

Development and validation of a new self-assessment tool to measure professionalism among medical students

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ABSTRACT

Introduction: Professionalism is a key quality that medical students should possess, but it is difficult to define and assess. Current assessment tools have room for improvement. This study aimed to design and validate a self-assessment tool to assess professionalism among medical students.

Method: A questionnaire was created based on 10 tenets of professionalism from the Charter on Medical Professionalism jointly published by the American Board of Internal Medicine Foundation, American College of Physicians Foundation and European Federation of Internal Medicine, along with input from Singapore guides. The self-administered questionnaire was administered to Year 2 to 5 students from Yong Loo Lin School of Medicine, National University of Singapore in a voluntary, anonymised manner in the academic year of 2019/2020. Construct validity and internal reliability were evaluated using Principal Component Analysis (PCA) and Cronbach's alpha, respectively.

Results: There was a total of 541 respondents. After removing incomplete responses, 504 responses were included. Following PCA, a 17-item questionnaire titled "Medical Professionalism: A Self-assessment Tool" (MPAST) with a 5-component solution was obtained. The 5 components were commitment to: (1) patient's best interest, (2) honesty and integrity, (3) professional competency, (4) patient safety and care, and (5) educational responsibilities. Their Cronbach's alpha value ranged from 0.540 to 0.714, with an overall Cronbach's alpha value of 0.777.

Conclusion: MPAST is valid, reliable, practical, and is the first validated self-assessment tool to assess professional attributes and behaviours among medical students, to our knowledge.

Ann Acad Med Singap 2023;52:457-66

Keywords: medical education, professionalism, self-assessment, students

INTRODUCTION

Professionalism is a concept that is difficult to define, but in relation to medical practice, it can be summarised as values, behaviours and conduct that foster the public's trust in doctors. It comprises a complex interplay of abstract concepts that have led to many attempts at defining professionalism.¹⁻⁴ With time, changes in the doctor-patient relationship have also led to shifts in the concept of professionalism, with patient-centredness involving focus on patient autonomy and patient experience having a much larger emphasis.⁴ Undergraduate medical education institutions in Singapore have also created a dedicated list of professional attributes^{5,6} that their graduates are expected to achieve. Despite the myriad of definitions available for professionalism, all these institutions have a similar consensus—that professionalism is a key component of medical education.

There are presently a few models of medical professionalism as described by various organisations throughout the world such as the American Board of Internal Medicine, American College of Physicians Foundation and European Federation of Internal Medicine (ABIM, ACP-ASIM, EFIM),¹ General Medical Council³ and Royal College Physicians of London.⁴ Professionalism can also be classified as an individual, interpersonal or societal process.⁷ Fundamentally, these models all describe certain attitudes that are consistent, such as personal improvement, teamwork, maintenance of appropriate doctor-patient relationship and recognition of the ethical dilemmas that physicians face daily.

Significantly, it has also been shown that unprofessional behaviours in medical school predict unprofessional behaviours in future medical practice.⁸ Professionalism is closely tied to the care patients receive, and consequently their health and illness outcomes.⁹ Professionalism can be developed¹⁰ but to do so will require methods to assess professionalism.¹¹ Hence, this highlights the need to pay more attention to the teaching and assessment of professionalism in medical schools.¹²

However, there are many barriers to measuring professionalism.¹³ Traditionally, professionalism assessment looks into personality traits, but reports¹⁴ have shown that one's behaviour and actions cannot be

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CLINICAL IMPACT

What is New

- To our knowledge, the Medical Professionalism: A Self-assessment Tool (MPAST) is the first self-assessment tool that has been validated in Singapore that assesses both professional attributes and actual behaviours to measure professionalism among medical students.

Clinical Implications

- MPAST can be used as part of a comprehensive assessment model to assess professionalism among medical students in Singapore and other countries with similar healthcare contexts.
- The findings can identify areas for action to nurture and develop professional values among students and doctors, which can translate to improvements in clinical outcomes for patients.

accurately inferred or predicted by personality traits. In a review of the methods of professionalism assessment, Ginsburg et al. came to the conclusion that studies on professionalism should emphasise behaviour instead of abstract concepts of professional traits or attributes.¹³ Emphasis on behaviours rather than traits also shifts the focus away from labelling an individual as professional or unprofessional, and this allows the assessment to be less threatening to the individuals and thus encourage higher uptake.¹³ Even if behaviours could be assessed accurately, the judgement of whether a certain behaviour is professional or not is highly context-dependent.¹⁵ Behaviours demonstrated by individuals are often the result of deliberation and conflict between 2 (or more) professional values, and most assessment tools for professionalism cannot accurately capture this process.¹³

There are many different tools that have been developed to assess professionalism,^{12,16} and they vary in terms of the aspect of professionalism being measured, the target group, the purpose of the assessment¹⁷ and the role of the respondents.¹³ The large number of tools is a testament to how complex the subject of professionalism is, and how a single mode of testing is unlikely to be able to fully assess professionalism.¹³ In addition, the professionalism assessment tools currently available¹⁸⁻²⁶ are limited in terms of their creation, content and conduct. In terms of creation, there

are tools^{19,26} that were created with older definitions of professionalism. Content-wise, some tools were created for other healthcare professionals^{20,21} or to assess the professional climate in a healthcare setting.^{22,23} Of the tools developed specifically for medical students, many scales do not have a strong emphasis on student behaviour.²⁵

Across different regions and cultures, there are differences in the understanding of professionalism.²⁷ Hence, cross-cultural validation of any assessment tool is important.⁷ The Professionalism Mini Evaluation Exercise (P-MEX) was recently found to be suitable for use in Singapore.²⁸ However, aside from this consensus, it has yet to be administered and its internal validity has not yet been demonstrated. However, P-MEX places students in simulated settings and relies on assessment by external observers, which has its limitations. Assessors' own ideals and wish to avoid criticising students influenced judgement and some felt the scoring items were too basic.²⁹

While there are tools to assess professionalism that rely on feedback from colleagues, friends, patients or assessors, self-administered questionnaires can be useful for assessing professionalism in large groups of students to identify patterns and associations.¹³ It is also useful as a part of a multi-component evaluation.^{12,30} Self-assessment has the added benefit of encouraging self-reflection, which may lead to personal improvement³¹ and sustainable lifelong learning in medicine.³² To aid in minimising biasness in self-reporting and recall, self-assessment can be done based on concrete, measurable targets determined by other parties coupled with constructive feedback.³³ This study therefore aims to design and validate a self-assessment tool for both professional attributes and behaviours among medical students.

METHOD

Developing the professionalism assessment tool

The 10 tenets of professionalism from the Charter on Medical Professionalism jointly published by the ABIM, ACP-ASIM, EFIM¹ were used as the foundation on which the survey was built upon. It was chosen because the Charter has been endorsed by a large number of national and international bodies.³⁴ The tenets have also been used internationally, such as in the creation of a questionnaire³⁴ for practising physicians. The questionnaire assessed their professional attributes and behaviours, which were associated with each tenet. These tenets were adapted for our study. To ensure contextual relevance, references were also made to the Singapore Medical Council's

Ethical Code and Ethical Guidelines² and the Yong Loo Lin School of Medicine, National University of Singapore (NUSMed) Student Handbook.⁵

The authors—comprising 2 medical students, a practising physician and a medical educationalist—created at least 2 items for each tenet of professionalism. Using a Likert scale, the first item assessed the attitude of how the student believed a physician should act in certain circumstances to demonstrate professionalism, whereas the second item required the student to reflect on his or her own behaviour and report the frequency at which a professional or unprofessional act was performed.

Pilot testing was conducted on a group of 10 medical students. The provisional questionnaire was administered to the students and feedback was gathered on the relevance of the questions, ease of understanding and whether there were ambiguities in the phrasing of the items. Based on the feedback provided, the questionnaire was modified to give the preliminary Medical Professionalism: A Self-Assessment Tool (MPAST) (supplementary materials, Appendix S1).

Participants

Year 2 to 5 medical students from NUSMed with clinical encounters and experience were invited for the survey. NUSMed's medicine course is a 5-year undergraduate programme, where the first 2 years are pre-clinical, involving lectures and tutorials.⁵ Year 2 students had patient contact and interaction through the Clinical Skills Foundation Programme to prepare them for the clinical years. From Year 3 onwards, students acquire knowledge and skills in the clinical learning environment through postings to various healthcare institutions in Singapore. This study was approved by the National University of Singapore Institutional Review Board (reference code S-19-183).

Data collection

Students attending combined teaching sessions were invited to complete a voluntary, anonymised, non-remunerative and self-administered questionnaire, which was administered in paper-and-pencil form between October 2019 and April 2020. The responses were subsequently transcribed by members of the research team. The responses were recorded on a scale of 0 to 4. For positively worded items, "strongly agree" or "always" responses were given a value of 4, while negatively worded responses like "strongly disagree" or "never" were given a value of 0.

Statistical analysis

All statistical analyses were conducted using jamovi software, version 1.2 (The jamovi project). The

construct validity of MPAST was evaluated using Principal Component Analysis (PCA). Responses with missing data were not included in the analyses. The varimax rotation was used. The assumptions for PCA were assessed using Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's test of sphericity. The threshold for KMO measure of sampling adequacy was 0.6. The threshold for Bartlett's test of sphericity was a *P* value of less than 0.05. Components were retained based on an eigenvalue more than 1.0 and the visual examination of the scree plot. A factor loading threshold of 0.3 was used.

Cronbach's alpha values were evaluated to assess the reliability of the questionnaire. A value of more than or greater than 0.7 was considered acceptable. Thematic analysis was used to analyse the items within each component.

RESULTS

Participant characteristics

Out of 812 participants, 541 (66.6%) responded. The majority of the participants were Chinese but equally distributed within each year of study and sex (Table 1). The proportion of males and females in the sample population is similar to students enrolled in the various medical schools in Singapore, at the time of study.³⁵

Table 1. Characteristics of respondents.

	No.	%
Year of study		
Year 2	126	23.3
Year 3	140	25.9
Year 4	126	23.3
Year 5	149	27.5
Sex		
Male	231	42.7
Female	306	56.6
Missing	4	0.7
Ethnicity		
Chinese	491	90.8
Malay	3	0.6
Indian	37	6.8
Others	7	1.3
Missing	3	0.6

Construct validity and internal reliability

After incomplete responses were removed, 504 responses were included in the PCA. Initial analysis inclusive of all the items in the questionnaire generated a 7-component solution with a Cronbach's alpha value of 0.744. Items that had a factor loading threshold of less than 0.3 and items that had a negative impact on the individual component or the overall Cronbach's alpha coefficient values were then sequentially removed. Following 6 iterations of the PCA, a 17-item questionnaire with a 5-component solution was obtained (Appendix S2). The details of each iteration of PCA are provided in Table 2. The scree plot is shown in Fig. 1. This accounted for 54.6% of the variance in the data. The component loadings and statistics are shown in Tables 3 and 4, respectively. The overall KMO Measure of Sampling Adequacy was 0.812, which suggested that the sample was sufficient for analysis. Bartlett's test of sphericity was $\chi^2(136)=1579$, $P<0.001$, which suggested that the correlation among variables significantly differed from zero.

Although there were some items that were loaded onto multiple components, these were not removed as they were deemed to be targeting important aspects of professionalism. These items were included in the component where they had the highest component loading. The overall Cronbach's alpha value was 0.777 for the validated question-

naire and the alpha reliability for its individual components are shown in Table 4.

The 5 components were commitment to: (1) patient's best interest, (2) honesty and integrity, (3) professional competency, (4) patient safety and care, and (5) educational responsibilities (Table 5).

DISCUSSION

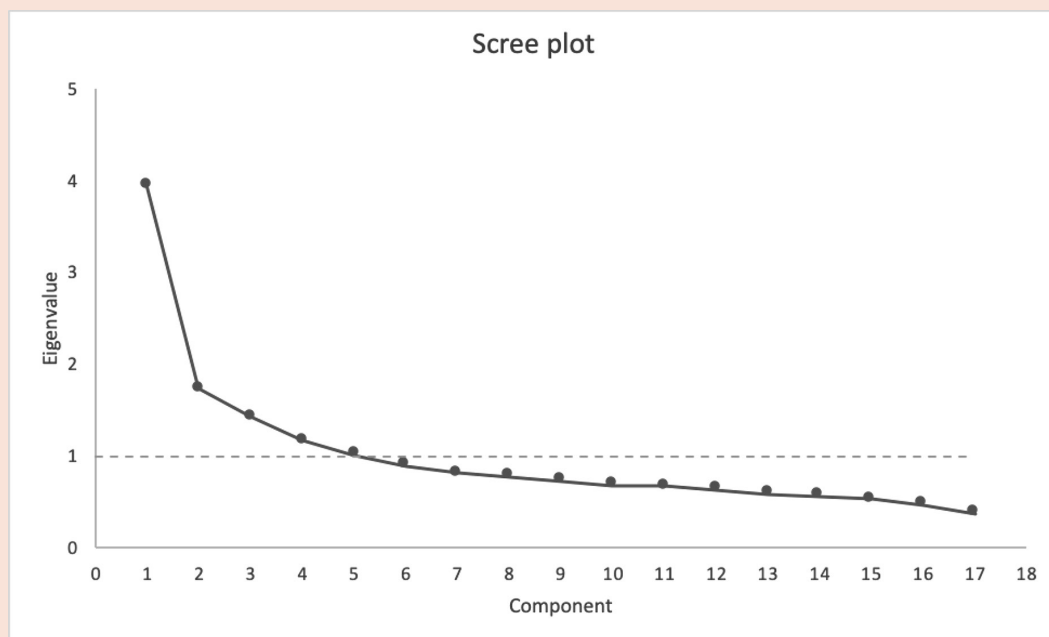
To our knowledge, this is the first study that aimed to design and validate a tool to assess both professional attributes and behaviours among medical students in Singapore. Our findings show that MPAST is valid, reliable and practical. After excluding incomplete responses, our sample size of 504 is adequate as it is recommended that validation of an instrument requires a minimum of 10 respondents per item³⁶ or a minimum overall sample of 300 respondents.³⁷

MPAST was designed with reference to ABIM, ACP-ASIM, EFIM's Charter of Medical Professionalism, which has been used to design other professionalism assessment tools in both Western^{18,23} and non-Western²⁶ countries. The initial questionnaire was created and contextualised using Singapore references,^{2,5,6} in collaboration with medical students, a practising physician and a medical educationalist, who deemed the items representative of their respective domains of professionalism, meaningful and relevant. This provided content and face validity. The inclusion of medical students in the

Table 2. Principal Component Analysis (PCA) iterations.

PCA iterations	Questions removed	Reason for removal of questions
1	(Question no. 17) I have attended conferences sponsored by pharmaceutical companies.	Had a factor loading threshold of less than 0.3.
2	(7) Physicians should never feel guilty about how they treat a patient from a humanitarian standpoint. (10) Physicians should encourage the participation of their patients in clinical trials.	Had a low Cronbach's alpha value as a component.
3	(23) I treat all patients the same regardless of gender, age, culture, social and economic status, sexual preferences, beliefs, contribution to society, illness-related behaviours or the illness itself.	Had a negative Impact on individual component Cronbach's alpha value.
4	(14) I have reflected upon the investigations and management of a patient and questioned the team if certain orders were truly necessary. (16) I have taken part in research projects with the aim of advancing knowledge and science.	Had a negative impact on overall Cronbach's alpha value.
5	(19) I have taken part in projects to reach out to populations who have poorer access to healthcare.	Had a negative impact on overall Cronbach's alpha value.
6	(25) I have strived to understand my patients' and their families' physical and emotional needs.	Had a negative impact on individual component Cronbach's alpha value.

Fig. 1. Scree plot obtained through Principal Component Analysis.



design and creation also offers special insight into the behaviour and psyche of a medical student.

Although MPAST was created with reference to ABIM, ACP-ASIM, EFIM's Charter on Medical Professionalism, the clustering of the items based on PCA was different to what was expected. There were some items that clustered based on the professional attribute that was being assessed, while other items clustered according to whether they assessed the students' attitudes or behaviour towards professionalism. However, this is realistic, given the interrelation between attributes and the 2 different professionalism outcomes, i.e. attitudes and behaviour.¹¹ By comparing the 5 themes with the 10 tenets, there is a suggestion the original 10 tenets could be further condensed into these 5 themes based on similarity of ideas as shown in Table 5.

Although the Cronbach's alpha value for overall questionnaire and component 1 was more than 0.7, component 2 to 5 had values that were more than 0.5 but less than 0.7, comparable with other professionalism assessment scales as shown in Table 6. Generally, Cronbach's alpha values of more than 0.7 are acceptable.³⁸ However, according to Taber,³⁹ Cronbach's alpha values should not be interpreted in isolation, but should be understood based on the context of the study and the items that are included in the instrument used. Based on the similarity of the professional attributes that are being assessed by items in their respective components, the MPAST has overall adequate construct validity and internal reliability.

In addition, there were also similarities in the themes identified for MPAST and the professional attributes that NUSMed aims to develop in its students. These include the concepts of honesty and integrity, taking responsibility for one's own learning and professional competency, taking responsibility for patient's safety and well-being, and being committed to patient's best interest by showing respect and sensitivity to patients.⁵ Comparing the themes again with another Singapore qualitative study, we see similar overlaps with 3 of 4 domains of medical professionalism, namely: doctor-patient relationship, inter-professional relationship and reflective practice.²⁸

Also, when comparing MPAST with other tools available, we can identify characteristics unique to MPAST. First, the MPAST features a unique emphasis for reflection on behaviour—not just ideal behaviour, but actual behaviour performed by the individual doing the assessment. Prior to this, many tools largely focused on attributes rather than behaviours²⁵ and even when there was an emphasis on behaviours, students were tasked to identify ideal behaviours instead of reflecting on their own actions. The flaw with such an approach is that traits alone may not accurately predict behaviour,¹⁴ since the importance of assessing behaviour has been shown.¹³ Hence, this scale included relevant and practical scenarios where professional dilemmas would arise. As current practising physicians who was a medical student not too long ago, many of these situations still leave a significant impression on the authors.

Table 3. Component loadings obtained through Principal Component Analysis.

Items	Components				
	1	2	3	4	5
Physicians should provide necessary care regardless of the patient's ability to pay.	0.806				
Physicians should put the patient's welfare above the physician's financial interests.	0.691				
Physicians should minimise disparities in care due to patient race or gender.	0.683			0.408	
Physicians have the obligation to protect the confidentiality of the patient.	0.647				
I have omitted learning about a certain condition or avoided speaking to a patient because the condition is deemed to be unimportant for examinations.		0.688			
I have reported a part of the physical examination as normal when it had been inadvertently omitted from the physical examination.		0.671			
I have discussed sensitive and confidential information about patients in a public setting with insufficient precautions taken.		0.569		0.357	
I have kept learning opportunities to myself instead of sharing them with my peers.		0.566			
Physicians should undergo recertification examinations periodically throughout their career.			0.795		
Physicians should report all instances of significantly impaired or incompetent colleagues to hospital, clinic, or other relevant authorities.			0.706		
Physicians should participate in peer evaluations of the quality of care provided by colleagues.		0.322	0.584		
I have practised beyond my limits by performing procedures beyond my capabilities under insufficient supervision.				0.617	
I did not inform the team in charge of a patient after I spoke to and retrieved additional information from the patient that was relevant to the patient's condition and management.		0.419		0.550	
I have insisted on talking to or examining a patient who was visibly tired or who had turned me down initially.		0.408		0.491	
Physicians should disclose all significant medical errors to affected patients and/or guardians.	0.301		0.337	0.466	
I pay attention to the teacher in lessons and contribute appropriately.					0.828
I have prepared myself well for my examinations and assessments in medical school.					0.797

Table 4. Component statistics and Cronbach's alpha values of overall questionnaire and individual components.

Component	Eigenvalue	Sum of squares loadings	Variance explained (%)	Cumulative variance (%)	Cronbach's alpha value
1	3.948	2.25	13.23	13.2	0.714
2	1.733	2.10	12.34	25.6	0.617
3	1.421	1.78	10.49	36.1	0.599
4	1.162	1.73	10.20	46.3	0.543
5	1.014	1.41	8.32	54.6	0.540
Overall	-	-	-	-	0.777

Table 5. Themes of components, their respective items and comparison to the 10 tenets of the Charter on Medical Professionalism by the American Board of Internal Medicine Foundation, American College of Physicians-American Society of Internal Medicine Foundation and European Federation of Internal Medicine (ABIM, ACP-ASIM, EFIM).

Component	Theme	Items	ABIM, ACP-ASIM, EFIM tenets
1	Commitment to patient's best interest	Physicians should put the patient's welfare above the physician's financial interests.	Commitment to improving access to care.
		Physicians should minimise disparities in care due to patient race or gender.	Commitment to a just distribution of finite resources.
		Physicians have the obligation to protect the confidentiality of the patient.	Commitment to patient confidentiality.
		Physicians should provide necessary care regardless of the patient's ability to pay.	Commitment to improving access to care.
2	Commitment to honesty and integrity	I have omitted learning about a certain condition or avoided speaking to a patient because the condition is deemed to be unimportant for examinations.	Commitment to honesty with patients (or academic work, since the respondents are medical students).
		I have reported a part of the physical examination as normal when it had been inadvertently omitted from the physical examination.	Commitment to honesty with patients.
		I have discussed sensitive and confidential information about patients in a public setting with insufficient precautions taken.	Commitment to patient confidentiality.
		I have kept learning opportunities to myself instead of sharing them with my peers.	Commitment to scientific knowledge.
3	Commitment to professional competency	Physicians should undergo recertification examinations periodically throughout their career.	Commitment to professional competence.
		Physicians should report all instances of significantly impaired or incompetent colleagues to hospital, clinic, or other relevant authorities.	Commitment to professional responsibilities.
		Physicians should participate in peer evaluations of the quality of care provided by colleagues.	Commitment to professional responsibilities.
4	Commitment to patient safety and care	I have practised beyond my limits by performing procedures beyond my capabilities under insufficient supervision.	Commitment to improving quality of care.
		I did not inform the team in charge of a patient after I spoke to and retrieved additional information from the patient that was relevant to the patient's condition and management.	Commitment to maintaining trust by managing conflicts of interest.
		I have insisted on talking to or examining a patient who was visibly tired or who had turned me down initially.	Commitment to maintaining appropriate relations with patients
		Physicians should disclose all significant medical errors to affected patients and/or guardians.	Commitment to maintaining trust by managing conflicts of interest
5	Commitment to educational responsibilities	I have prepared myself well for my examinations and assessments in medical school.	Commitment to scientific knowledge
		I pay attention to the teacher in lessons and contribute appropriately.	Commitment to scientific knowledge

Second, by placing an emphasis on actual behaviour, MPAST provides an opportunity for self-reflection that can potentially stimulate a desire for self-improvement.³¹ As medical students progress through their medical school and become doctors, they develop their professional identity, which may

refer to their internalisation of what being a good doctor means and the manner in which they should behave.⁴⁰ The formation of professional identity is increasingly being accepted as a key component of professionalism education,⁴¹ and is influenced by formal, informal and hidden curricula.⁴² Self-

Table 6. Comparison of Cronbach's alpha values of the Medical Professionalism: A Self-assessment Tool with other scales.

S/N	Scale	Range of Cronbach's alpha values for individual factors	Overall scale Cronbach's alpha value
1	Penn State College of Medicine Professionalism Questionnaire ¹⁸	0.51–0.78	Not reported
2	Scale that measures professional attitudes and behaviours associated with the medical education and residency training environment ¹⁹	0.59–0.72	0.71
3	Professionalism Assessment Tool ²⁰	0.91–0.95	Not reported
4	Professionalism Scale by Project Consortium ²¹	0.505–0.825	Not reported
5	Queen's University Belfast Professionalism Index ²²	0.77–0.88	Not reported
6	Instrument to Measure the Climate of Professionalism in a Clinical Teaching Environment ²³	0.75–0.91	Not reported
7	Medical Students' Attitudes Toward Providing Care for the Underserved ²⁴	0.4–0.91	0.87–0.91
8	Professionalism Assessment Scale ²⁵	0.6–0.84	Not reported
9	Arabian Learners' Attitude of Medical Professionalism Scale ²⁶	0.42–0.57	Not reported

reflection plays a key role in the formation of this professional identity.^{42–44} It is through reflection on their experiences and actions that medical students can merge their personal and professional identities, internalise professional values as their personal values and manifest that as professional behaviour.⁴² Building a strong professional identity is important as this has been shown to influence patient care and outcomes.⁹ As students and doctors develop a responsibility to their patients, this may also help them find meaningful employment and remain committed, with a similar parallel being drawn in the law industry.⁴⁵ This is especially important following the recent COVID-19 pandemic having led to a significant rise in healthcare workers leaving the workforce due to burnout and increasing work commitments. With changing work environments and business practices influencing medicine, a strong set of professional values is fundamental to doctors continuing to deliver ethical and altruistic care for patients.⁴⁶

Last, MPAST is a simple and practical self-assessment tool that can be administered quickly to a large population in a short period of time. It is useful in assessing professionalism among a large number of students.¹³ This allows comparison of the levels of professionalism among various groups of students and identification of relevant factors or associations. Additionally, through the various themes of professionalism, MPAST can help individuals or schools to identify areas of professionalism that require actions. By administering MPAST to the same population at 2 different time points, it would also be possible to track

changes in the level of professionalism longitudinally. In order to best assess the qualities of an individual, the MPAST can form part of a comprehensive approach that utilises different modalities. Feedback should also be sought from peers, seniors, juniors, patients and standardised patients who had extensive interaction with the individual to obtain a holistic assessment of an individual's professional attitudes and behaviour.

However, this study has several limitations. First, the sample population that was used for validation of MPAST was only from 1 undergraduate medical school, and the data collected might not be representative of all medical students from other medical schools. Furthermore, this study was limited to a single country, hence future cross-cultural validation would be required prior to application of this tool in other cultural contexts.⁷ An analysis of medical professionalism in Asian cultural contexts and Western frameworks revealed differences in emphasis, with the former having stronger emphasis on morality, intrinsic values and upholding of a high moral standard when no one is around.⁴⁷ Western frameworks, such as the ABIM, ACP-ASIM, EFIM's referenced in this paper, had stronger focus on commitment to a set of professional factors. Notably, MPAST amalgamates these strengths, being built upon professional commitments while also encouraging students to reflect on their own actions and intrinsic values in private.

The MPAST was created by a small team comprising two medical students, a practising physician and a medical educationalist. A pilot trial was conducted with 10 medical students. This

could have been improved by utilising more rigorous qualitative methods, such as focused group discussions or nominal group technique to be comprehensive and inclusive, and to allow thematic analysis when developing the questionnaire items.

In addition, there can be self-reporting bias, including both social desirability bias and recall bias as this is a self-reported questionnaire. However, social desirability bias was minimised by the anonymity of the participants who completed the survey.

Lastly, the use of a single modality for the assessment of professionalism might not provide a holistic judgement of students' professionalism. However, the intent of MPAST was never to replace all other modalities, but rather to complement and represent the self-assessment component of a comprehensive, all-rounded assessment of one's professionalism.

Moving forward, relationships between the level of professionalism and demographic factors can also be determined using this new validated tool. Longitudinal studies can also be conducted to assess changes in professionalism with time. More studies on nurturing professionalism can also be pursued, in particular, on employing a method of mentorship, which has been shown to be of particular importance in the Singapore cultural context.⁴⁸ Ultimately, MPAST can help to spark further conversation and discussion about professionalism. It also emphasises the importance of behaviour as being a part of professionalism assessment and the benefits that self-assessment can provide.

CONCLUSION

Professionalism is a core attribute that medical professionals should possess. The process of inculcating professional attributes and behaviours has to begin in medical school. Identifying students who possess unprofessional behaviour, tracking their progress and targeting factors that influence professionalism are key steps that educational institutions should undertake. MPAST is a practical, reliable and validated tool to facilitate these processes and pave the way for future development in medical professionalism assessment.

Disclosure

The authors declare no conflicts of interest.

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