An evaluation of the multiple mini-interview as a selection tool for dental students

R. McAndrew1 and J. Ellis2

Objective This research evaluated the multiple mini-interview (MMI) process as part of the admissions procedure for a dental school. Design The thematic analysis of a paper-based questionnaire. Materials and methods Following screening an MMI was arranged for 190 candidates applying to study dentistry with written feedback obtained from candidates and interviewers. Results A 100% response rate to the paper-based questionnaire was achieved for candidates and a 90% response rate was obtained from interviewers. With specific reference to how candidates perceived their performance, 127 (67.9%) felt they had performed well with 24 (19.3%) unsure and 36 (12.8%) saying their performance was not ideal. Candidates generally thought that they had prepared as well as they could have done for the MMIs and 146 (77.2%) thought that they had done enough at interview to merit being offered a place to study dentistry. The MMI experience was considered favourable and from 137 written comments received by candidates 39 were most positive with reference to the MMIs. A thematic analysis of the comments identified a number of emergent themes including lack of control, anxiety and nervousness, preparedness and comparisons with conventional interviews. Conclusion The MMI appears to be useful in the selection of dental students.

INTRODUCTION

It has been stated that medical students should not be selected on academic ability alone and that some form of pre-selection interview should take place.1 All dental schools in the UK currently utilise an interview in the selection of their potential undergraduates, although the importance placed on these interviews differs between schools. It is known that a personal interview may be a poor indicator of future performance in health care professions2 and does not always explore non-cognitive traits such as empathy, ethical understanding or indeed communication.3-5 While structured interviews have been used by some in order to assess medical students, they too have suffered from problems with regard to reliability and predictability.3-8

Since its conception, introduction and evaluation, the multiple mini-interview (MMI) has been adopted by some medical schools as part of their selection procedures. The MMI has been shown to be reliable, deliverable and acceptable when used at undergraduate and postgraduate level.9-12 However, there is currently no published data on the acceptability, validity and or reliability of the MMI in the selection of dental students.

This paper presents the evaluation of an MMI process. The evaluation is based on a post-interview questionnaire from a cohort of prospective undergraduate dental students who attended the MMI at Cardiff Dental School for entry into the 2011 academic year. It also presents the findings from a post-participation evaluation questionnaire and debriefing sessions involving the interviewers participating in the MMI process. The aim of the study was to gain a greater insight into the applicants’ and participants’ experiences of the MMI process and inform future research in this field.

METHODS

Candidates applying for admission to the five or six year BDS courses offered by Cardiff University (UCAS codes A200 and A204) had their applications screened and scored by administrative staff following a matrix which considered a number of domains including academic performance (achieved and/or predicted), dental related work experience, non-dental related experience, UKCAT score and the academic supporting statement. This screening ranked the applications, which then provided a cohort to participate in the next stage of the application process: an invitation to attend for interview. In 2011 in Cardiff this was a series of MMIs which covered a number of areas: dentistry as a career, logic, reasoning, ethics and plagiarism, manual dexterity, breaking bad news, research and data interpretation. Every station, manned by one or two interviewers (dependent on the nature of the station), assessed the candidate’s ability in two fields: ability to discuss and cover the scope of the station and communication skills. Additionally, a generic assessment of the candidate’s perceived suitability to a career in dentistry was also made. The overall performance grades and generic assessments were then used to further rank candidates and inform the process of acceptance or rejection.

1University of Cardiff, Applied Dental Research and Public Health, Dental Hospital, Heath Park, Cardiff, CF14 4XY; 
*Correspondence to: Dr Robert McAndrew
Email: mcandrew@cf.ac.uk

Refereed Paper
Accepted 10 November 2011
DOI: 10.1038/j.1366-689x.2011.0000

© 2012 British Dental Association
Overall, four sessions were run sequentially on five consecutive days with breaks and refreshments timetabled into the schedule and care taken to ensure that different candidates participating in different sessions did not meet. Ten stations were used for the MMI: each station lasted up to five minutes with two minutes scheduled between stations. There were no rest stations and the MMI timetable allowed for a maximum of 200 candidates to be involved in the process. The interviewers were recruited by invitation from the dental school’s clinical and non-clinical academic staff, hospital staff and student body. A total of 21 clinical academic staff, 8 academic staff, 10 final-year dental students and 3 clinical support staff were involved in the MMIs. At the start of each day a pre-MMI briefing meeting was held where the reasons for conducting MMIs along with station explanation, practice and clarification was facilitated.

Feedback on the MMI process was obtained voluntarily from the candidates immediately after interview by means of an anonymous paper-based questionnaire. The questionnaire was constructed with questions specific to the interview process along with open ended questions designed to explore candidate experiences of the MMI process. Cardiff Dental School Research Ethics Committee confirmed that as an evaluation of an admissions process, a formal research ethics review was not required for this research. Nevertheless, candidates were informed that they did not have to participate in the evaluation of the MMI and that completion (or otherwise) of the questionnaire would not reflect on the outcome of the MMI. Candidates were also informed that written responses may be published but that deductive disclosure would not be possible from any data used.

For the interviewers, in addition to the daily group debriefing sessions, a follow-up on the MMI procedure was achieved through an electronically delivered paper-based questionnaire.

**DATA ANALYSIS**

Results to the procedural questions along with basic generic data were entered into the Microsoft Excel software package. The qualitative analysis was completed by an independent researcher who was neither involved in the interview process nor based in Cardiff. Free text responses were transcribed into a single text document. The text was coded according to multiple classification categories, some of which were pre-determined and others which emerged during the course of analysis. Emergent themes were identified across the answers to individual questions and indicative quotations are presented to illustrate these themes.

**RESULTS**

**Procedural data analysis**

Of the 190 interviewed candidates a 100% response rate to the paper-based questionnaire was achieved. A 90.5% response rate (38 out of 42) was obtained from the interviewers. It should also be noted that all interviewers participated in the debriefing sessions at the end of each day (that is, when the MMI process was completed). Any comments made at the debriefings were noted and subsequently annotated.

With reference to how candidates perceived their performance at interview, 127 (67.9%) felt they had performed well, 24 (19.3%) were unsure and 36 (12.8%) said their performance was not ideal. Candidates generally thought that they had prepared as well as they could have done for the interview process and at the end of the process 146 (77.2%) thought that they had done enough at interview to merit being offered a place.

With reference to the day as a whole, 186 (97.9%) reported arrangements for the day as being satisfactory, with 172 (91%) reporting that they had received enough pre-interview information on the structure of the MMIs. Only 130 (70.7%) reported that they thought they had received enough information on the content of the MMIs and this was reflected in the qualitative analysis of the MMI process.

Interviewers, like the candidates, were asked to evaluate the day’s arrangements and answered similar questions to that of the candidates on the day’s events. Of the respondents, 33 (86.8%) thought that arrangements for the day could not have been better and 5 (13.2%) reported satisfaction. The interviewers were happy that they had received enough information on the structure of the MMIs (36; 95.4%) and generally felt that they had been provided with enough information on the content of the MMIs (34; 89.4%). The pre-MMI briefing session was scored as ‘couldn’t have been better’ by 29 (76.3%) of the 38 interviewers replying and 8 noted satisfaction (13.7%). The debriefing/focus group sessions were described as ‘couldn’t have been better’ by 26 members of the group (68.4%) with the remainder indicating that it was satisfactory (12; 31.6%).

Candidates commented favourably on the MMI process as a whole. Of the candidates interviewed 114 (64.8%) considered them to be better than conventional interviews, 18 worse (10.2%) and 44 were ambivalent (25%).

Interviewers were similarly positive about the MMI process and from the responses in their questionnaire 34 (89.4%) thought the MMI process to be a better medium than a conventional interview process for assessing a candidate’s suitability to dentistry as a career. Two assessors did not reply to this question (5.3%).

**Qualitative analysis**

Candidates were given the opportunity by means of a free comment/text box to indicate why they felt they may have not performed as well as they could have during the MMIs and 69 written replies were received in this area alone. Candidates were also invited to make comment on their experience of the MMI process itself. The independent thematic analysis of all comments received by candidates and interviewers (187 responses in total) identified a number of emergent themes in the comments and these were expanded upon: 27 written comments were received from the assessors with 23 being noted during the debriefing sessions. A number of themes emerged from the qualitative analysis and these are detailed.

**Lack of control**

The very nature of MMIs requires a very structured process with absolute adherence to the prescribed timetable and structured questioning. For some candidates this was clearly a disappointment as they were not able to influence the direction of the questions or indeed the length of time they spoke about areas of interest; whereas a more conventional interview may have a degree of flexibility both in relation to the time for each
Anxiety and nervousness

Many of the candidates commented on their anxiety/nerves potentially being a barrier to them performing well:

- ‘I was very nervous and did not communicate my thoughts as effectively as I could have’
- ‘Not calm enough to logically answer the tasks’.

In addition, candidates who felt they had given a poor performance on a previous station experience increased anxiety in subsequent stations, particularly if they could not forget about a perceived poor performance:

‘A lot of the stations went poorly and if the previous station was bad I was nervous for the next one.’

In addition, the intensity of the process or the tight scheduling may have contributed to levels of anxiety by some candidates interpreting the interviewer’s brisk questioning to be negative behaviour:

- ‘Interviews are stressful and I think that the MMIs were intense’
- ‘The problem solving one spoke really quickly’
- ‘Some interviewers were quite aggressive’.

Comparison with conventional interviews

Where candidates had undertaken previous interviews they were able to compare these with the MMI experience. The comparisons all recognised the novelty of the MMI approach and its difference from the conventional interview, however, candidate’s preferences varied:

- ‘I was very nervous and it was nothing like any other interview’
- ‘I found the MMIs more difficult than a regular interview’
- ‘I feel that I performed better today than at normal interviews as I felt a lot more relaxed and I could be myself’
- ‘My experience of MMIs was much more positive than normal interviews.’

Most recognised that their performance may have differed from station to station and for some this was a positive feature. This may be due to the fact that they acknowledged that despite performing poorly in one station, the next station represented a fresh start. The more astute candidates may also have been able to develop their performance as they moved from station to station, learning from their immediate past performance. Likewise the variety of styles of stations considered a range of skills, which was welcomed by some candidates:

- ‘I think I performed a lot better on some stations than others, which is why I liked MMI’
- ‘Some of the stations were unexpected so really tested both my mental and physical skills (but in a good way)’
- ‘I think it’s a great system – it was easy to get relaxed after one station and I think it was great to have so many skills tested’.

Preparedness

Perhaps the most interesting theme which seems to split the opinion of the cohort was that many of the MMI stations could not be prepared for in advance. These stations tended to present non-dental situations which could be used to appreciate the candidate’s ability to think quickly, logically and with flexibility. For these stations preparation was impossible or unhelpful as the exact content was unpredictable. Most candidates acknowledged the challenge of such stations but for one group this represented an opportunity to be free of conforming to expectations, to be able to ‘think on their feet’ and to excel:

- ‘I think MMI challenges you but allows you to shine as well’
- ‘The fact that we had no information before the interview was perhaps the best thing about it as I could have a clear mind when answering’
- ‘Some of the stations were unexpected so really tested both my mental and physical skills (but in a good way).’

For some candidates who were able to reflect on the process, the inability to prepare answers to conventional questions highlighted areas for personal development:

- ‘For several stations earlier preparation was not helpful. The ability to think on your feet is very important and is something that I personally feel I need to improve.’

However, not all candidates welcomed this approach:

- ‘I can’t do logic questions off the bat’
- ‘Most of the stations were random and I didn’t feel I did as well as I would have if I knew what to prepare for and recap. Some stations that I could not prepare for did not go well’
- ‘Did not feel as well prepared but think that was the right way to do it.’

Some recognised that their difficulty in performing well was due to their own skill base being insufficient. Others, however, did not seem to recognise that the intention of these stations was to test their ability to use logic and apply personal skill sets to unexpected scenarios. For these candidates, they saw their inability to prepare as a fault in the level of information they were given or the newness of the process. They seemed to lack personal insight:

- ‘As it was the first year of conducting, there was hardly any information of the content’
- ‘I think because this was the first year, Cardiff couldn’t give us enough information about what this was like and how to prepare’
- ‘Need more examples of what stations will be about’
- ‘Give a bit more of a clue about what the questions are going to be.’
Free comment by the interviewers also raised some themes. Notably in comparison to the traditional interview many interviewers preferred this novel approach.

- ‘...let’s keep doing it – in my opinion it’s a much better way of evaluating future dental students’
- ‘The MMIs are a great idea...’
- ‘MMIs...are a significant improvement on the standard interview process...’
- ‘The MMIs took the candidate off the prepared speech and gave.... discrimination....’
- ‘...definitely better than old style interviews’
- ‘I do feel that all interviewees should have an opportunity to shine ....these questions were able to do this.’

However, there was a concern that ‘assessor fatigue’ throughout the day could be a problem. This was particularly so where the station domain was predictable and where candidates had been able to prepare or indeed be prepared:

- ‘It does allow the prospective student to merely quote prepared answers, often (as many were so similar) written by careers school staff’
- ‘It is an essential station, however, after 40 candidates I found it a little tedious’
- ‘For the ‘why dentistry?’ applicants were pretty well-prepared and moving them away from reciting a monologue where they extol the virtues of dentistry was a little challenging’.

A further theme that emerged, as perhaps was to be expected, was targeted suggestions for areas of improvement along with specific suggestions on how stations could be improved.

**DISCUSSION**

There are a number of issues that should be considered when introducing and evaluating any new assessment protocol and while two of these (reliability and validity) can be calculated, another two (feasibility and acceptability) can only be evaluated after attempting the process.

Participation in the MMI was found to be a positive and valuable experience for the majority of participants and seen as a worthwhile venture, confirming acceptability as an evaluation medium.1,11 The evaluation of the MMI procedures along with its qualitative analysis has provided valuable insight into how the process can develop, mature, improve and evolve.

Overall, candidates were very favourable in their perception of the MMIs and there was a good deal of evidence to suggest that it was a preferable medium. This was also reflected in the assessor evaluations. Some candidates did, however, make reference to the fact that the MMI process did not give them the opportunity to show personal skills and perhaps this is an area that should be explored.

There was concern shown suggesting adhering to a structured format in order to maintain consistency for candidates could result in interviewer fatigue. It was noted that this observation tended to centre on the more traditional stations where the candidate had a good idea of what was likely to be asked and could prepare for it. For example the questions, ‘why do you want to be a dentist?’ ‘Why do you want to come to Cardiff?’ It was clear that some assessors would have preferred a less prescriptive approach and to be allowed some free reign to challenge the applicant.

Assessors were very positive about the process and valued the ability not only to assess the area/field of the station but to be given the opportunity to make a global assessment/rating with regard to an applicant’s perceived suitability for dentistry as a career. The opportunity to have a subjective assessment confirmed on a number of occasions by four or five other assessors was viewed not only as positive but extremely valuable in the decision making process. The value placed on this global assessment cannot be underestimated. Personal uneasiness on failing a candidate has been noted before14 and it was again noted in discussion as well as the evaluation, highlighting that assessors were very prepared to use the full range of grade marks wherever possible.

Research has previously indicated that a concern of assessors in the process of MMIs has been a lack of benchmarking and a personal inability to gauge how well an assessor’s particular performance relates to another’s, ie the hawk or dove effect. There was surprisingly little written on this subject matter, nor verbal comment. One assessor did make reference to the possibility of trying to achieve some internal consistency in one particular station, but that was the only reference to this noted.

The fact that each station made evaluations in three areas (ability to deal with the focus of the station, communication skills and a global rating) worked well and was appreciated by the interviewers. It is arguable that the success of this perhaps relates to the understanding of the processes by the assessors and clear guidance and appreciation of what the MMI entailed overall. Once again, this is an area that will need to be explored and considered when using MMIs in the future.

It is believed that the MMI is a dynamic medium and future evaluations of the MMI process following the introduction of changes and suggestions highlighted by this evaluation will facilitate improvements in the process and allow realistic comparisons to be made. The findings from the qualitative analysis will be used to facilitate the construction of a tailored questionnaire in order to explore in more detail the potential experiences of applicants of MMIs.

In addition to the above it is also the intention of the authors to monitor and evaluate how students selected through the MMI process compare in their studies to those selected by the previous more traditional process.

**CONCLUSION**

The purpose of this study was to gain a greater insight into applicant and interviewer experience of the MMI process and inform future research in this field, which is perceived as a new method in selecting dental students. The findings of this study not only have direct relevance to Cardiff Dental School but have relevance to all professions who employ such a selection process. The evaluation has already proved extremely valuable and will be used to develop what is seen as fluid medium when it comes to selecting prospective dental students in the future. Additionally, by being actively involved in such a process and from its evaluation, it was evident that the effect that chance or individual subjectivity had in selection or rejection was seen to be considerably reduced in the responses from participants in the MMI process.
The authors would like to thank all applicants and interviewers who participated in the MMI process. Their comments, observations, responses and replies proved invaluable in the production of this manuscript. Additionally, the support from the Dean of the School of Dentistry should also be recognised, as without it the process could not have been completed.