What is the evidence regarding the utility of Multiple Mini-Interviews for selection to undergraduate health courses?

BEME review protocol

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Background to the topic

In selection for undergraduate health programmes, applicant numbers invariably exceed the number of available places, thus selection processes must focus on effectively ranking applicants. Nayer (1992) stated "the purpose of admission procedures is to select students who will complete the educational program and go into professional careers, do well in the program, perform creditably in professional practice and possess the traits of character and ethical values desired of a professional person."[1]

The Liaison Committee on Medical Education (LCME) publish standards for the accreditation of medical education programmes leading to MD degrees in United States and Canada.[2] Current LCME standards for selection state that "A medical education program must select for admission medical students who possess the intelligence, integrity, and personal and emotional characteristics necessary for them to become effective physicians". Whilst these standards originate from America and are intended for medical schools, they highlight characteristics that are appropriate to select for in admissions to all health professions courses internationally. Intelligence can be assessed, for the purposes of admissions, through previous academic qualifications and scores on admissions tests. The Medical College Admission Test (MCAT) is arguably the admissions test most widely used for health professions programme admissions. The MCAT is a standardised multiple choice format examination that assesses candidates' problem solving and critical thinking skills in addition to their background science knowledge.[3] Applicants to almost all US medical schools and many Canadian medical schools are required to have sat the MCAT. Evidence suggests MCAT results predict performance in the pre-clinical years of medical degrees.[4] However, evidence in support of the predictive validity of MCAT for clinical years is lacking. Similar admissions tests exist for other programmes.[5-8]

Whilst there are quantitative measures of academic ability readily available to inform schools of a candidate's intelligence, other attributes are more difficult to quantify. An attempt at determining a candidate's suitability for a profession (beyond academic ability) is clearly desirable. Approaches include application forms, interviews, references and combinations of these. Admissions interviews are associated with significant interviewer variability[9], 'halo and horns' effects whereby interviewers are unduly influenced by one positive or negative characteristic of the applicant, and by first impressions.[10]

In 2004, Kevin Eva and colleagues at McMaster University developed the Multiple Mini-Interview (MMI), a multiple sample approach to admissions interviews, with the intention of increasing reliability and ability to predict clerkship performance.[11]

The MMI could be considered to be an admissions version of the well-known Objective Structured Clinical Examination (OSCE). Similar to an OSCE, candidates rotate through stations in which there are tasks to complete. However, unlike an OSCE, the stations tend to examine a particular attribute of the candidate, rather than their ability to perform a specific skill.

McMaster's original MMI consisted of 8 stations that assessed 4 domains that were considered to be important characteristics for success in the health professions; ethical decision making, critical thinking, communication skills, and knowledge of the health care system. There were an additional 2 stations that took the form of short standard interviews focusing on topics that are frequently addressed in standard admissions interviews to health professions (why do you want to work in this profession? What experiences do you have related to this profession?). The stations designed to assess communication skills involved the candidate communicating with actors, including one station in which the candidate had to explain to a colleague that they had damaged the colleague's car.[11] McMaster has since sold their MMI system to other schools, and provided training to schools wishing to develop and implement their own MMIs. Many schools internationally have adopted the approach in their admissions processes, subsequently evaluating its reliability, validity, acceptability and feasibility. Several schools have adapted the approach based on the attributes they consider most important. For the purposes of this review, we define a multiple mini-interview as being an admissions process with greater than one interview (or station) with each being designed to assess a particular attribute.

To date, there does not appear to be any systematic review of the literature regarding Multiple Mini-Interviews or a consensus on how they may be optimised. Through systematically reviewing the existing literature we will synthesise what is currently known about MMI and identify areas for future research. We hope that publication of this review will encourage institutions who have adopted an MMI approach to admissions to analyse their data to further illuminate reliability and validity of the approach.

Review question and key words

Review question: What is the evidence regarding the utility of Multiple Mini-Interviews for selection to undergraduate health courses?

Through this review we intend to explore, analyse and synthesise the evidence relating to Multiple Mini-Interviews for selection to undergraduate health courses (for courses included see Table 2). Ultimately we aim to synthesise the existing literature to guide and inform those responsible for admissions to health profession courses, particularly those who already use Multiple Mini-Interviews or are considering adopting Multiple Mini-Interviews to assist their admissions process.

Through consideration of the review question a number of sub-questions will be addressed:

- How can MMI's be best developed?
- What format of Multiple Mini-Interviews optimises validity, acceptability, and reliability?
- What are the strengths and weaknesses of Multiple Mini-Interviews?
- How cost effective are Multiple Mini-Interviews when compared to traditional selection methods?
- How acceptable are Multiple Mini-Interviews to candidates and faculty?
- How feasible are Multiple Mini-Interviews?
- What is the predictive validity of Multiple-Mini Interviews?

In addition, we aim to describe an overall picture of the current variability of Multiple Mini-Interviews in use internationally.

Key words: Multiple Mini-Interviews, MMI, admission, selection, undergraduate, health

Search sources and strategies

Scoping search

A scoping search has been undertaken in order to inform the review group of approximate number of papers relating to Multiple Mini-Interviews. This scoping search retrieved 44 papers of relevance. In light of these findings, we believe the group has the capacity to include selection to all healthcare professions courses.

Electronic searching

The following databases will be searched electronically: ERIC, Medline, Web of Science, EMBASE, CINAHL, British Education Index, PsychINFO, British Nursing Index, ASSIA, Australian Education Index, Health Business Elite, HMIC, and AMED Allied and Complementary Medicine

The terms to be searched in each database are listed in Table 1

The limits imposed will be: English language, human, 2004 – present

Table 1 - Search terms

"Multiple Mini-interview$"	AND	Admission*	AND	Undergraduat*	AND	"Healthcare education"
OR MMI		OR Applicant*		OR Pre-registration		OR "Medical Education"
OR OSCE		OR Selection		OR Initial		OR Medic*
OR Station*		OR Candidate*		OR Universit*		OR "Nurs* Education"
OR Multiple				OR Student$		OR Nurs*
				OR School$		OR Physiotherap*
				OR Bachelor$		OR Midwif*
				OR Degree		OR Dent*
				OR Graduate		OR Pharmac*
						OR Veterinary
						OR "Occupational therap*"
						OR Dietetic$
						OR "Allied health"
						OR Audiology
						OR "speech pathology"
						OR "Clinical psychology"

Hand searching

The reference sections of relevant articles will be scrutinised to identify additional relevant publications.

Key journals identified through the scoping search(Advances in health sciences education : theory and practice, Medical Education, Nurse education today, Medical Teacher, British Medical Journal, American Journal of Pharmaceutical Education, Journal of Rehabilitation Research and Development and Academic Medicine) will be hand searched (since 2004) for relevant articles.

Grey literature

Grey literature will be searched for, including conference proceedings from relevant Health Professions Education conferences since 2004. Admissions departments of schools known to have implemented Multiple Mini-Interview based admissions processes will be contacted regarding any

reports or publications in-press they may be aware of. Experts in the field will be contacted to request any additional sources of information.

Search strategy constructed with assistance from Dr R Gick, Liaison Librarian for Health, Keele University. Unfortunately Dr Gick is unable to join the group as a full review member.

Study selection criteria

For this review we are interested in primary research relating to the use of Multiple Mini-Interviews in the admissions process for undergraduate health professions courses.

All formats of Multiple Mini-Interviews will be included, regardless of whether they involve group stations.

In order to maximise the number of relevant studies and outcomes measured we have chosen to study admissions to all undergraduate health professions courses. We have defined this as admissions to health profession courses of initial training regardless of candidates' qualifications on application. Applications to postgraduate courses and postgraduate training programmes will be excluded on the basis that candidates have already been pre-selected by admission to an undergraduate course, by some other means. Graduate entry courses will be included as they still provide a primary healthcare qualification.

No study will be excluded from the review purely on the basis of study design, although studies must provide primary data to be included (either quantitative or qualitative). Studies that are purely descriptive will be excluded, as will commentary and opinion pieces.

As Multiple Mini-Interviews were conceptualised by Eva and colleagues (McMaster University) in 2004, only studies since (and including) will be included.[12]

A summary of the inclusion and exclusion criteria can be found in Table 2.

Table 2 - Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Population	Applicants to: Undergraduate medicine Undergraduate nursing Undergraduate dentistry Undergraduate pharmacy Undergraduate veterinary Undergraduate midwifery Undergraduate allied health professions	Applicants to: Non-health professions courses Postgraduate courses Postgraduate training programmes
Intervention	Multiple Mini-Interviews	
Outcome	All outcomes	
Study design	Studies which provide primary data	Commentary articles
Publication date	After 2004	Before 2004
Study language	English[13]	Non-English

Procedure for extracting data

All papers will undergo an initial screening process and articles with titles that indicate they are obviously irrelevant will be excluded by one reviewer. The abstracts of the remaining articles will be independently assessed by two reviewers against the inclusion and exclusion criteria:

- Both reviewers agree include → full paper will be retrieved and progress to the coding stage
- One include and one exclude → full paper will be retrieved and assessed against inclusion and exclusion criteria – third reviewer opinion if necessary
- Both reviewers agree exclude → article moved to excluded article database

Full articles will be retrieved for all remaining studies and coded by reviewer pairs on an adapted BEME coding sheet. As Multiple Mini-Interviews are an admissions intervention as opposed to an educational intervention, Kirkpatrick's hierarchy of impact of intervention (used for many medical education systematic reviews) is not an appropriate tool. We intend, instead, to produce a tool for

measuring impact of intervention that is specific to admissions, which will be added to our existing coding sheet. Our provisional adapted BEME coding sheet (appendix 1) has been designed to capture content from included articles.

Pilot study

The pilot study will focus on refining the provisional coding sheet and confirming the methodology for narrative synthesis to be adopted in this review. The provisional BEME coding sheet will be piloted with reviewers coding 3 articles before meeting to discuss categories to be included and amendments to be made to the coding sheet, the intention being to ensure the coding sheet includes all necessary domains and reviewers are coding consistently. Reviewers will then be paired and asked to independently code an additional 3 articles per pair, after which the coding sheet will be finalised and a methodology for narrative synthesis confirmed.

The pilot study will cover 15 articles in total (3 articles by all reviewers followed by 3 articles per pair for each of the four pairs), these articles will be selected by the lead reviewer.

Synthesis of extracted evidence

Based on the pilot literature search, it is anticipated that this review will yield an array of primary quantitative and qualitative research papers, many focusing on different aspects of Multiple Mini-Interviews. We intend on undertaking a mixed method review; synthesising quantitative data through meta-analysis (where appropriate) and qualitative data through narrative synthesis.

Project timetable

The anticipated date for submission of our report is December 2013. A breakdown of stages of the review and associated timeframe can be found in Table 3

Table 3 - Timeframe for review

Stage	Start date	Expected duration	Expected completion date
Form review group	August 2012	8 weeks	October 2012
Registration of topic	August 2012	8 weeks	October 2012
Creation of protocol	October 2012	6 weeks	December 2012
Development and pilot of BEME coding sheet	November 2012	3 months	February 2012
Systematic literature search	March 2013	2 weeks	March 2013
Contacting experts	March 2013	6 weeks	April 2013
Identification of studies to be included	March 2013	2 weeks	March 2013
Retrieval of full text articles	March 2013	2 weeks	April 2013
Pilot study	April 2013	2 weeks	April 2013
Coding of full articles & Data abstraction	March 2013	8 weeks	June 2013
Synthesis of findings	June 2013	12 weeks	September 2013
Writing review	September 2013	3 months	December 2013
Finalising and submission of report	December 2013	4 weeks	December 2013

Implications

We hope that the outcomes of this review will inform best practice for Multiple Mini-Interviews. Additionally, it is anticipated that publication of this review will encourage further evaluation and research of Multiple Mini-Interviews, in particular predictive validity.

Conflict of interest

The group has no conflict of interest.

Plans for updating the review

This review will be updated 3 to 5 years after completion, depending on quantity of papers published. By this time it is expected that there will be more data available regarding the predictive validity of Multiple Mini-Interviews.

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Appendix 1 – Provisional adapted BEME Coding Sheet

1. ## Administrative

   a. Reference Number

   b. Reviewer

   c. Date

   d. Citation Type:

   ☐ Book   ☐ Journal article

   ☐ Non-peer review article   ☐ Conf. paper/proceedings

   ☐ Official publication   ☐ Thesis

   ☐ Other:

   e. Citation Information:

   Author(s)

   Title

   Publication

   Year   Volume   Issue   Pages

   f. Search Method:

   ☐ Electronic search   ☐ Personal recommendation

   ☐ Hand search   ☐ Grey literature

   ☐ Other:

2. ## Evaluation Methods

   a. Research design (tick all that apply)

   Non-comparative studies

   ☐ Audit   ☐ Expert opinion   ☐ Report

   ☐ Action-based   ☐ Focus group   ☐ Observation

   ☐ Case series   ☐ Historical   ☐ Survey

   Comparative studies

   ☐ Cross Sectional   ☐ Case control

   Single group studies: Cohort study: Trials:

   ☐ Before & after studies   ☐ Prospective   ☐ Non-randomised

   ☐ Time series   ☐ Retrospective   ☐ Randomised

   Review

☐ Review - Details:

Meta-analysis

☐ Meta-analysis - Details:

b. Data collection methods (tick all that apply)

Interview:	Observation:	Opinion:	Questionnaire:	Focus group:
☐ Applicant	☐ Applicant	☐ Applicant	☐ Applicant	☐ Applicant
☐ Assessor	☐ Assessor	☐ Assessor	☐ Assessor	☐ Assessor

☐ Assessment results – details:

☐ Student outcomes – details:

☐ Other – details:

3. Context (target population)

Number of subjects

Country/ location of study

Profession:

☐ Medicine	☐ Nursing	☐ Midwifery
☐ Veterinary	☐ Dentistry	☐ Pharmacy
☐ Physiotherapy	☐ Other:	

4. Aim of study

a. Objective / purpose of study   ☐ Stated   ☐ Not available

Details:

b. Tied to theoretical/conceptual framework   ☐ Stated   ☐ Not available

Theoretical/conceptual framework used:

c. Based on relevant literature   ☐ Stated   ☐ Not available

Specify whether the author demonstrated awareness of the literature:

5. Intervention

Description of Multiple Mini-Interviews used:

Number of stations:

Duration of stations:

Randomisation of stations: ☐ set stations ☐ Randomised stations

Randomisation of questions within stations: ☐ set questions ☐ Randomised questions

Details of stations:

Description of outcomes:

6. Impact of intervention studied

[we will produce a admissions specific tool for coding impact of intervention studied]

Code the level of impact studied in the item and summarise the results of the intervention at the appropriate level. Note:

Include both predetermined and unintended outcomes

7. Rate evaluation methods

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
1. Appropriate study/review design	☐	☐	☐	☐	☐
2. Well implemented study/review design	☐	☐	☐	☐	☐
3. Appropriate data analysis	☐	☐	☐	☐	☐

4. comment on evaluation methods, if applicable:

Overall study quality: Low Quality ⟹ High Quality
☐ 1––– ☐ 2––– ☐ 3––– ☐ 4––– ☐ 5

8. Author's key findings

Author's findings:

9. Strength of findings

Low   1 ☐ No clear results can be drawn. Not significant

2 ☐ Results ambiguous, but there appears to be a trend

3 ☐ Conclusions can probably be based on the results

4 ☐ Results are clear and very likely to be true

High   5 ☐ Results are unequivocal

Comments:

10 Further details

Overall impression

Avenues for further

research

New insights / implications