Comparison between Personality, Emotional, and Educational Outcomes of Multiple Mini Interviews and Personal Interview

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ABSTRACT

Objectives: This study investigated the outcomes of multiple mini interviews and personal interview on personality traits, emotional intelligence, perceived educational environment, and stressors. *Methods*: This is a comparative cross-sectional study on two cohorts of pre-clinical medical students who were selected by multiple mini interviews and personal interview, respectively. Their personality traits, emotional intelligence, perceived educational environment, and perceived stressors were measured using different measurement tools. *Results:* Multiple mini interviews and personal interview demonstrated a similar ability to recruit medical students with a high level of emotional intelligence. The main advantage of personal interviews over multiple mini interviews in terms of personality traits is that it recruited candidates who had a higher level of conscientiousness trait. The main advantage of multiple mini interviews over personal interview on the educational environment is that medical students chosen by multiple mini interviews had a higher level of satisfaction with social aspects of medical training. Regardless of admission processes, the medical students were equally vulnerable to psychological distress due to various stressful events throughout medical training particularly related to academic loads. *Conclusion:* This study provided evidence to support the outcomes that multiple mini interviews and personal interview have on medical students' emotional intelligence, personality traits, perceived educational environment, and perceived stressors during the pre-clinical medical training. Interestingly, personal interview had a better outcome on conscientiousness while multiple mini interviews had a better outcome on the social aspect.

Medical schools are responsible for choosing and recruiting medical students with the right abilities, values, and potential capacity to complete medical programs. Nevertheless, choosing and recruiting the right candidates is not a straightforward task because it requires medical schools to devise well-designed admission strategies.[1] Even more, medical programs are different from many other academic programs because obtaining a medical degree is just a starting point, and medical graduates are expected to be life-long learners to provide the best patient care.[1–3] Hence, medical schools must carefully design the admission process to ensure it recruits the right candidates for undergoing medical programs because the kind of students recruited at the beginning determines the kind of doctors produced at the end.[4]

Medical schools must establish a valid, reliable, fair, and feasible admission mechanism to choose and recruit the right candidates for undergoing medical programs, else it will cause more problems and defeat its goal.[4,5] The admission mechanism can be either based on previous academic merit or non-academic merit. The previous academic merit commonly looks at the previous academic achievement of applicants, such as the cumulative grade point average. The non-academic merit usually looks at aptitudes, values, and potential capacity of applicants for personality traits, emotional intelligence, resilience, teamwork, and others. Academic merit has been the easiest and most popular mechanism to choose and recruit potential candidates. However, it is not necessarily the only criteria that produce competent and good doctors in the future[6,7] because its predictive values fade with the progression of medical training.[6,8] Norman stated that, "It is perfectly appropriate to devise admissions strategies, in-course performance indices, and certification procedures that include both academic and interpersonal measures. It is

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not appropriate to force a choice between one and the other.[1]"

The most common non-academic approach is interview-based admission, either personal interview[2] or multiple mini interviews.[9–11] Many studies consistently reported the favorable outcomes that multiple mini interviews have on cognitive outcomes, but limited studies have reported non-cognitive outcomes.[9–11] For the personal interview, one study provided evidence to support the outcomes that it has on clinical performance and the emotional intelligence of clinical medical students.[2] According to that study, the clinical medical students recruited through personal interviews demonstrated a higher level of clinical performance and emotional intelligence than those recruited through academic merit. Besides, two studies showed the personality traits of medical students recruited through personal interviews were more favorable than those selected through academic merit.[2,12] So far, none of the studies compared the outcomes that multiple mini interviews and personal interviews have on emotional intelligence, personality traits, perceived educational environment, and perceived stressors during medical training.[2,9–11] Hence, this study was carried out to close the literature gap.

This study was carried out to investigate the outcomes of multiple mini interviews and personal interview on emotional intelligence, personality traits, perceived educational environment, and perceived stressors at the pre-clinical medical training. This study provided important contributions to support the validity of the two interview-based medical admissions.

METHODS

This is a comparative cross-sectional study on two cohorts of pre-clinical medical students at Universiti Sains Malaysia (USM) at the end of the second year. The medical students who were recruited through personal interviews were the 2016 academic session cohort and those who were recruited through multiple mini interviews were the 2017 academic session cohort. They went through a five-year medical program with a similar medical curriculum, syllabus, learning activities, assessment, and learning facility. The medical program was delivered based on the SPICES (i.e., student-oriented, problem-based, integrated, community-oriented, electives, self-

learning, and systematic learning) curriculum model and organized into the pre-clinical phase (first and second year) and the clinical phase (third, fourth, and fifth year). The pre-clinical medical students learn the foundation and applied knowledge related to the average human being and the normal responses to injuries. The clinical medical students learn clinical sciences and skills in a clinical workplace setting.

A total of 600 medical program applicants were invited to attend a 30-minute personal interview session with a pair of interviewers. Every candidate was questioned based on a set of standard interview questions assessing their interest, general knowledge, expectations about a medical career, personal attributes, communication skills in Malay and English languages, and characteristics that might hinder them from completing medical training and performing clinical functions.[3] The top 200 applicants, based on the interview score ranking, were recommended to join the medical program.

A total of 500 applicants were invited to attend multiple mini interview sessions. The applicants were interviewed via a short interview across multiple stations. Each candidate went through five active stations and four rest stations, each station lasts for seven minutes (two minutes for preparation and five minutes for performing a specific task), and each station was assigned to an assessor. The candidates were judged on language proficiency, general conduct, critical thinking, ethical awareness, communication skills, knowledge of the healthcare system, and standard interview questions.[13] The top 150 candidates, based on the multiple mini interview score ranking, were recommended to join the medical program.

The ethical approval was sought from the Human Ethics Committee of USM before the study (USMKK/PPP/JEPeM(212.4[2.5])).

All medical students of the 2016 and 2017 academic session cohorts were invited to participate in this study. Students that refused to take part, failed to return the consent form, or failed to return the questionnaires were excluded. Participation in this study was voluntary and would not have any consequences on their medical training progress.

The 17-item USM Emotional Quotient Inventory (USMEQ-17), 15-item USM Personality Inventory (USMaP-15), 17-item Dundee Ready Educational Environment Measure (DREEM-17), and 20-item Medical Student Stressor Questionnaire

(MSSQ-20) were administered through a guided self-administered immediately after the final pre-clinical phase examination.

The USMEQ-17 has 13 items measuring emotional intelligence and four items measuring the faking index.[14] The faking index was not included as the study outcome. The items were rated by a five-point Likert scale: 0 (not like me) to 4 (totally like me). It is a valid and reliable tool measuring emotional intelligence in medical student samples as it demonstrated high internal consistency (Cronbach's alpha > 0.7) and good construct validity.[15–17] It has three domains: global emotional intelligence, personal competence, and social competence.[15,18,19] Global emotional intelligence is the ability to perceive, express, understand, motivate, control, and regulate emotion.[15,18,19] Social competence is the ability to know and understand one's own and other persons' internal states, preferences, resources, and intuitions as well as their effects.[15,18–21] Personal competence is the ability of self-control from disruptive emotions and impulsive feelings, the ability to facilitate and guide emotional tendencies to achieve and reach intended goals, and the ability to align and work with others in a group or organization towards common goals.[15,18–21]

The USMaP-15 has 15 items measuring openness, conscientiousness, extroversion, agreeableness, and neuroticism – the five-factor personality traits.[22,23] The items were rated by a five-point Likert scale: 0 (very inaccurate) to 4 (very accurate). It is a valid and reliable tool to measure personality traits in medical student samples as it demonstrated a stable internal consistency that ranged from 0.63–0.83 and good construct,[22,24–26] indicating an acceptable to a high level of internal consistency and consistent across time intervals and occasions.

The original version of DREEM has 50 items[27] and been translated into various languages, including Malay.[28–33] It has five domains: students' perception of learning (SPoL), students' perception of teaching (SPoT), students' academic self-perception (SASP), students' perception of atmosphere (SPoA), and students' social self-perception (SSSP). It is internationally accepted as a useful tool to provide feedback on the educational climate in medical institutions. The DREEM-17 is a shorter version based on the recommendation of a previous study,[28] the internal consistency values ranged from 0.53 to 0.82[28,30] and has a stable internal consistency over multiple observations.[32]

Table 1: Demographic profiles of medical students.

Variables	Frequency (%)
Selection method	
Personal interview	141 (58.5)
Multiple mini interviews	100 (41.5)
Sex	
Male	88 (36.5)
Female	153 (63.5)
Race	
Malay	119 (49.4)
Chinese	61 (25.3)
Indian	54 (22.4)
Other	7 (2.9)
Qualification	
Matriculation	188 (78.0)
High school certificate	8 (3.3)
Advanced level	6 (2.5)
Other	39 (16.2)
Age, mean ± SD	21.1 ± 0.6
Personal interview	21.1 ± 0.4
Multiple mini interviews	21.2 ± 0.7

SD: standard deviation.

The original version of MSSQ has 40 items (MSSQ-40). However, we used a brief version of 20-item MSSQ (MSSQ-20).[34,35] MSSQ measures six sources of stress in medical students related to academic, interpersonal, teaching and learning, social, drive/desire, and group activity. It is a self-report, self-scoring instrument that requires medical students to rate the intensity of stress caused by each source of stress on a scale of 0–4 (0 = causing no stress to 4 = causing extreme stress). The internal consistency value for MSSQ-20 was > 0.8, and for each MSSQ-20 construct ranged from 0.55 to 0.97.[35] MSSQ-20 has a stable internal consistency over multiple measurements across different time intervals as evidenced by the intraclass correlation coefficient value of > 0.4.[36] These facts support the validity, reliability, and stability of MSSQ-20 for measuring stressors in medical students.

A research assistant administered the USMEQ-17, USMaP-15, DREEM-17, and MSSQ-20 questionnaires to the students. The medical students were requested to answer the questionnaires and submit them immediately after completion.

Data were entered into SPSS Statistics (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.). An independent t-test was performed

Table 2: The comparison of emotional intelligence between the multiple mini interviews and personal interview cohorts.

Outcome	Selection method	Mean	SD	t-statistics (df)	p-value
Social competence	Personal interview	2.9	0.8	-0.745 (239)	0.457
	Multiple mini interviews	3.0	0.7		
Personal competence	Personal interview	2.9	0.6	-0.463 (239)	0.644
	Multiple mini interviews	2.9	0.5		
Global emotional intelligence	Personal interview	2.9	0.67	-0.682 (239)	0.496
	Multiple mini interviews	2.9	0.5		

SD: standard deviation; df: degree of freedom. Mean score of emotional intelligence domains (USMEQ-17): low = 0–1.20, average = 1.21–2.80, high = 2.80–4.00.

to test the association between multiple mini interviews and personal interviews with emotional intelligence, personality traits, perceived educational environment, and stressors. Assumptions were checked before analysis, and the results were tabulated accordingly. Any p-values < 0.050 were considered significant.

RESULTS

The demographic profiles were summarized in Table 1. Most medical students were from the matriculation stream, females, and Malays. The mean age of multiple mini interviews and personal interview cohorts was comparable.

The global emotional intelligence, social competence, and personal competence levels between the multiple mini interviews and personal interviews were similarly at a high level [Table 2]. These results indicate both interview-based admission processes had similar outcomes on emotional intelligence.

Both interview-based admissions showed a similar ability to recruit medical students with a high emotional intelligence level across the three domains (the mean score of > 2.8).

Table 3 shows that the personal interview cohort has a significantly higher level of conscientiousness trait than the multiple mini interview cohort. Conversely, both interview-based admission cohorts demonstrated a similar level of extraversion, agreeableness, openness, and neuroticism. These results suggest the medical students recruited by personal interview had more conscientiousness traits than those recruited by multiple mini interviews, whereas the other personality traits were at the average category for both. The main advantage of the personal interview over multiple mini interviews in terms of personality is that it recruited more conscientious candidates.

Table 4 shows that the multiple mini interviews cohort has a significantly higher SSP level than the personal interview cohort. Conversely, both cohorts

Table 3: The comparison of personality traits between the multiple mini interviews and personal interview cohorts.

Outcome	Selection method	Mean	SD	t-statistics (df)	p-value
Extraversion	Personal interview	8.5	2.5	1.662 (239)	0.098
	Multiple mini interviews	8.0	2.4		
Conscientiousness	Personal interview	8.2	2.1	2.019 (239)	0.045
	Multiple mini interviews	7.6	2.1		
Agreeableness	Personal interview	8.8	2.2	1.263 (239)	0.208
	Multiple mini interviews	8.4	2.3		
Neuroticism	Personal interview	3.9	2.4	-0.992 (239)	0.322
	Multiple mini interviews	4.2	2.2		
Openness	Personal interview	8.9	2.2	-0.218 (239)	0.828
	Multiple mini interviews	9.0	2.2		

SD: standard deviation; df: degree of freedom. Mean score of personality traits (USMaP-15):[37] extraversion: low = 0–7, average = 8–9, high = 10–12; conscientiousness: low = 0–6, average = 7–9, high = 10–12; agreeableness: low = 0–7, average = 8–9, high = 10–12; neuroticism: low = 0–3, average = 4–6, high = 7–12; openness: low = 0–7, average = 8–9, high = 10–12.

Table 4: The comparison of perceived educational environment between the multiple mini interviews and personal interview cohorts.

Outcome	Selection method	Mean	SD	*t*-statistics (df)	*p*-value
SPoL	Personal interview	6.1	1.8	-1.211 (239)	0.227
	Multiple mini interviews	6.4	1.8		
SPoT	Personal interview	6.1	2.0	-0.444 (239)	0.660
	Multiple mini interviews	6.2	1.9		
SASP	Personal interview	6.0	1.9	-0.180 (239)	0.858
	Multiple mini interviews	6.1	1.5		
SPoA	Personal interview	9.9	2.8	-1.795 (239)	0.074
	Multiple mini interviews	10.6	2.6		
SSSP	Personal interview	6.0	2.0	-2.536 (239)	0.012
	Multiple mini interviews	6.7	2.0		

SD: standard deviation; df: degree of freedom; SPoL: students' perception of learning; SPoT: students' perception of teaching; SASP: students' academic self-perception; SPoA: students' perception of atmosphere; SSSP: students' social self-perception.
Educational environment scores (DREEM-17): SPoL (maximum score of 15): unsatisfactory – less than 7.5, satisfactory = at least 7.5; SPoL (maximum score of 15): unsatisfactory – less than 7.5, satisfactory = at least 7.5; SASP (maximum score of 15): unsatisfactory – less than 7.5, satisfactory = at least 7.5; SPoA (maximum score of 25): unsatisfactory – less than 12.5, satisfactory = at least 12.5; SSSP (maximum score of 15): unsatisfactory – less than 7.5, satisfactory = at least 7.5.

demonstrated a similar perception of learning, teaching, academics, and atmosphere. These results suggest the medical students selected by multiple mini interviews scored higher in the SSP than those selected by personal interviews, whereas the other educational environment aspects were perceived similarly. The mean educational environment domain scores were at the unsatisfactory level except for the PoA. The main advantage of multiple mini interviews over personal interviews on the perceived educational environment is that the students were more inclined towards social activities.

Both multiple mini interviews and personal interview cohorts showed no difference in the perceived sources of stress related to academic, group activity, social, interpersonal, drive, teaching, and learning during medical training [Table 5]. These results indicate that both interview-based admission processes had similar outcomes on perceived stressors. Regardless of admission processes, the medical students experienced the same stressful events particularly related to academic loads.

DISCUSSION

This study contributed four important findings on the outcomes that multiple mini interviews and personal interviews have on medical students'

Table 5: The comparison of stressors between the multiple mini interviews and personal interview cohorts.

Stressor	Selection method	Mean	SD	*t*-statistics (df)	*p*-value
Academic	Personal interview	2.8	0.8	0.401 (239)	0.689
	Multiple mini interviews	2.8	0.7		
Group	Personal interview	2.2	0.9	0.152 (239)	0.879
	Multiple mini interviews	2.2	0.8		
Social	Personal interview	2.2	0.9	-0.874 (239)	0.383
	Multiple mini interviews	2.3	0.8		
Interpersonal	Personal interview	2.0	1.1	-0.995 (239)	0.321
	Multiple mini interviews	2.2	0.9		
Drive	Personal interview	1.3	1.1	-0.639 (239)	0.523
	Multiple mini interviews	1.4	1.1		
Teaching and learning	Personal interview	1.8	1.0	-0.373 (239)	0.710
	Multiple mini interviews	1.8	0.9		

SD: standard deviation; df: degree of freedom. Mean stressor scores (MSSQ-20):[38] mild = 0.00–1.00, moderate = 1.01–2.00, high = 2.01–3.00, severe = 3.01–4.00.

emotional intelligence, personality traits, perceived educational environment, and perceived stressors. First, multiple mini interviews and personal interviews demonstrated a similar ability to recruit medical students who posed a high level of emotional intelligence. Second, the main advantage of the personal interview over the multiple mini interviews in terms of personality traits is, it recruited candidates who had a higher level of conscientiousness trait. Third, the main advantage of the multiple mini interviews over the personal interview on the educational environment is that multiple mini interviews medical students had a higher level of satisfaction with social aspects of medical training. Finally, regardless of admission processes, the medical students were equally vulnerable to psychological distress by various stressful events throughout medical training, particularly related to academic stress. The insights gained from these findings were discussed in the subsequent paragraphs.

Interestingly, though no significant difference was observed, the multiple mini interviews and personal interviews demonstrated the ability to recruit medical students with a high level of emotional intelligence. This finding is consistent with a previous study that reported the medical students selected through an interview-based admission had a higher level of emotional intelligence than those selected through the academic merit.[5] Emotional intelligence is the ability to perceive, express, understand, motivate, control, and regulate emotion, and there is considerable proof that emotional intelligence influences success in a range of occupational settings.[20,21,39] According to a systematic review, high emotional intelligence levels had positive outcomes on academic achievement, clinical performance (such as clinical diagnostic and prognostic ability, doctor-patient relationships, empathy, interpersonal skills, teamwork, communication skills, and ability to manage stress), and organizational commitment.[40] These facts indicate the important roles that emotional intelligence has on tomorrow's doctors' essential competencies. It is worth noting that this study is the earliest study that compared the outcomes that multiple mini interviews and personal interviews have on the emotional intelligence of medical students.

The main advantage of the personal interview over the multiple mini interviews is that the recruited candidates demonstrated a higher level of conscientiousness trait during the medical training. However, all personality traits were at the average level. These findings are consistent with the two previous studies that reported an interview-based admission demonstrated the average level of personality traits, and it was significantly higher than an academic-based admission.[5,12] The extroversion, conscientiousness, agreeableness, neuroticism, and openness (the five-factor personality traits) have become a useful personality trait framework for scientific research.[41–44] In general, the five personality traits predict individuals' cognitive ability, well-being, mental health, career success, job performance, and personal qualities in the non-medical profession.[41–44] Similarly, in the medical profession, the five personality traits correlate with mental health, work performance, career success, learning approach, and academic performance.[45–49] This study showed that medical students recruited through personal interviews had greater conscientiousness than those recruited through multiple mini interviews, indicating a more desirable personality trait. Medical students with a high conscientiousness level are at an advantage since they are always avoiding creating troubles and achieving a high level of success through purposeful planning throughout medical training and their future career.[12,50] These facts suggested that interviewed-based admissions could choose and recruit more desirable personality traits related to the professionalism attributes as good doctors. Downie and Charlton (1993) echoed the kind of students recruited at the beginning determines the kind of doctors produced at the end.[4]

In the educational environment context, the main advantage of the multiple mini interviews over the personal interview is that the medical students had a better perception of the social aspect during medical training – however, most educational environment areas were perceived unsatisfactorily. There are five aspects of the educational environment: academic, learning, teaching, social, and atmosphere.[27] Researchers across the globe recognize that the medical education environment is at a suboptimal level due to some of its aspects during medical training causing negative ramifications on the well-being of young medical students.[51–60] Unfortunately, it doubled or tripled at the end of medical training,[58,59,61] especially near to examinations.[61] One study reported that a positive educational environment has direct and positive influences

on the psychological health of medical students.[52] Thus, improving the perception of medical students towards the educational environment will improve their psychological health during medical training.[52] Based on this fact, the perception of medical students, either recruited by personal interview or multiple mini interviews, towards the educational environment was unsatisfactory except medical training. It indicates the educational climate was unfavorable to the medical students pertaining to teaching, learning, academic, and social. One of the important implications of this finding is that medical schools should pay attention to rectify the unfavorable educational climate ensuring their psychological well-being during medical training. Yusoff and Arifin echoed, "Medical schools should be aware that a high prevalence of psychological distress among their students might be a signal of an unfavorable educational environment, and thus, proactive effort should be conducted to improve this condition.[52]"

Finally, regardless of admission processes, the medical students were equally vulnerable to various stressful events causing distress feelings throughout medical training, particularly related to the academic pressure. Many studies revealed a high prevalence of psychological distress,[57,58] depression,[62] and burnout[51,54] among medical students; the main source of stress is academic pressure. Ironically, before they join medical training, the prevalence of depression was < 5%.[58,63,64] Two studies that were conducted in the first year of medical training showed an interview-based admission recruited medical students with better psychological health than those recruited based on merely academic merit;[65,66] however, the major stressor was still the academic load.[57] These facts suggest that though the interview-based admission process has a significant role in recruiting the best candidates, improving the overall educational environment by reducing unnecessary psychological pressure will result in a better and less harmful impact on their well-being. Apart from that, one possible explanation for no significant difference in perceived stressors between the two admission processes is might be due to the medical students' ability to handle various stressors that had been developed and strengthened by the process of medical training.[5] Another possible explanation is that at the end of medical training, both cohorts of medical students had developed skills to manage the

rigor of the medical study; therefore, they are better able to cope with various stressors, and no significant difference was observed.[57] As a whole, the interview-based admission is essential to recruit candidates with relevant aptitudes and capacity to go through medical training, but the nurturing process must be planned appropriately so that the rigor of medical training will develop and fortify their resilience and ability to become resilient doctors.

This study has several limitations that should be considered in future research. First, the medical students were recruited from a medical school; therefore, any attempt to generalize the finding should be done with caution by considering the study context. Second, this study used solely quantitative, thus it is recommended that qualitative study be conducted in future research to understand the underlying reasons to explain the study findings. Finally, the data was a snap-shot observation, and will not able to capture the pattern of the outcomes longitudinally. For those reasons, future works should address these limitations to confirm the present findings. Apart from that, this study showed that different admission strategies should be considered for recruiting candidates with relevant aptitudes, values, and potential capacity to deal with challenging medical training.

CONCLUSION

This study provides evidence to support the outcomes that multiple mini interviews and personal interviews have on medical students' emotional intelligence, personality traits, perceived educational environment, and perceived stressors during the end of pre-clinical medical training. Interestingly, the personal interview had a better impact on conscientiousness, while the multiple mini interviews had a better impact on the social aspect of the educational environment. The results provide several recommendations and limitations for future research.

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