excluded.

The study was carried out in three phases:

1. Phase 1: Conducting focus group discussion (FGD) with faculty members to identify the themes to design a conceptual framework for the development of the new questionnaire
2. Phase 2: Development of the questionnaire followed by face and content validation
3. Phase 3: Pilot testing of the online version of the new questionnaire developed.

The study involved purposive sampling method involving all the faculty members (5 faculty members) working in the department of public health dentistry, from the study institution. A written informed consent form was taken from all the participating faculty members. The FGD lasted from 60 to 90 min. The participants were assigned an identification number and were instructed to tell their respective identification number before they could comment, thus maintaining the anonymity. The full discussion was audiotaped using an audio recorder. Content analysis was used to analyze the data. The focus group interviews were transcribed then analyzed manually. The theoretical principles, practical issues, and pragmatic decisions were essentially consider to conceptualize on the content of the scale and the initial item pool included items representing all the domains of the scale.

The formulation of the initial pool of items related to the various domains was a crucial task for developing the scale. The fundamental goal at this juncture was to formulate all content systematically in a sequential manner that is potentially relevant in the new questionnaire.

For the present study, the items/questions reviewed from BDS curriculum ordinance book, journals and electronic media were identified, adapted and compiled in framing the items with most of them on a five-point Likert scale. Later, the questionnaire was tested for face and content validity.

Face validity refers to researchers' subjective assessments of the presentation and relevance of the measuring instrument as to whether the items in the instrument appear to be relevant, reasonable, unambiguous and clear. Practically, the quantitative assessment of face validity was achieved by 10-point criterion, wherein the judging panel scores on the five-point Likert scale from poor to very good with 0 being the least score and 4 being the highest, to objectively measure the satisfaction of each of the criteria indicated.⁵ The mean average score of the expert panel is obtained to rate the tool by using an arbitrary scale.

Content validity refers to the conceptualization of the statements for developing the scale for the study. An estimate of the content validity of a test was obtained by thoroughly and systematically examining the test items to determine the extent to which they reflect the content domain.⁶

The items on the scale were rated as strongly relevant, relevant needs modification or irrelevant. The experts reviewed all the items across six key concepts of the DPH curriculum and the items focusing on teaching and learning practices followed at individual dental institutions. The statements that were found to be irrelevant and confusing were deleted, and those that were rated as needs modification were revised. The suggestions made by the panel were incorporated to enhance clarity and readability of the instrument.

The generally, accepted quantitative index for content is the Aiken's V-index. This index was used to quantify the ratings of panel experts constituted for evaluating the items in the instrument. The Aiken's V-index with 0.80 indicates good content validity of the measure.

After the tool was developed, a draft copy of the tool was prepared and was tested for readability by the investigator, Hence, as to ensure that the items of the tool did not have double barrel questions, the items were not contradicting in nature and also further to ensure that there was no repetition of any items with similar meanings.

A pilot study was conducted using the online PDF fillable questionnaire, developed by the investigator using a Software viz. Adobe Acrobat Version 10.

RESULTS

Focus group participant's characteristics are presented in Table 1.

Table 1: Participant characteristics

Characteristics	Details
Gender	
Male	1
Female	4
Age	
Mean	34.5 years
Educational status	Master of dental surgery (public health dentistry)
Designation	1 – Professor and Head 2 – Readers 2 – Senior Lecturer
Academic experience	Professor and Head - 11 years Readers - 4 years each Senior Lecturer - 3 years each

The themes derived from the FGD were utilized to construct the conceptual framework for the development of the new instrument. The conceptual framework consisted of six domains and the additional sub-domains, namely, (i) Curriculum aims, goals, objectives and competencies, (ii) curriculum content/subject matter, (iii) innovative methods of teaching/learning, (iv) Other essential skills, (v) curriculum evaluation/assessment methods, and (vi) institutional support, and a section on the teaching, and learning activities followed in their respective institutions.

In the present study, 83 items were identified, adapted and compiled for the formulation of scale to assess the faculty perception on current UG DPH curriculum.

Panels of five subject matter experts were given the questionnaire for face and content validity.

The mean face validity score was 3.5 (out of 4 as the highest score in the arbitrary scale), and it was indicating that the panel of subject matter experts rated the face validity as "very good".

Those 83 items, which were initially screened using face validity with experts were subjected to content validity. If any question had Aiken's index <0.80 (range of 0.60-0.70), that marked them as not relevant, contradicting and confusing were deleted or changed after consultation with the experts (Table 2 and 3). After the validity assessment, out of 83 original questions, 75 items were retained, five were modified, seven were deleted, and one item was split and modified into two separate questions.

The majority of the items in the questionnaire had got the Aiken's V-index score of 1.0, indicating that all the raters giving those items the highest possible rating. However, the Aiken's V-index score for all the 76 items ranged between 0.80 and 1.0.

In the present study, all the items were given a response scale, by using five-point Likert scale for various domains and sub-domains, which includes "strongly disagree" to "strongly agree", "not at all important" to "very important", "not all satisfied" to "very much satisfied" and "poor" to "very good", with 1 being the least score and 5 being the highest.

The final semi-structured questionnaire consisted of a total of 76 items (02 open-ended and 74 close-ended questions) which was framed with six domains for assessing the faculty perceptions on UG DPH curriculum with such as: (i) Curriculum aims, goals, objectives and competencies (25 items [including 23 sub-items]), (ii) curriculum content/subject matter (21 items), (iii) innovative methods of

Table 2: Content validity of the new instrument with Aiken index

S. No.	Statement	Aiken's index
	Curriculum aims, goals, objectives and competencies	
1.	The DPH curriculum has stated its aims, goals and objectives clearly	1.00
2.	The DPH curriculum is more of a knowledge-based curriculum	1.00
3.	How important do you think these competencies are for an undergraduate student through the Department of Public Health Dentistry (Note: After undergoing training in III and IV BDS, these are the competencies required for the student through the Department of Public Health Dentistry) Competencies (Note: Competency is defined as an ability or fitness or capacity to do a defined task – Webster's Dictionary)	
	a. Knowing clinical dental skills	1.00
	b. Adept in program planning	1.00
	c. Adept in performing preventive procedures	1.00
	d. Having research skills	1.00
	e. Having qualities like leadership and working in teams	1.00
	f. Ability to diagnose and treat dental diseases at a community level	1.00
	g. Advocacy and policy influencing skills	0.80
	h. Grant writing skills	0.80
	i. Ability to critically appraise a document or situation	0.80
	j. Ethics and social perspectives	1.00
	k. Soft skills e.g.: Presentation skills, documentation skills etc	0.90
	l. Any other	1.00
4.	Do you think these competencies are fulfilled in the present training of RGUHS/your university undergraduate DPH curriculum Competencies	
	a. Knowing clinical dental skills	1.00
	b. Adept in program planning	1.00
	c. Adept in performing preventive procedures	1.00
	d. Having research skills	1.00
	e. Having qualities like leadership and working in teams	1.00
	f. Ability to diagnose and treat dental diseases at a community level	1.00
	g. Advocacy and policy influencing skills	0.80
	h. Grant writing skills	0.80
	i. Ability to critically appraise a document or situation	0.80
	j. Ethics and social perspectives	1.00
	k. Soft skills e.g: Presentation skills, documentation skills etc.	0.90
5.	Curriculum content/subject matter	
	a. Theory content	
	i. The DPH curriculum has explicitly defined theoretical components	1.00
	ii. The theoretical component in DPH curriculum is vast and wide	0.60
	iii. The present DPH curriculum prioritizes the theoretical components has must know/desirable to know	1.00
	iv. The theoretical components in present DPH curriculum are adequate for training the students in the DPH competencies required	1.00
	v. The manpower recommended by DCI is adequate for the teaching of theory contents of DPH curriculum	1.00
	vi. The time allocated in the RGUHS DPH curriculum is adequate for the completion of prescribed theory contents	1.00
	vii. The present undergraduate curriculum prioritizes the theoretical contents, which are important from DPH perspective	0.80
	b. Practical/clinical content	
	i. The present DPH curriculum has an explicitly defined practical component	0.80
	ii. The curriculum trains the students in instrumentation component	0.60
	iii. The present DPH curriculum prioritizes the practical components has must know/desirable to know	0.80
	iv. The practical components in present DPH curriculum are adequate for training the students in the competencies required for a public health dentist	1.00
	v. The manpower recommended by DCI is adequate for teaching of practical contents of DPH curriculum	1.00
	vi. The time allocated in the RGUHS DPH curriculum is adequate for the completion of prescribed practical contents	0.90
	vii. DPH curriculum emphasizes more on the use of indices for measurement and quantification of disease than on important DPH skills like research, program planning, etc.	1.00
	viii. UG research in the UG curriculum helps in developing scientific skills and self-learning in students	1.00
	ix. UG DPH curriculum considers training the students to enter clinical research organizations after graduation	0.60
	c. Outreach programs	
	i. The present DPH curriculum explicitly mentions the number and type of outreach programs to be conducted for undergraduate students	1.00
	ii. The outreach program activities in present DPH curriculum are adequate for training the students in the competencies required for a public health dentist	0.90
	iii. The UG DPH curriculum mandates the field visits and emphasizes the importance of the same to the UG students	0.70

(Contd...)

Table 2: (Continued...)

S. No.	Statement	Aiken's index
	iv. The UG DPH curriculum provides reporting protocol of the field visits in a systematic manner	0.60
	v. The DCI recommends a designated manpower (Doctors and Auxiliaries) for conducting the outreach programs as indicated in DPH curriculum	0.80
	vi. The present manpower recommended is adequate to conduct the outreach programs as per the DPH curriculum	1.00
	vii. The DPH curriculum has explicitly mentioned the time allocation for outreach program activities	0.80
	viii. The outreach program activities in present DPH curriculum are adequate for training the students in the competencies required for a public health dentist	0.90
	ix. The time allocated in the DPH curriculum is adequate for conducting various outreach programs	1.00
	x. The present DPH curriculum states clearly the roles and duties of a student during an outreach program	1.00
	xi. The present DPH curriculum considers posting of undergraduate students to the satellite center	0.80
6.	Innovative methods of teaching/learning	
	a. Does the curriculum mention innovative teaching/learning methods?	1.00
	b. Innovative teaching/learning methods are important component of DPH UG curriculum	0.70
	c. Does the present DPH curriculum allow you to incorporate the innovative teaching strategies without hampering the fulfillment of the syllabus?	1.00
7.	Other skills	
	a. The present UG DPH curriculum encourages personality development and communication skills	1.00
	b. The present DPH curriculum provides efficient training in dental practice management for UG students who wish to start private practice immediately after BDS	1.00
8.	Curriculum evaluation/assessment methods	
	c. The DPH curriculum clearly states type, number and methods of evaluation	1.00
	d. Curriculum considers holistic way of evaluating a student considering his punctuality, class room behavior, meeting deadlines, etc.	0.60
	e. An UG student trained in DPH should possess certain DPH competencies. The present examination system evaluates all these competencies adequately	1.00
	d. The DPH curriculum looks into both summative and formative assessment of the student during the evaluation	1.00
	e. The manpower recommendations of the DCI are appropriate and adequate for evaluation of the UG students' performance in DPH	1.00
	f. The present practical examination pattern stresses on the case history and indices component, which are not the priority DPH competencies	1.00
	g. Components like research, critical appraisal skills, program planning, community diagnosis etc., are not evaluated in the present practical examination system	1.00
9.	Institutional support	
	a. The mechanism of logistical and financial support to promote research in institutions is mentioned adequately in the DPH curriculum	1.00
	b. The mechanism of logistical and financial support to promote research in institutions should be mentioned in the DPH curriculum	1.00
	c. The institution should provide logistical and financial support to promote research among undergraduate students in institutions	0.80
	d. Does your university provide adequate guidelines on mechanism of logistical and financial support to conduct a good quality research?	1.00
10.	Curriculum review	
	a. Has the undergraduate DPH curriculum been reviewed in last 20 years?	1.00
	b. If yes, how frequently was it been reviewed in the last 20 years?	1.00
	c. Indicate 2 best practices that you think are incorporated in the undergraduate DPH curriculum over the last 20 years	1.00
Section B		
	Teaching/learning skills practices at your institution	
11.	How do you rate the teaching and learning facilities in your institution and mention two reasons/explanations/ comments for the same	1.00
	a. Theory	
	b. Practical	
	c. Outreach programs	
	d. Evaluation/examination	
	e. DPH manpower/faculty	
12.	Name the innovative teaching components that you have incorporated in your institution	0.80
13.	It is unethical practice to bring the patients from other departments to public health dentistry department only to record case history and Indices	1.00
14.	The present DPH curriculum should consider integrating recording of relevant indices by the undergraduate students, during the case history recording process in other departments	0.90
15.	Does your department has at least one individual satellite center/one collaborated with other health organization/NGO?	1.00
16.	Management of satellite centers in your department	0.80
17.	If DPH MDS faculty are posted to satellite center, does it compromise the UG program in your department	1.00
18.	If UG students are posted, what is the nature of work done by the undergraduate students in the satellite center?	0.80
19.	Please mention three components that you would wish to change in the present undergraduate DPH curriculum to make it more suitable to the present need of a DPH cohort	1.00

DPH: Dental public health, DCI: Dental Council of India

Table 3: Validation by five subject experts for developing the new instrument for assessing the faculty perception of undergraduate DPH curriculum

Description	Number of items	Percentage
Number of items screened at face validity	83	100
Number of items screened evaluated by the experts	83	100
Number of items satisfied Aiken's index	76	92.2
Number of items, not satisfied Aiken's index	07	7.8

DPH: Dental public health

teaching/learning (02 items), (iv) other essential skills (02 items) (v) curriculum evaluation/assessment methods (06 items) and (vi) institutional support mechanism (04 items), curriculum review (04 items) with most of the items on a five-point Likert scale with the ratings of 1-5 for the faculty members to rate their perceptions on the curriculum and the teaching and learning activities (12 items).

DISCUSSION

The DCI is currently facing several challenges in a diverse system of culture and geography to empower dental graduates to render quality service on par with international standards.

In community-based dental education, acquiring competency in addressing oral health needs at the community level and deepening their knowledge about the social and local health situation is an important aspect. Students are not only placed in community settings to treat individual patients, however also challenged to consider DPH issues, including the administrative aspects of dental services.⁷

In India, UG DPH curriculum is not competency based in order to meet the growing oral health care demands and producing competent dentists with comparable standards of education, inclusion of professionalism, research culture, critical thinking and communication skills, program planning strategies, other soft skills, and the promotion of skills for lifelong learning takes precedence.

There is a lack of instilling of this core DPH skills in the dental graduates of India and eventually they need further education when they immigrate to other developed countries.

“Delivery” of knowledge is discipline-based and uses conventional instruction methods and it is evident that there is a lack of innovative teaching and learning methods. Assessment of knowledge and skills is more summative than formative.

The present system of DPH emphasizes more on imparting a vast range of subject matter and vague general knowledge but not specific skills. In addition, the curriculum stresses more on traditional measurement, and quantification of disease and indices recording, with minimal credits to research component.

In this context, a search was conducted among the published literatures to find the availability of pre-validated questionnaire to assess the faculty perception on the DPH curriculum. There was neither a gold standard instrument nor a prevalidated questionnaire available.

Hence, this study was conducted to facilitate the development of a new questionnaire considering the comprehensiveness of the various domains that addresses the strengths and weaknesses of the current DPH curriculum.

In any research or program evaluation endeavor, it is important to ensure that the outcomes of interest are clearly defined and that the outcomes are evaluated using valid measures. The purpose of this paper was two-fold: (a) to describe the development of a questionnaire for assessing the faculty perception on current UG DPH curriculum, (b) to validate the newly developed questionnaire.

This is an exploratory study employing a qualitative research design utilizing FGD for the synthesis of the conceptual framework on questionnaire development. The study considered to validate the questionnaire by drawing rigorous methodological protocols from benchmark literatures.⁸⁻¹¹

The present study, led to the development of a valid instrument for assessing the faculty perception on current UG DPH curriculum. The new questionnaire on considers all the essential dimensions of the UG DPH curriculum that can be evaluated from the faculty perspective and thus identify its strengths and weakness. Using this questionnaire will allow for a deeper insight into the current challenges, and gaps in the DPH curriculum, and may result in a faculty-based measure of process-related curricular review eventually.

The development of this questionnaire was performed in several steps using methods and procedures consistent with best practices for developing psychological measures.

The researchers sought to identify qualitative and quantitative measures that would be valid, practical, and useful for assessment of UG DPH curriculum from a faculty perspective. The researchers then agreed that the new instrument should include the following components: (a) A block of socio-demographic items like gender, current designation, academic experience etc., (b) a section

on comprehensive evaluation of UG DPH curriculum, (c) a separate section on the teaching and learning methods, followed in DPH departments at individual dental institutions. Accordingly, the new instrument was developed with three separate sections as indicated above, that contained six items on socio-demographic details and a separate 76 items sections for assessing the UG DPH curriculum, and teaching and learning practices followed at individual institutions.

Later the questionnaire was tested for face validity objectively, with a panel of five subject matter experts, using the appropriate checklist as described in the literature¹² and accordingly the panel rated the questionnaire as having good face validity.

The researcher also decided to expand the number of items, tapping each of the UG DPH curriculum domains to ensure that we included a sufficient number of items to adequately measure the domain of interest.

The Aiken's index process was used to test for content validity as described in the methodological section¹³ and it was considered that the Aiken's index <0.80 , the question was deemed as inadequate and was deleted or changed after consultation with the experts. After the validity assessment, out of 83 original questions, 75 items were retained, five were modified, seven were deleted, and one item was split and modified into two separate questions.

The possibility that the construct of the new instrument is multidimensional cannot be excluded since a factor analysis was not performed due to limited sample size. Furthermore, test-retest reliability was not assessed.

In the present scenario, the researcher was concerned about the mode of administration (paper-based, online based) from the perspective of the study results. However, in accordance with research results of the effect of administration mode implementing online surveys in evaluating isolated components of the curriculum in dental and medical fields,^{14,15} and owing to the advantages that the online questionnaire carry, the researchers believe that different methods of administration will not substantially change results and thus decided to choose online survey formats.

To the best of our knowledge, this is the first of its kind to explore and develop a new questionnaire to assess faculty perception on the strength and weakness of current UG DPH curriculum, which has not previously been studied in India.

The new questionnaire has the potential to become an important tool to assess faculty perception on UG DPH

curriculum and further consider the same for the effective curricular reform process. The questionnaire has been assessed as demonstrating face and content validity with a high level of agreement between the subject matter experts.

However, owing to limited sample size, the study participants could not be divided into a development and a test sample. Moreover, it was not possible to engage in more sophisticated psychometric analyses to test for construct validity and reliability.

The data collected from this questionnaire would help researchers to identify main domains of concern and the degree to which each domain is affected. This could direct stakeholders and policymakers in initiating action in areas of weakness and improving areas of strength.

More research is advocated to appraise the utility of this questionnaire in various other regional, national, and international settings. Moreover, with the addition of future cohorts to our dental curriculum research working group, we expect to have sufficient sample size to further examine the complex psychometric properties of this questionnaire such as construct validity and reliability.

CONCLUSION

Considering all strengths and limitations of this study, it can be concluded that a valid instrument for the assessment of faculty perception on UG DPH curriculum has been developed, to facilitate effective curricular reforms. Thus, it represents a valuable tool for dental curriculum research and may result in a more positive dental curriculum oriented research programs in the future. This study can be an effective mechanism to communicate and convince the education administrators, curriculum review committees at the regional universities and dental council to make them realize the importance of developing such tools from the dental educator's perspective.

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