

ORIGINAL ARTICLE

BARRIERS AND FACILITATORS TO WRITE GOOD QUALITY MCQs FOR DENTAL ASSESSMENTS: A QUALITATIVE CASE STUDY

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Background: To explore barriers and facilitators to write good quality items for undergraduate dental assessments. **Methods:** A qualitative case study was conducted from Feb–April 2021. Semi-structured interviews were conducted with a purposive sample of eighteen item writers from a public-sector dental institute of Rawalpindi, Pakistan. The data were transcribed verbatim and thematically analyzed to extract themes regarding barriers and facilitators to write good quality items. All quality assurance procedures of qualitative research were ensured during the research process. **Results:** Five themes related to barriers and three themes related to facilitators to write good quality items emerged from the data. The participants reported more barriers such as lack of frequent training and lack of peer review and feedback. Other barriers were demotivation due to lack of acknowledgement or monetary incentives, lack of content and construct expertise, clinical workload, and contextual barriers such as lack of internet facility, outdated library, and lack of place and time allocation for item construction. Facilitators were availability of peer review, feedback from post-hoc analysis, motivation due to the senior designation, clinical experience, and ample time for basic sciences faculty. **Conclusion:** Frequent item writing training, strong peer review process, pre-exam item vetting by the dental education department, and institutional improvements such as striving for content experts, time and place allocation for item construction, internet facility, updated library, and equal distribution of workload among faculty could enhance the quality of items. Moreover, ways to inculcate motivation among item writers such as appreciation or monetary incentives could be used to improve the quality of undergraduate assessments.

Keywords: Undergraduate medical education; Academic training; Examination questions; Quality assessments

Citation: Aziz A, Jaffer M, Qaiser A, Siddique L, Ali S. Barriers and facilitators to write good quality MCQs for dental assessments: a qualitative case study. J Ayub Med Coll Abbottabad 2022;34(1):178–82.

INTRODUCTION

Assessment in medical education should be valid and reliable in order to discriminate the performance levels of the cohort being tested.¹ A valid and reliable assessment ensures the production of competent doctors by a medical school.² Knowledge, skills, and attitudes gained by medical students are evaluated by a variety of assessment methods.^{2,3} To assess knowledge in high stake examinations, multiple choice questions (MCQs) are frequently used to test higher order thinking skills of medical students.^{2,3,4} MCQs or items which were introduced in the Medical examination system in 1950 carry a number of advantages over other question formats such as testing a wide range of content, assessing a large number of students, and a rapid scoring system.^{2,3} They are proved to be valid and reliable assessment tools if constructed properly.³ A good quality MCQ consists of a detailed clinical scenario-based statement, a clearly asked question in the form of lead-in, and one most appropriate answer along with three or four functional distractors.³ Guidelines provided by Case and Swanson regarding item construction for basic

and clinical sciences are considered the best ones in medical education.⁵

Once an MCQ is constructed according to the recommended guidelines, it should be reviewed by the vetting committee consisting of item writers, content experts, and medical education experts to make it perfect in all aspects before the examination.^{2,4,6} Item vetting is a stepwise review and evaluation process in which item quality is improved by correcting technical flaws, checking content and language aspects to make them free of any mistakes.^{7,8} This protocol of item construction and vetting ensures quality presentations of items during examinations.⁷

Despite the availability of literature regarding guidance on the construction of high quality MCQs,^{8,9} items used within medical colleges are often poorly constructed having flaws in them.^{3,10} Factors which may have a positive or negative impact on the quality of MCQs written by clinicians and teaching faculty have been identified, *but limited research articles are available which investigated the barriers and facilitators faced by individual item writers.*¹¹ Item writers can best explain their institutional experiences

which may encourage or discourage them to improve the quality of the assessment.¹¹ Effective interventions could be planned to improve both the quality and quantity of assessment items by investigating and highlighting the challenges faced by individual item writers.⁸ The interventions could be a stepping-stone towards the production of flawless, valid and reliable assessment tools to draw fair conclusions regarding student's ability.¹²

The purpose of this study is to explore the barriers and facilitators faced by individual item writers so that necessary interventions could be planned to overcome barriers and to improve the quality of undergraduate dental assessments.

MATERIAL AND METHODS

A qualitative case study was conducted from Feb–April 2021. A case study approach was chosen to get a holistic investigation of a real phenomenon regarding item construction by item writers.¹³ Ethical approval was obtained from the Ethics Review Board (Ref No. 918/Trg dated 01 March 2021) of a public-sector dental institute of Rawalpindi, Pakistan.

Item writers of undergraduate dental assessments were purposively selected to get in-depth data. All item writers from junior faculty (demonstrators) and senior faculty (Assistant Professor and above) identified by the Head of Department of each basic and clinical dental sciences were included in the sampling frame utilizing maximum variation sampling strategy. A data collection guide was developed having an informed consent form and open-ended questions regarding barriers and facilitators to write quality items for undergraduate assessments. The extensive literature on the topic helped in developing open-ended questions which were validated by five medical education experts and piloted with eight item writers within one focus group to check for clarity. After minimal revision and approval by all authors, the preliminary questionnaire was finalized. Later, individual interviews were conducted due to sensitive nature of the data. The participants were informed about

their voluntary participation ensuring confidentiality and anonymity. The data were collected using the guide till the saturation level which was achieved at participant number 18. All interviews were audio taped and reproduced word-to-word. The transcripts were kept in password protected laptop and were anonymized before sharing with other authors for data analysis.

Manual thematic analysis of the data was performed to get themes regarding barriers and facilitators to write quality items. Approach to the thematic analysis given by Braun and Clark was utilized.¹⁴ The steps used were familiarize with the data, generate initial codes, search for themes, review themes, define and name themes and produce the manuscript. All authors familiarized with the data by carefully reading the transcripts. Later in-vivo codes giving rich descriptions of the data set were generated during the first coding cycle. The codes were utilized to make subthemes and they were later merged to form main themes answering the research question. The data were independently analyzed by all authors to get consensus on themes hence confirming findings and ensuring analytical triangulation.¹⁵

RESULTS

The participant's characteristics are given in Table-1.

This study has explored the barriers and facilitators to write good quality items for undergraduate dental assessments. The participants reported more barriers and less facilitators. Five themes along with ten subthemes emerged from the data related to barriers (Table-2) and three themes with nine subthemes were identified related to facilitators (Table-3).

Barriers: According to the participants, lack of frequent training, peer review and feedback were the main barriers to write quality items. Moreover, demotivation, lack of expertise, clinical workload and other contextual barriers were also reported.

Facilitators: Informal peer feedback and formal post-hoc analysis were facilitating some item writers. Motivation and time availability for basic sciences faculty were other facilitators to write quality items.

Table-1: Characteristics of the study participants (n=18)

Characteristics		Frequency (%)
Gender	Male	5 (28)
	Female	13 (72)
Age Groups (Years)	A1: 25-35	9 (50)
	A2: 36-45	9 (50)
	A3: 46-55	-
	A4: 56-65	-
Designation Groups	D1: Professor	-
	D2: Associate P	-
	D3: Assistant P	8 (44.44)
	D4: Demonstrator	10 (55.55)
Basic Dental Sciences	BS	5 (27.77)
Clinical Dental Sciences	CS	13 (72.22)
Total Teaching Experience (Years)	E1: 1-5	10 (55.55)
	E2: 6-10	6 (33.33)
	E3: 11-15	1 (5.55)
	E4: 16-20	1 (5.55)

Table-2: Barriers to write good quality items for undergraduate dental assessments

Themes	Sub-themes	Representative Quotes
Lack of frequent trainings, peer review & feedback	Lack of guidelines for MCQs construction	"I get a little confused when it is asked to construct items by following guidelines." (F, D4, CS, P #10)
	Lack of peer review and feedback	"No formal feedback has been arranged by my department till now." (F, D4, CS, P# 8) "I do not receive feedback from peers; rather I give guidance and feedback to my juniors." (M, D3, CS, P #1)
Demotivation	Lack of monetary incentives	"Lack of financial incentives from the institute is the reason of my demotivation to construct items." (F, D3, CS, P # 4)
	Lack of acknowledgement	"If I construct good quality MCQs as compared to others...I feel as if my hard work is not acknowledged by seniors and institute that leads to demotivation." (F, D3, CS, P #2)
	The eleventh-hour deadlines	"Honestly, I do not get enough time to construct MCQs because the demands made by the examination cell at the eleventh-hour become unmanageable with other teaching duties." (F, D3, BS, P # 17)
Lack of expertise	Lack of content expertise	"As I did not pursue post graduate qualification, therefore my content expertise is compromised." (F, D4, BS, P #15)
	Lack of construct expertise	"I am not able to judge whether my constructed test items are up to the mark or not." (F, D4, CS, P # 8) "Planning and writing functional distracters is a barrier for me." (M, D4, CS, P # 7) "I have difficulty in constructing higher order MCQs despite having content expertise." (F, D3, BS, P # 14)
Lack of time	Clinical workload	"There is shortage of time at the workplace as I have to supervise students, look after the clinical setup and manage educational duties simultaneously." (F, D3, CS, P # 6)
Contextual barriers	Minimal resources	"Sometimes we have unavailability of laptops and internet connection and much time is wasted at the workplace." (F, D4, BS, P # 16) "Unavailability of e-books and outdated textbooks in the library act as a hindrance in constructing quality MCQs." (F, D3, CS, P # 4)
	Lack of time and place allocation for MCQ construction	"Proper time and specific place for MCQ construction is not allocated." (F, D3, CS, P # 4)

*M: Male, F: Female, D: Teacher's designation group, BS: Basic Sciences, CS: Clinical Sciences, P: Participant no

Table-3: Facilitators to write good quality items for undergraduate dental assessments

Themes	Sub-themes	Representative Quotes
Availability of peer review & feedback	Peer review & Feedback	"Yes, I did get feedback from my peers regarding the quality of my MCQs." (F, D3, BS, P # 17)
	Formal post-hoc analysis	"We do have a feedback session at the departmental level. Also, we discuss post-hoc item analysis report." (M, D4, BS, P # 18)
Motivation	Monetary incentives	"I get monetary incentive being head of department and I construct MCQs for high stakes undergraduate and postgraduate examinations. So, this factor facilitates me to construct good quality MCQs." (F, D3, CS, P # 6)
	Senior designation	"My senior designation provokes me to write good MCQs. I feel responsible and pressurized to construct high quality MCQs." (F, D3, CS, P # 2)
	Clinical experience	"Clinical cases facilitate me in writing MCQs. I can construct a scenario easily by observing my patients." (M, D3, CS, P# 12)
	The eleventh-hour deadlines	"Sudden deadlines by the institute to construct and submit MCQs act as a facilitator for me." (F, D4, CS, P # 8)
	Availability of personal resources	"My personal assets aid me in writing MCQs. I have my own textbooks, e-books and literature and they act as a valuable resource." (F, D3, CS, P # 4)
	Interesting topic	"Any interesting topic surely motivates me to make more and quality test items." (F, D3, BS, P # 17)
Ample time in basic sciences	Ample time in Basic Sciences	"Being from basic sciences dept, we have a lot of time...it's all about managing time and prioritizing your timetable (F, D3, BS, P # 14)

* M: Male, F: Female, D: Teacher's designation group, BS: Basic Sciences, CS: Clinical Sciences, P: Participant no

DISCUSSION

This study explored the barriers and facilitators to write good quality items faced by individual item writers in a public sector dental institute. In a recent study by Luailiyah et al., factors impacting the quality of items have been identified such as basic needs including autonomy, competence, relatedness, and religiosity.¹⁶ In that study, sampling was done from both active and non-active item writers from clinical and non-clinical faculty of medicine.¹⁶ A scoping review by Karthikeyan et al., highlighted the need to explore barriers and facilitators from individual items writers.¹¹

The main barrier to write quality items according to the participants was lack of frequent faculty development workshops and formal and informal peer review and feedback. In medical education, short duration workshop (single day) has minor to moderate effect on improving the quality of in-house items by faculty members.^{17,18} Whereas, the structured faculty development programs, if held longitudinally, can have a greater effect on improving the quality of items due to sustainability.^{19,20} A recent review article by Salam et al., has highlighted problems in constructing good quality items in medical schools such as lack of formal faculty training, the last-minute items preparation leading to deficient time for review for its quality (vetting) before the examination, lack of agreement on standard of item construction format and underestimating the use of blueprint.²¹ In our study *eleventh-hour deadlines for item submission* was acting both as a barrier and a facilitator to construct quality items. Few participants said that *peer feedback* and *post-hoc analysis report* helped them in constructing quality items. Post hoc item analysis is a useful tool for assessing the quality of items in undergraduate medical education.²²

Another important barrier in the study was *demotivation* by the participants to construct quality items due to *absence of monetary incentives and lack of acknowledgement*. In literature, lack of time, multiple responsibilities and taking item writing not as a priority were the barriers for those items writers who were not motivated to write items.¹⁶ *Monetary incentives* were facilitator to one of the item writers as she was involved in item writing for undergraduate and postgraduate examinations being head of the department. The other *motivating factors* were the *senior designation provoking to write quality items, clinical experience, availability of personal resources* such as textbooks and e-books and *any interesting topic* for the individual item writer. Recent international literature has more or less same findings for the motivating factors identified in our study such

as formal responsibility for writing items, level of content expertise and clinical experience.²³ Whereas in our local context, no such study has been identified which might have highlighted barriers to write good quality items at the institutional level.

Lack of content and item construction expertise was a barrier to the study participants. Most novice item writers tend to create poor-quality items having flaws in them with low cognitive levels which test unimportant content.¹⁵ Item writers from clinical sciences were unable to manage time due to *increased workload* hence, they labelled it as a barrier. Whereas item writers from the basic sciences had *plenty of time* and labelled it as a facilitator to write quality items. Other barriers were related to specific context including *lack of place and time allocation for constructing items* at the workplace, *lack of resources* such as internet availability, e-books, and updated textbooks in the library.

Limitation of the study; Barriers and facilitators from item writers have been explored from one study site only.

CONCLUSION

Teaching and assessment in medical education are two sides of the same coin. Assessment tools must be of good quality to ensure valid and reliable assessment in medical schools for production of competent doctors to serve the community. Effective interventions could be planned to overcome barriers faced by item writers to write good quality assessments. Moreover, ways to inculcate motivation among item writers such as appreciation or monetary incentives could be used to improve the quality of undergraduate assessments. Future studies could collect data from more sites to capture contextual differences. Furthermore, data could be collected from faculty after applying required interventions such as frequent workshops and item vetting at the study site or at any other site after identifying the barriers to write good quality items.

AUTHOR'S CONTRIBUTION

AA: Conception of study, literature review, tool development, thematic analysis and manuscript drafting. MJ: Data collection, transcription and analysis, contribution in a writeup. AQ: Analysis and interpretation, contribution in a writeup, LS: Literature review, initial coding, contribution in a writeup. SA: Literature review, initial coding, contribution in a writeup.

Conflict of Interest: None to declare.

Funding Disclosures: None to declare.

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Submitted: June 30, 2021

Revised: October 14, 2021

Accepted: October 24, 2021

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