

## The Multiple Mini-interview for Physical and Rehabilitation Medicine Residency Admissions: Reliability and acceptability

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### ABSTRACT

**Objectives:** To evaluate the reliability and acceptability of using the multiple mini-interview (MMI) for Physical and Rehabilitation Medicine in the residency admission selection process.

**Study design:** A retrospective cross-sectional study.

**Setting:** Department of Rehabilitation Medicine, Maharat Nakhon Ratchasima Hospital, Nakhon Ratchasima, Thailand.

**Subjects:** Candidates for the Physical and Rehabilitation Medicine residency program in November 2022 and interviewers who evaluated the candidates using the MMI.

**Methods:** The MMI consisted of 6 ten-minute structured interview scenarios mapped with the expected competencies of the candidates. Some parts of the traditional interview were included, e.g., the candidates presenting themselves in station 1 where two interviewers, faculty members and residents, evaluated the candidates independently without discussion among themselves. Interviewers used scoring forms to evaluate the overall performance of the candidates in each MMI using a rating scale of 1 to 10 with an open section for comments. Reliability within each of the MMI stations was determined by intraclass correlation coefficients (ICC). The candidates and interviewers completed an anonymous survey questionnaire regarding the MMI. Candidates' responses to the open-ended questions were recorded.

**Results:** A total of 12 interviewers and seven candidates participated in the MMI process on the day of the interviews. The overall satisfaction of the candidates and interviewers with the 70-minute MMI was positive. Both candidates and interviewers thought the MMI was fair, decreased bias, and could efficiently evaluate the candidates' performance and strengths. Most of the interviewers (83%) had score differences of at most 3 points for each candidate, which indicates the ability to discriminate between the candidates was quite low. The ICCs of the six MMI stations were 0.34, 0.29, 0.64, 0.95, 0.88, and 0.77. The ICC for MMI scores across all stations was 0.7.

**Conclusions:** The MMI is a reliable Physical and Rehabilitation Medicine residency admission method. The ICC of 4 of the 6 stations was acceptable. The MMI's high acceptability among both candidates and interviewers, especially in terms of fairness and decreased bias, allowed efficient evaluation of the candidate's performance and strengths.

**Keywords:** interview, physical and rehabilitation medicine, internship and residency, medical education

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### Introduction

The selection of medical school and residency training candidates involves evaluation of cognitive and non-cognitive attributes. Cognitive abilities are evaluated by means of either a written examination or previous academic performance, e.g., grade point average (GPA) and National license examination scores (NL). Traditional interviews, conducted face-to-face with either one or a panel of interviewers using structured questions, is a standard selection process method. The objective is to evaluate interpersonal and behavioral attributes of the candidates. However, there have been questions regarding interviewer bias, reliability, and validity.<sup>1</sup> Multiple mini-interviews (MMI) were introduced by Eva et al. in 2004.<sup>2</sup> Using a "multiple sample-based" approach with an OSCE-style exercise, MMI is intended to assess non-cognitive attributes such as communication skills, critical thinking, and ethical decision-making. The MMI has been used in undergraduate and postgraduate admissions around the world.<sup>3-10</sup> Postgraduate applicant pools generally have fewer and more homogeneous candidates than undergraduate pools.<sup>3</sup>

A 2019 review of the MMI by Ali, S et al. reported that the MMI has high internal consistency and item-total correlation for each station, ranging from 0.53 to 0.96.<sup>11</sup> A total of 5 to 12 stations were studied and showed good G coefficients.<sup>11</sup> A previous study in a cardiology residency program with ten stations showed a relative G coefficient between 0.56 and 0.73.<sup>4</sup> The duration of the station interviews has been studied, with 5-to-8-minute working times reflecting adequate reliability.<sup>11</sup> A study of resident selection for the Physical and Rehabilitation Medicine program in Canada which involved four 15-minute stations was published in 2011.<sup>5</sup> The intraclass correlation coefficients (ICC) ranged from 0.1 to 0.69, and the ICC between stations ranged from -0.45 to 0.47. There was sufficient inter-rater reliability in three out of four MMI stations, while the

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overall MMI had moderate reliability.<sup>5</sup> In Thailand, many medical schools currently use the MMI as a selection method, but published research is limited.<sup>12</sup>

The Department of Rehabilitation Medicine, Maharat Nakhon Ratchasima Hospital has been a training center for the Physical and Rehabilitation Medicine residency program since 2018, accepting two new residents per year. Responding to the growing demand for psychiatrists in the public health service, the number of candidates has increased. The yearly residency program's acceptance rate in Thailand has decreased from 69% in 2019 to 51% for the 2023 training year. The selection process for candidates is intended to measure the expected competencies that result in successful residency graduates and satisfied, capable psychiatrists working in government hospitals.

The traditional interview has been used since residency training was begun in 2018 and consists of a 30-60-minute interview with each candidate conducted by a panel of 4-6 interviewers. Scores from the interviews are combined with information from the candidates regarding their experience during their internship period and the hospitals that give them a position after graduating from the training. The traditional interview method was adequate when there were only a small number of candidates and thus a low level of competition. Because of the advantages of the MMI, our department's committee decided to use the MMI instead of the traditional interview process for residency admission in 2022 with the MMI interview portion counting for 65% percent of the candidate's total score. Evaluating the reliability and acceptability of this first experience with the MMI presents a challenge to both the hospital committee and to other stakeholders. This study aimed to evaluate the reliability and acceptability of the multiple mini-interview (MMI) for Physical and Rehabilitation Medicine residency admission.

## Methods

### Setting

Department of Rehabilitation Medicine, Maharat Nakhon Ratchasima Hospital, Nakhon Ratchasima, Thailand.

### Study design

A retrospective cross-sectional study was performed. The present study was approved by the Ethics Committee of

Maharat Nakhon Ratchasima Hospital (No.140/2022).

### Participants

An anonymous questionnaire survey was conducted with seven candidates and twelve interviewers after completion of the interviews.

### The multiple mini-interview (MMI)

The seven competencies expected of the candidates identified by a Department of Rehabilitation Medicine committee included: 1) knowledge and skills in patient care, 2) interpersonal skills and teamwork, 3) communication skills, 4) reasoning, problem-solving, and management skills, 5) responsibility and professionalism, 6) continuous professional development, and 7) committed to the career (Table 1), competencies which correlate with the outcomes when graduating from the residency program.

The MMI consisted of 6 ten-minute structured interview scenarios. The different scenarios were developed by the committee and correspond to the expected competencies of the candidates. In addition to the MMI, an abbreviated version of the traditional interview process was included in station 1.

The two interviewers in each station included eight faculty members (six psychiatrists, one nurse, and one occupational therapist) and four residents. Each member of a station evaluated the candidates independently. The interviewers had been trained in the MMI scoring system and were blinded to information about the candidates. Candidates were identified by number only rather than by name. The interviewers were instructed not to discuss the candidates with each other through either verbal or non-verbal communication both during and after the evaluation of each candidate. A staff member collected the scoring forms for each candidate after each rotation after which the interviewers were not allowed to edit their scoring of previous candidates. A scoring data spreadsheet which included appropriate evaluation formulas had been designed before the interviews by an expert with experience in evaluating medical students.

The scoring forms evaluated overall performance on communication skills, the strength of the discussion or performance, and the candidate's suitability for the medical profession.<sup>6</sup> The rating scale of 1 to 10 included descriptive terms, e.g., unsuitable, less suitable, satisfactory, above average, and

**Table 1.** The MMI blueprint showing the expected competencies of candidates in each station

Station number	Knowledge and skills	Interpersonal skills and teamwork	Communication skills	Reasoning, problem-solving, and management	Responsibility and professionalism	Continuous professional development	Committed to the career
1		⊙			⊙	⊙	⊙
2			⊙	⊙	⊙		
3	⊙		⊙	⊙	⊙		
4	⊙		⊙	⊙		⊙	
5	⊙		⊙		⊙	⊙	
6		⊙	⊙	⊙			

MMI, multiple mini-interview

outstanding. The form also included a space for comments. No candidate's name or other information regarding the candidate was recorded on the scoring forms. Because this was the first use of the MMI at this hospital, station 1, which was an abbreviated form of the traditional interview, had a maximum score of 15, while the other five stations each had a maximum score of 10, giving a total possible MMI score of 65.

Each station was located in a separate room each of which had been checked to ensure there was no sound interference among the stations. The scenarios of each station were posted at the entrance to the room. The candidates had 2 minutes to read the scenario followed by 8 minutes of response time at each station. The candidates were randomly assigned a number, which was their only identification during the interview. The initial station for each candidate was also randomly assigned, after which they rotated through the remaining stations in numerical order. Station 7 was a rest station. The candidates were informed of the MMI orientation before the interview process started. To help the candidates keep track of the time remaining, an audible signal was given at each station after 2, 9, and 10 minutes.

### Outcome measurements

The scores from all interviewers for each candidate were evaluated to assess the reliability of the MMI. The opinions of the candidates and interviewers regarding the acceptability of the MMI were obtained by means of an anonymous questionnaire. The questionnaire included closed-ended questions regarding the usefulness of the MMI, the level of stress involved, the efficiency of the MMI in evaluating a candidate's performance and the candidate's preferences regarding the MMI and a traditional interview. Responses were marked as "strongly agree," "agree," "disagree," and "strongly disagree." Overall satisfaction was scored on a rating scale of 1 to 10, with 10 indicating greatest overall satisfaction. In addition, candidates were asked to respond to two open-ended questions about the interview experience and the strengths and limitations of the MMI. The candidates were also asked to vote for the stations that they "liked the most," "did it best," and which were "the most appropriate for the selection process."

### Statistical methods

The demographic data of candidates and interviewers and the MMI scores are shown as percentage, mean, standard deviation (SD), minimum, maximum, and relative standard deviation (RSD).<sup>6</sup> A wide variance in scores (RSD) of each interviewer indicates that they were able to discriminate between the candidates in their station.

The reliability of the 6 MMI station scores was determined by intraclass correlation coefficients (ICC). A two-way mixed-effects model was used. The reliability within the same competency was similarly investigated. The ICC across the 6 MMI stations was calculated to determine overall reliability. Values of less than 0.5, 0.5-0.75, 0.75-0.9, and greater than

0.9 indicate poor, moderate, good, and excellent reliability, respectively.<sup>13</sup>

The candidates' and interviewers' opinions regarding the MMI were evaluated using numbers and percentages. Quotes from the open-ended questions were also recorded. Finally, MMI scores and previous academic performance were compared.

## Results

Eight candidates applied for the residency program for the training year 2023, but only 7 candidates appeared for the interview. Demographic data of the candidates are shown in Table 2. Four were male. The mean age was 27.57 years (range 27-31, SD 0.61). Five candidates graduated from medical school in the Collaborative Project to Increase Production of Rural Doctor (CPIRD). The mean grade point average score (GPA) was 3.11 (2.58-3.71, SD 0.42). The mean total MMI score was 49.7 (44.38-53.5, SD 3.48) out of a possible 65 points.

The ICC within stations (Table 3) ranged from 0.29 for the conflict resolution station to 0.95 for the searching on the Internet and presenting in English station. From the guidelines of reporting ICC,<sup>13</sup> there were two stations with very good reliability, two stations with good reliability, one with moderate reliability, and two with poor reliability. The ICC within competencies is shown in Table 4. Moderate reliability was found for most competencies with the exception of interpersonal skills and teamwork which had good reliability. The ICC for MMI scores across all stations was 0.7.

Table 5 summarizes the MMI scores from each interviewer. From the total score of 10 in each station, the interviewers scored each candidate between 3 and 10 points, with a score difference among the interviewers of between 1 and 5. Ten of the twelve interviewers (83%) had an MMI score difference of at least 3 points. The scores by five interviewers had a relative standard deviation (RSD) below ten: 1-A, 1-B, 2-A, 3-B, and 6-B.

**Table 2.** Demographic data of the candidates (N=7)

Category	Value
Age (years) <sup>1</sup>	27.57 (0.61)
Gender <sup>2</sup> : male	4 (57.14)
Time since graduation from medical school <sup>2</sup>	
< 3 years	5 (71.43)
> 3 years	2 (28.57)
Undergraduate medical school	
CPIRD	5 (71.43)
Non-CPIRD	2 (28.57)
GPA <sup>1</sup>	3.11 (0.42)
NL1 <sup>1</sup>	64.42 (4.62)
NL2 <sup>1</sup>	61.14 (4.66)
Mean total MMI score <sup>1</sup>	49.7 (3.48)

CPIRD, Collaborative Project to Increase Production of Rural Doctor; GPA, Grade Point Average score; NL, National License Examination score; MMI, Multiple mini-interview  
<sup>1</sup>Mean (SD), <sup>2</sup>Number (%)

**Table 3.** ICC within stations

Station	Details	Assessors	ICC	95%CI
1	Traditional interview	One staff, one resident	0.34	-2.83, 0.89
2	Conflict resolution	One staff, one resident	0.29	-3.15, 0.88
3	Telling bad news	One staff, one nurse	0.64	-1.07, 0.95
4	Searching on the Internet and presenting in English	One staff, one resident	0.95	0.72, 0.99
5	Physical examination and writing medical records	One staff, one resident	0.88	0.27, 0.97
6	Team building with wooden blocks	One staff, one OT	0.77	-0.35, 0.96

ICC, Intraclass correlation coefficient; 95%CI, 95% Confidence interval

**Table 4.** ICC between stations with the same competencies

Station	Competencies	ICC	95%CI
3,4,5	Knowledge and skills	0.61	-0.10, 0.92
1,6	Interpersonal skills and teamwork	0.75	0.21, 0.95
2,3,4,5,6	Communication skills	0.62	-0.02, 0.92
2,3,4,6	Reasoning, problem-solving, and management	0.64	0.01, 0.93
1,2,3,5	Responsibility and professionalism	0.59	-0.13, 0.92
1,4,5	Continuous professional development	0.73	0.23, 0.95

ICC, intraclass correlation coefficient; 95%CI, 95% confidence interval

**Table 5.** MMI scores for each station and interviewer

Station	Minimum score	Maximum score	Score difference	Score mean	SD	RSD
1-A	8	10	2	9.07	0.68	7.50
1-B	7	9	2	8.57	0.73	8.52
2-A	7	9	2	8.29	0.7	8.44
2-B	6	9	3	7.5	1.1	14.67
3-A	6	9	3	7.43	1.18	15.88
3-B	7	8	1	7.43	0.49	6.59
4-A	7	10	3	8.14	1.12	13.76
4-B	6	9	3	7.14	1.36	19.05
5-A	5	9	4	7	1.31	18.71
5-B	5	8	3	7	0.93	13.29
6-A	3	8	5	5.86	1.55	26.45
6-B	6	8	2	7.14	0.64	8.96

SD, Standard deviation; RSD, Relative standard deviation

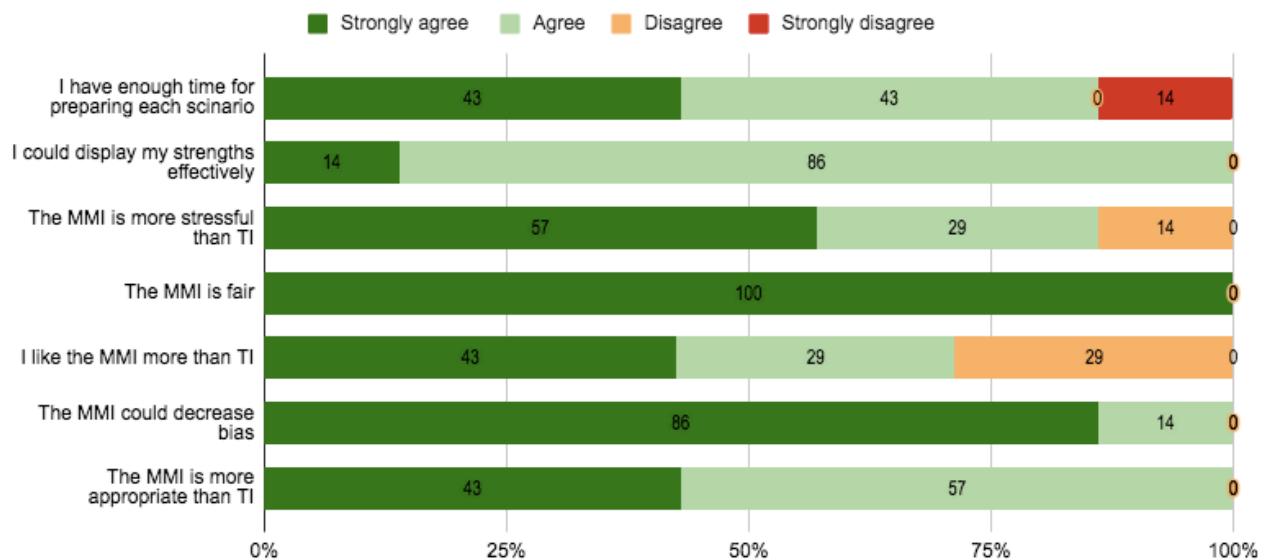
The correlation between past academic performance and the MMI scores were investigated. GPA was categorized into three groups (2.5-2.99, 3.0-3.49, and 3.5-4.00). National license examination scores parts 1 & 2 and grades in Rehabilitation Medicine subjects were divided into 2 groups. The dividing lines were 60 points and B+ (3.5), respectively. Years since graduation (3 years and more than three years) and medical schools (CPIRD and non-CPIRD) were also studied. MMI scores between these variable groups showed no statistically significant difference.

Overall satisfaction with the MMI on a scale of 1 to 10 showed a range of 5 to 9 from the candidates and 7 to 10 from the interviewers. More than 70 percent of the candidates gave a score of 7 or more.

The acceptability survey was completed by 100% of the candidates (Figure 1). Six of 7 candidates stated they had sufficient time to prepare for each scenario. All candidates agreed that they were able to display their strengths effec-

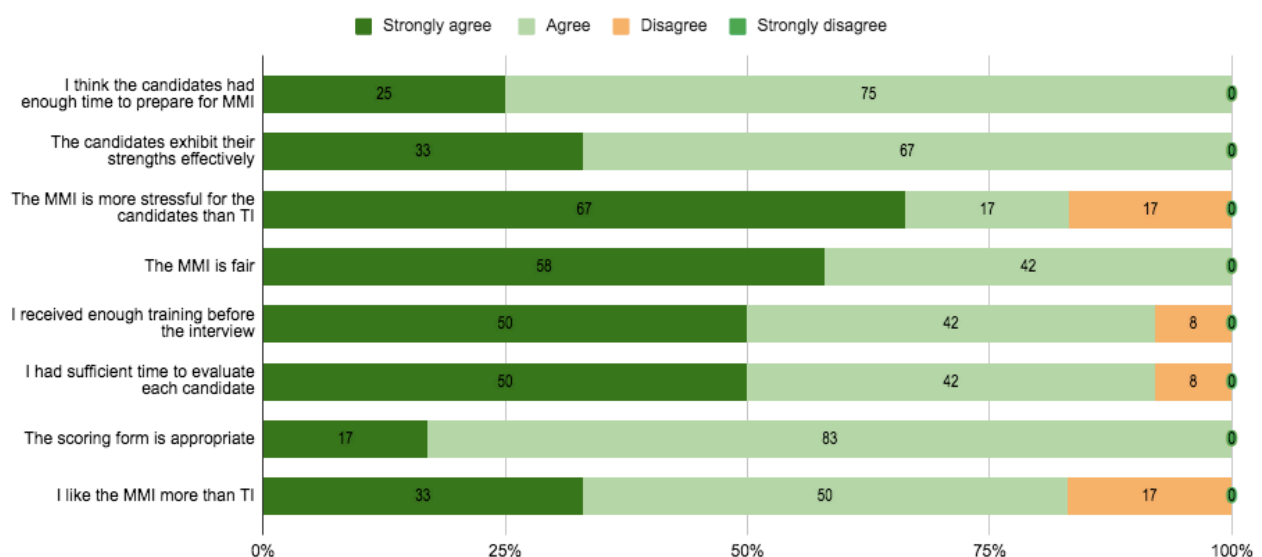
tively. They also mentioned that the MMI is fair, decreases bias, and is more appropriate than the traditional interview for residency admission. Five candidates preferred the MMI to the traditional interview, although most candidates felt that the MMI was more stressful than the traditional interview.

All 12 interviewers completed the acceptability questionnaire. Their mean age was 38.75 years (28-60, SD 9.67). Ten were female. About half of the interviewers (58%) had previous interview experience. All the interviewers agreed that the candidates had sufficient time to prepare for each scenario and that they were able to exhibit their strengths efficiently (Figure 2). All answered that the MMI is fair. Ten interviewers (84%) agreed that the MMI is more stressful for the candidates than the traditional interview although most of the interviewers (84%) preferred the MMI to the traditional interview. Regarding the interview process, all agreed that the scoring system was appropriate. Eleven of the 12 interviewers reported that they had received sufficient training prior to the



**Figure 1.** Acceptability of the MMI by candidates (percentage of different ratings of agreement)

MMI, multiple mini-interview; TI, traditional interview



**Figure 2.** Acceptability of the MMI by the interviewers (percentage of different ratings of agreement)

MMI, multiple mini-interview; TI, traditional interview

interview and that they had sufficient time to evaluate each candidate.

Answers to the open-ended questions about the candidates' feelings toward the interview experience showed they were excited and optimistic about the new method, especially its fairness, decreased bias, and the multiple performances evaluated. Examples of their own quotes include: "I am so excited" (candidate number 1, 2 and 5, male 27 years old); "The interviews are appropriate and comprehensive" (candidate number 7, female, 26 years old) and "It was fun. I performed something I have never done before" (candidate number 5, male, 27 years old). However, the feeling of stress and being under pressure were also mentioned, e.g., "The multiple stations made me feel pressured" (candidate number 4, female, 27

years old)" and "Before the interview, I felt stressed because it was new and I have had no experience with MMI. However, in the actual station, I was not so much stressed as excited" (candidate number 3, female, 27 years old), and "If the performance at the first station is not done well, it may create discouragement for the following stations" (candidate number 4, female, 27 years old).

The interviewers' opinions were similar to those of the candidates. One suggested combining the MMI and the traditional interview. Examples of the interviewers' comments include: "Under stressful conditions, the candidates may not exhibit their true strength," "The scoring form should add a description section to evaluate the candidates more clearly," and "I could not see the candidates' performance in other stations."

The candidates were asked to vote for the station they liked the most, the one where they did their best, and the one most appropriate for the selection process. Five candidates liked station 1 the most, and the other two liked stations 2 and 6. Most chose station 3 and thought they did their best in station 1. As to the most appropriate station for selecting residents, 5 candidates chose station 1, the other 2 chose stations 2 and 5.

## Discussion

This is the first study in Thailand to evaluate the reliability and acceptability of the multiple mini-interview (MMI) for residency admission. The MMI is a multiple-station interview process that can evaluate multiple competencies of the candidates. It is a reliable method for identifying individuals for Physical and Rehabilitation Medicine residency admission with an acceptable ICC in 4 of the 6 stations and an 0.7 overall reliability. High overall satisfaction and positive feedback from the candidates and interviewers was reported in this study. Although preparing the scenarios, formulating simulated patients, and analyzing evaluation forms requires time and resources, the time required on the interview day was significantly less than that for traditional interviews. The traditional interview process takes approximately 3.5 hours, but the MMI required only 70 minutes for interviewing seven candidates. The upshot is that the MMI process is feasible and can be applied successfully.

As shown in Table 3, four of six stations had an ICC of 0.64 to 0.95. This MMI had an acceptable level of reliability, consistent with previous studies.<sup>5,6,7</sup> The scenarios of these four stations included performance that was easily evaluated. The scenarios of searching on the Internet and presenting in English had the highest ICC of 0.95. The stations of performing a physical examination and of writing a medical record and team building with wooden blocks both also had good reliability with ICC of 0.88 and 0.77, respectively. The station 3 telling bad news, had an ICC of 0.64, indicating moderate reliability.

The stations that had low reliability were stations 1 (ICC 0.34) and 2 (ICC 0.29). The composition of these two stations should be discussed. For station 1, the scenario was similar to the traditional interview but shorter, reduced from around 30 minutes to 8 minutes. During those 8 minutes, the candidates were asked to present their work experience, responsibility, professional development, readiness for residency training, and their intention to be a psychiatrist in a government facility. The ICC in this station was 0.34, indicating the reliability within this station was low. The two interviewers in this station each scored candidates in different directions. The range of scores from interviewers in this station was 2 points, with RSDs of 7.5 and 8.52. The ability to discriminate between the candidates was poor as well. Station 1, on the other hand, was the most liked, did it best, and was considered the most appropriate for residency selection in the opinion of the candidates, although it had some limitations in terms of reliability and in

the ability to discriminate among candidates.

Station 2 also had low reliability. The scenario was the candidate communicating with a senior research co-worker in a conflict situation. The candidate was the principal researcher, and the research had been accepted for presentation at an international conference. The senior co-worker and the candidate both wanted to attend, but the hospital could provide a grant for only one person. The candidates were asked to talk with a senior co-worker about getting the grant. This station used a senior resident as the co-worker who interacted with the candidates. This resident was also the interviewer that evaluated the candidates. Some unintended bias might have occurred, especially in cases where there was emotional involvement. Other factors that resulted in this station having a low reliability may be related to the scoring form and to the degree difficulty in evaluating the performance of the candidate. The scoring form for overall performance used a rating scale which does not include a description of the expected performance. It may be difficult to judge the performance of individual interviewers because of differences in personal preferences.

The ICC between the stations that evaluated the same competencies is shown in Table 4. Most of the competencies had an ICC of 0.59 to 0.73. Interpersonal skills and teamwork were the only competencies that had good reliability with an ICC of 0.75. This result may be due to the fact that only two stations evaluated these competencies, whereas other competencies were evaluated by at least three stations. The MMI scenarios were mapped with the expected competencies. The good reliability between the same competencies was not surprising as reliability depends on the objectives of the scenarios. A previous study by Abri RA et al. used two scenarios to evaluate medical knowledge and five scenarios to measure behavioral knowledge. That study found the reliability scores between the 2 types of knowledge were independent.<sup>7</sup>

The MMI score differences reported by the interviewers are shown in Table 5. Only 2 of 12 interviewers had a score difference of more than 3 points. Only one interviewer gave an RSD of more than 20, 6 interviewers gave an RSD between 10 to 20, and 5 interviewers gave an RSD below 10. The wide variance in scores (RSD) among the interviewers indicates that they were able to discriminate between the candidates in the station. Most of the interviewers' MMI station scores in the present study were lower than in a previous study, in which most of the interviewers gave an RSD of more than 20.<sup>6</sup> The small numbers of candidates may be the main reason for this difference: there were only 7 candidates in this study whereas a previous study included 187 candidates.<sup>6</sup> In the present study, interviewers who were not directly involved in training, e.g., a nurse (3-B) and an occupational therapist (6-B), gave narrow scores of 1 and 2 with low RSD which may be another factor affecting the variance. The last factor involves the details of the scenarios that were mentioned earlier. Both interviewers in station 1 (1-A and 1-B) and one interviewer in station 2 (2-A) gave a score difference of 2.

Scenarios that are clear, valid, and involve performance that can easily be observed should be considered for future MMI.

The overall level of satisfaction and acceptance of the MMI as evidenced by the candidates' and interviewers' opinions were high, especially in terms of fairness, decreased bias, and the capacity to evaluate the candidates' performance and strengths efficiently which is consistent with previous studies.<sup>7-9</sup> Limitations of the MMI were creation of stress and provoking anxiety, findings consistent with the previous studies of Boysen-Osborn M et al.<sup>8</sup> and Sklar M et al.<sup>10</sup> Being new to and not familiar with the MMI may have led to some degree of stress for both candidates and interviewers.

Sklar M et al. described how MMI resulted in a loss of interaction between candidates and interviewers, e.g., getting to know each other and learning more about the residency program. In the traditional interview, candidates were given the opportunity to discuss their educational background, extracurricular activities, and desire to be a doctor in that specialty.<sup>10</sup> A study by Boysen-Osborn M et al. found that candidates felt the MMI neglected the "getting to know you" aspect. Some mentioned that the MMI was "one-sided," and candidates could not discover if the program would really suit them. Many candidates thought the traditional interview should be added to the MMI.<sup>8</sup> Because all candidates already had had at least one week of elective in our department, they had all been afforded the opportunity to get to know the training program and the staff members. That experience should have provided the "getting to know you" aspect. Combining the traditional interview and the MMI was suggested by one interviewer in the present study.

Previous academic performance such as GPA and NL scores have commonly been part of interviewers' considerations in resident selection. The present study, however, found that differences in previous academic performance did not affect the total MMI scores. This is not surprising as the MMI is intended to evaluate non-cognitive attributes, while previous academic performance is mainly evaluated by written examinations which measure cognitive attributes. The traditional interview and the MMI both aim to assess non-cognitive attributes which are correlated but which do not reliably lead to the same rank order,<sup>10</sup> i.e., these two interview methods evaluate different characteristics.

This study showed the relatively high level of reliability, acceptability, and feasibility of the MMI. This first-time experience, however, leaves room for improvement. Suggestions for enhancing the MMI include: 1) using appropriate scenarios that facilitate rapid evaluation of the candidates and which can be mapped with the expected competencies, 2) ensuring that the time used in each station appropriates with the scenarios, 3) using a scoring form that provides expected performance details as rubric scores, 4) adequately training interviewers, e.g., conducting a simulated MMI interview before the actual interview, especially in the case of new interviewers, 5) including stress-reducing techniques during the MMI, and 6) considering combining traditional interviews and the MMI.

There were some limitations of this study. First, this study had a small number of participants. Second, the study was conducted at only one small training center. The acceptability of the MMI may be different elsewhere. Finally, this was the first experience of the training center with the MMI, so the scenarios and the process of the interviews leave many areas for improvement.

## Conclusions

The MMI is a reliable evaluation method for Physical and Rehabilitation Medicine residency admission. An ICC of 4 of the 6 stations is considered acceptable. The MMI has a high acceptability among candidates and interviewers, especially in the areas of fairness, decreased bias and ability to evaluate the candidate's performance and strengths efficiently.

## Disclosure

The authors have no conflict of interest.

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## References

1. Mann WC. Interviewer scoring differences in student selection interviews. *Am J Occup Ther* [Internet]. 1979 Apr [cited 2023 Jan 8];33(4):235-9. Available from: <https://pubmed.ncbi.nlm.nih.gov/443148/>
2. Eva KW, Rosenfeld J, Reiter HI, Norman GR. An admissions OSCE: the multiple mini-interview. *Med Educ* [Internet]. 2004 Mar [cited 2023 Jan 8];38(3):314-26. Available from: <https://pubmed.ncbi.nlm.nih.gov/14996341/> doi: 10.1046/j.1365-2923.2004.01776.x.
3. Dore KL, Kreuger S, Ladhani M, Rolfson D, Kurtz D, Kulasegar K, Cullimore AJ, Norman GR, Eva KW, Bates S, Reiter HI. The reliability and acceptability of the Multiple Mini-Interview as a selection instrument for postgraduate admissions. *Acad Med* [Internet]. 2010 Oct [cited 2023 Jan 8];85(10 Suppl):S60-3. Available from: <https://pubmed.ncbi.nlm.nih.gov/20881706/> doi: 10.1097/ACM.0b013e3181ed442b
4. Burgos LM, DE Lima AA, Parodi J, Costabel JP, Ganiele MN, Durante E, Arceo MD, Gelpi R. Reliability and acceptability of the multiple mini-interview for selection of residents in cardiology. *J Adv Med Educ Prof* [Internet]. 2020 Jan [cited 2023 Jan 8];8(1):25-31. Available from: <https://pubmed.ncbi.nlm.nih.gov/32039270/> doi: 10.30476/jamp.2019.83903.1116
5. Finlayson HC, Townson AF. Resident selection for a physical medicine and rehabilitation program: feasibility and reliability of the multiple mini-interview. *Am J Phys Med Rehabil* [Internet]. 2011 Apr [cited 2023 Jan 8];90(4):330-5. Available from: <https://pubmed.ncbi.nlm.nih.gov/21765249/> doi: 10.1097/PHM.0b013e31820f9677

6. Ahmed A, Qayed KI, Abdulrahman M, Tavares W, Rosenfeld J. The multiple mini-interview for selecting medical residents: first experience in the Middle East region. *Med Teach* [Internet]. 2014 Aug [cited 2023 Jan 8];36(8):703-9. Available from: <https://pubmed.ncbi.nlm.nih.gov/24804916/> doi: 10.3109/0142159X.2014.907875.
7. Al Abri R, Mathew J, Jeyaseelan L. Multiple Mini-interview Consistency and Satisfactoriness for Residency Program Recruitment: Oman Evidence. *Oman Med J* [Internet]. 2019 May [cited 2023 Jan 8];34(3):218-23. Available from: <https://pubmed.ncbi.nlm.nih.gov/31110629/> doi: 10.5001/omj.2019.42
8. Boysen-Osborn M, Wray A, Hoonpongsimanont W, Chakravarthy B, Suchard JR, Wiechmann W, Toohey S. A Multiple-Mini Interview (MMI) for Emergency Medicine Residency Admissions: A Brief Report and Qualitative Analysis. *J Adv Med Educ Prof* [Internet]. 2018 Oct [cited 2023 Jan 8];6(4):176-80. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6191827/>
9. Singh N, DeMesa C, Pritzlaff S, Jung M, Green C. Implementation of Virtual Multiple Mini-Interviews for Fellowship Recruitment. *Pain Med* [Internet]. 2021 Aug [cited 2023 Jan 8];22(8):1717-21. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8083225/> doi: 10.1093/pm/pnab141
10. Sklar M, Eskander A, Dore K, Witterick IJ. Comparing the traditional and multiple mini interviews in the selection of postgraduate medical trainees. *Canadian Medical Education journal* [Internet]. 2015 Dec [cited 2023 Jan 8]; 6(2):e6-e13. Available from: <https://www.researchgate.net/publication/295402778> doi: 10.36834/cmej.36676
11. Ali S, Sadiq Hashmi MS, Umair M, Beg MA, Huda N. Multiple Mini-Interviews: Current Perspectives on Utility and Limitations. *Adv Med Educ Pract* [Internet]. 2019 Dec [cited 2023 Jan 8];10:1031-8. Available from: <https://doi.org/10.2147/AMEP.S181332>
12. Nonsuphap S. The effects of multiple mini interview incorporate with motivational technique on satisfaction and disclaim rate of nursing students applicants, Suranaree University of Technology, 2012 academic year. *Regional Health Promotion Center 9 Journal* [Internet]. 2017 [cited 2023 Jan 8];11:134-57. Available from: <https://he02.tci-thaijo.org/index.php/RHPC9Journal/article/view/242757>
13. Koo TK, Li MY. A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. *J Chiropr Med* [Internet]. 2016 Jun [cited 2023 Jan 8];15(2):155-63. Available from: <https://pubmed.ncbi.nlm.nih.gov/27330520/> doi: 10.1016/j.jcm.2016.02.012