

Validation of an assessment tool for professionalism in medical students: A mixed method study

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Abstract

Objective: To develop and validate a tool for the assessment of professionalism in medical students during clerkship.

Method: The mixed-method study was conducted from February to September 2018 at the Islamic International Medical College, Riphah University, Islamabad, Pakistan. A preliminary focus group discussion was followed by two rounds of Delphi technique to validate micro-scenarios for the relevance of each item of the instrument alongside its content validity. For content and construct validation of the tool, content validity, cognitive validity, cognitive pretesting, confirmatory factor analysis and reliability assessment was done. Piloting was done on medical students doing clerkship. Data was analysed using SPSS 21 and AMOS 21.

Results: A 35-item preliminary tool from micro-scenarios generated after focus group discussion was developed for the first Delphi round. For the second round, a 29-item tool was resent to the experts for validation. After the second round, the content validity scale was 0.94. Removal of 1 item produced a 28-item tool. Pre-cognitive testing of the 28 items resulted in rephrasing of 4, modification of 2, and deletion of 1 and a tool with 27 items. Piloting was carried out and after CFA resulted in a reduced 21 item tool. Cronbach's alpha value was 0.96. A good to excellent model fit was produced after performing confirmatory factor analysis.

Conclusion: A tool comprising of 21 items scored on a 5-point Likert scale that had acceptable construct validity and good content validity was developed. It can be used to evaluate the level of professionalism of local medical students doing clerkship.

Keywords: Professionalism, Delphi, Focus group, Medical students, Factor analysis. (JPMA 73: 2177; 2023)

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Introduction

Professionalism in medical is a "commitment to carrying out professional responsibilities, adherence to ethical principles and sensitivity to diverse patient populations".¹ The American Board of Internal Medicine (ABIM) framework has identified six areas of professionalism -- respect, accountability, excellence, altruism, integrity and duty -- that a graduating medical doctor must display.²

The cognitive and non-cognitive base of professionalism is provided during preclinical and clinical years through teaching and role modelling, respectively. Compared to the cognitive base of professionalism, assessment of non-cognitive base during clerkship is more challenging due to a complex blend of ethical commitment and essential attributes.³ Periodic assessment of professionalism through a valid and reliable instrument may help implement effective teaching methods that aids the growth of professional behaviour in medical students.⁴

According to the theory of planned behaviour, development of professionalism in undergraduate students can be predicted.⁵ Therefore, a feedback tool based on the behavioural elements, such as attitude, subjective norm and perceived behavioural control, may be used by the faculty to assess, specific professional behaviours in different workplace situations, and guide students in improving professionalism.⁶

Assessment lies at the core of lasting knowledge. To ensure the development of the desirable internalised professionalism attributes and behaviours, its formative and summative assessment must be incorporated in the curriculum, especially during clerkship.⁴ The faculty can be helped through the introduction of an assessment tool developed in the local context as part of a 360 degree feedback loop during their clinical rotation.⁷

Medical professionalism is a culture sensitive construct as a social contract is formed between medical doctors and the public demonstrated in explicit behaviours by the evolving future doctors.⁷ The ABIM framework is most commonly used in the Western world for assessing the professional behaviour. Learner's Attitude on Medical Professionalism Scale (LAMPS) has been developed in the

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Arabian context using ABIM framework.⁸ Similarly, in Pakistan, which is a Muslim country, the provision of a feedback tool based on local norms may be helpful to assess a particular professional behaviour of the students in the local context reflecting its culture, beliefs and religion.⁹ At present, various tools, such as Conscientiousness Index (CI), LAMPS, mini-clinical evaluation exercise (Mini-CEX) and professionalism mini-evaluation exercise (P-MEX) are being used to assess professionalism without reporting the psychometrics properties.¹⁰

Societies vary in their expectations of doctors, and, hence, a tool needs to be developed on the basis of cultural values of the region reflecting regional diversity, such as displaying respect, completion of task and dressing up properly. The current study was planned to develop and validate a new tool to measure the professionalism of medical students during the clerkship module.

Materials and Methods

The mixed-method study was conducted from February to September 2018 at the Islamic International Medical College, Riphah University, Islamabad, Pakistan.

The Professionalism in Medical Students (PIMS) tool was micro-scenarios designed in 3 phases after approval from the institutional ethics review board.

Phase-1: Comprised content, domain specification and item generation. Guided by the recommendations of the Association for Medical Education in Europe (AMEE) Guide No 87, a literature review was carried out, and 6 questions were finalised guided by the ABIM framework.^{2,11} Focus group discussion (FGD) was conducted with nine qualified medical educationists having more than 3 years' experience.¹² This phase comprised of micro-scenarios were developed on the basis of quotes of the participants depicting possible professional situations for a preliminary tool in the local context.

Phase-2: Comprised of content validation. A 35-item preliminary tool was finalised from the micro-scenarios. This content was validated by a panel of experts through two Delphi rounds. Clinical teachers having more than 5 years' teaching experience were involved. The experts were assistant professors and above, both males and female. They were from hospitals of Rawalpindi, Pakistan. For round 1, 40 experts were sent emails with a covering letter, consent form and the tool in Google Forms. The experts were asked to rate each item on a scale ranging from 5='very important' to 1='not important'. They were also encouraged to suggest any additional component to be included. Data was analysed using SPSS 21.

For round 2, a tool with reduced items and a summary of all the responses were sent back to the same participants. They were asked to categorise each item based on relevance and essentiality. For relevance of items to the construct, a 5-point Likert scale was used, ranging from 5='highly relevant' to 1='not relevant'. For essentiality of the item, a 3-point Likert scale was used, ranging from 3='essential' to 1='non-essential'. For Delphi, a period of 3-4 weeks was given to the participants to respond. Upon reaching consensus, the Delphi phase was concluded.¹³

For computing the content validity index (CVI) of the items (I-CVI), data was transferred to Excel sheet. The collective result for the content validity scale (S-CVI/Ave) was determined. Using Lawshe formula, content validity ratio (CVR) was computed to assess the essentiality of items.¹⁴ Items with CVR extending from 0.60 to 0.80 were modified, and those with score <0.6 were deleted.

Pre-cognitive testing was done to determine the response process validity of the tool. It was carried out on a 10-member panel before piloting.

Phase-3: Comprised piloting of the tool, evaluation of the reliability and construct validity. A 12-member faculty team of assistant professors and senior registrars from the Ear-Nose-Throat (ENT), Eye, Medicine, Paediatrics, Surgery and Obstetrics and Gynaecology (OBGYN) departments conducted the piloting of the tool on students doing clerkship from fourth and final year of their studies. A 5 point Likert scale was employed where observed behaviour was marked from 5='excellent' to 1='very poor'. There were 27 items against 06 constructs.¹⁵ AMOS 21 was used to conduct confirmatory factor analysis (CFA).

Results

In the first phase, 46 micro-scenario item statements were developed as a result of FGD. This led to a 35-item tool.

In phase 2, of the 40 experts approached, 24(60%) responded for Delphi round 1. There was ≥80% agreement with a median score of ≥4 which resulted in the removal of 6(17%) items. A 29-item tool was finalized for Delphi round 2 for which 18(75%) experts responded. Items having I-CVI ≥0.78 were eliminated, I-CVI 0.78-0.90 were modified, and I-CVI ≥0.90 were incorporated. The thematic analysis of the comments from the experts resulted in the modification of 5(17.24%) items and elimination of 1(3.44%). A 28-item preliminary tool for precognitive testing was finalised.

The pre-cognitive testing in phase 3 resulted in the deletion of 1(3.6%) item, and a 27-item remained for piloting (Table-1).

Table-1: Results of the Delphi rounds of PIMS (Phase II (n1=24/40)(n2=18/24).

Sr.No	Domain	Items for Professional behaviour	Mean	%A	I-CVI	CVR	Results	
1.	Respect	Greets patient with salaam	4.5	100%	1	1	Included	
2.		Considers the cultural values, while examining the patient	4.5	100%	1	1	Included	
3.		Takes care of patient comfort during examination	3	69%	0.64	0.06	Removed	
4.		Communicates with patient in a language that is understood by him/her	4.5	94%	0.92	.81	Included	
5.		Has a friendly behaviour with the colleagues	4.5	90%	0.92	0.81	Included	
6.		Respects diversity of race, gender, social status and religion	4.5	92%	1	9.3	Included	
7.		Works as a good team player	3.5	75%	0.64	0.06	Removed	
8.		Demonstrates cooperativeness and supportiveness with the class fellows working in a collaborative manner	3.5	70%	0.73	0.06	Removed	
9.		Respectful of the age and experience of the junior staff	3	69%	0.64	0.06	Removed	
10.		Empathise with patient over his pain	4	90%	0.80	.80	Included	
11.	Altruism	During history taking uses language that is understood by the patient	4.5	90%	0.92	0.81	Included	
12.		Displays readiness to help and relieve peers if required in wards	4.5	100%	1	1	Included	
13.		Prioritizes ward duties over social commitments	4.5	100%	1	1	Included	
14.		Works with student welfare society to help patients	4.5	100%	1	1	Included	
15.		Listens patiently to the patient during history taking	4.5	100%	1	1	Included	
16.		Is always truthful and never backbites or bullies	3	69%	0.64	0.06	Removed	
17.		Does not copy from another student's examination neither does he allows another student to copy examination	3.5	75%	0.64	0.06	Removed	
18.		Honor and integrity	Notes down the patient complaints and examination findings without falsifying data	4.5	100%	1	1	Included
19.			Demonstrates truthfulness about an incidence of conflict with: Peers Nursing staff Relative of patients	4.5	100%	1	1	Included
20.			Ensures patient trust by his interaction with patient	4.5	94%	0.92	.81	Included
21.	Accountability	Accepts feedback and corrects mistakes	4.5	90%	0.92	0.81	Included	
22.		Takes responsibility for tasks given during clerkship	4.5	92%	0.84	0.63	Revised	
23.		Demonstrates eagerness to learn new procedure	4.5	92%	0.84	0.63	Revised	
24.		Seeks approval from supervisors before posting an incident on social media about a patient	4.5	92%	0.84	0.63	Revised	
25.		Reflects on his actions and tries to correct his mistakes	4.5	100%	0.92	0.81	Included	
26.		Duty	Fulfils call duties	4.5	100%	1	1	Included
27.			Acts as a bridge between the patients and the clinician	4.5	100%	0.92	0.81	Included
28.	Excellence	Guides junior staff in patient care	4.5	92%	0.84	0.63	Revised	
29.		Tries to correct his mistakes	4	85%	0.92	.81	Included	
30.		Participates enthusiastically in the ward rounds	4.5	90%	0.92	0.81	Included	
31.		Behaves in a dignified manner	4.5	100%	1	1	Included	
32.		Dresses in a professional manner	4.5	100%	1	1	Included	
33.		Participates in ward rounds and clinical discussions	4.5	100%	1	1	Included	
34.		Attends conferences and participates in research activities for continuous professional development	4.5	92%	0.84	0.63	Revised	
35.	Completes assignment on time and is well prepared	4.5	92%	0.84	0.63	Revised		

PIMS: Professionalism in medical students, n1: Number of participants in round 1, n2: Number of students in round2, M: Mean, %A: Percentage of agreement, I-CVI: Content validity index of item, CVR: Content validity ratio.

Table-2: Results of confirmatory factor analysis of the 21-item instrument (n= 231).

Measure	Value	Level of Acceptance	Interpretation
χ^2/df	2.832	Between 1 and 3	Excellent
CFI	0.921	>0.95	Acceptable
NFI/TLI	0.905	>0.90	Excellent
GFI	0.838	>0.80	Excellent
IFI	0.922	>0.90	Excellent
RMSEA	0.089	0.08-0.1	Marginal
SRMR	0.049	<0.05	Good

χ^2/d : Squared distribution with degree of freedom, CFI: Comparative fit index, TLI: Tucker-Lewis index, GFI: Goodness of fit index, IFI: Incremental fit index, RMSEA: Root mean square error of approximation, SRMR: Standardised root mean square residual.

Cronbach's alpha for internal consistency of the tool was 0.96 despite multifaceted elements. Item for the domains of Respect were 4, Altruism had 3, Honor and Integrity had 4 items, accountability had 4, duty had 3, and excellence had 4 items respectively. The Cronbach's alpha was 0.933

for respect, 0.74 for altruism, 0.80 for honour and integrity, 0.85 for accountability, 0.81 for duty and 0.87 for excellence. The inter-item correlation ranged from 0.741 to 0.933 which ranged from satisfactory to excellent.

CFA measurement model (Figure) showed that all the item loadings exhibited acceptable factor loadings (>50). CFA parameters ranged from acceptable to excellent (Table-2).

Discussion

The current study outlined the method of construction and validation of a tool for measuring the development of professionalism in a local setting, focussing on the areas of professionalism specified in the ABIM framework.² According to the key findings, the identified areas of professionalism were comparable to those recognised by ABIM and other instruments with diverse backgrounds.²

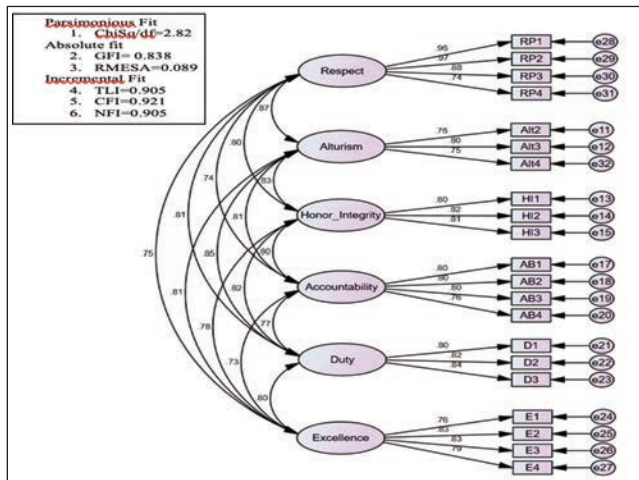


Figure: Sequential equation model for professionalism in medical students, showing factor loadings, factor co-relations and good for fit indices (parsimonious, absolute, and incremental fit) for 6-factor model containing 21 items.

RP: Respect, Alt: Altruism, HI: Honour and Integrity, AB: Accountability, D: Duty, E: Excellence, x²/d: Squared distribution with degree of freedom, CFI: Comparative fit index, TLI: Tucker-Lewis index, GFI: Goodness of fit index, RMSEA: Root mean square error of approximation.

This suggests that these are universal characteristics, but these items were valued as per the local contextual requirement by the participants. Effective display of a respectful attitude is extremely necessary and is desirable when dealing with peers, patients and seniors. Concerning duty, it was agreed that it should be reflected in the actions of students, such as assisting junior staff with the patients and finishing assignments on time. During high-pressure situations, the students should exhibit the element of 'honour and integrity' characterised as one area in the present tool. In the ABIM framework, they are considered separate domains.² This might be because the concept might be considered as having similar meaning in the local context since during the FGD, the participants' views frequently overlapped.

Regarding excellence, it was established that students should wear proper attire. A study concluded that proper dressing of the physicians improves patient satisfaction.¹⁶ Doctors must behave in a dignified manner as they are not only praised for their skills but also for mannerisms. The doctor must show him/herself to be attentive, courteous neither aggressive nor insensitive as these are humanistic qualities. These are the attributes that are also reflected in the Hippocratic Oath and are important in establishing a patient centred professional care.¹⁷ Accountability is the desire to improve and hold oneself responsible for one's actions.

Compared to a prior tool developmental study on professionalism, the statements of the present tool were developed more methodically.¹⁸ That study evaluated the observations of different professional groups about

professional behaviours and described 29 circumstantial statements on elements such as respect, accountability, honesty and integrity, empathy, self-directed learning, and skill communication.¹⁸ In the current study, FGD was carried out to construct micro-scenarios on areas of ABIM framework² of professionalism and validated through modified Delphi rounds.

The present tool can be compared to a tool developed earlier.⁸ That tool was designed to assess professionalism in an Arabian context whereas this tool is for Pakistani context.

The current study can be compared to a professionalism tool development study in Taiwan which had 34 items.¹⁹ The current tool has 21 items. For the earlier study, the expert panel was not specified and the methodology for piloting was not clear.¹⁹ The current study had a 9-member panel for FGD. Furthermore, the technique of pre-cognitive testing was used to evaluate the tool. A preliminary study was also performed on 231 medical students. It is similarly comparable to the 36-item Penn State Professionalism Questionnaire, which has four parallel forms for medical students, residents, basic sciences faculty, and clinical sciences faculty.²⁰ The current tool is meant for clerkship undergraduate medical students.

For a tool, determining the content validity is essential, which if not acceptable may not be insightful of the intended group. ICV-I, S-CVI and I-CVI/Avg was calculated which was 0.94. This feature of the study is in agreement with a study that assessed the characteristics of communication in professionalism.²¹

Many of the tool development studies do not report CFA for construct validity.¹⁰ The suitability of a hypothetical design is evaluated on the basis of whether or not it meets data statistics, providing theoretical justification. These indices are squared distribution with degree of freedom (x²/df), comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square residual (SRMR) and standardised mean root square residual (SRMR).²² The basic value for fit indices, the CFI and TLI, is 0.90 and is compared with the proposed null model.²³ The current tool had CFI and TLI indices 0.921 and 0.905, respectively, signifying acceptable fit. Root mean square error of approximation (RMSEA) is absolute fit and measures overall goodness of fit model. Values ≤ 0.05 are good, values ranging 0.05-0.08 are acceptable and value between 0.08 and 0.10 are marginal. However, it was 0.089 in the present study, so statistically the tool cannot be rejected as the CFI and the TLI were within the range.²³

The current study identified that all the constructs expected to be exhibited by the medical students for the

attainment of a professional behaviour befitting a doctor were correlated. This indicates that while all the domains of professionalism may be an important means of exhibiting professionalism, all affect each other. The direct correlation emphasises the importance of all the domains of professionalism.

The tool is meant for the faculty to measure the development of professionalism in medical undergraduate students who are about to exit the medical institutions. One of the strengths of the current study is that the micro-scenario statements were developed in the local context, bearing in mind the fact that the opinion of the practising faculty can differ in how the undergraduate students should exhibit professionalism. Through feedback at the undergraduate level, this will serve to standardise the professional quality of the students' conduct and attitude toward patient care.

When the different items of this tool were examined, the micro-scenario statements were developed to assess clinical competence and acceptable professional behaviour contextually. If the participants perceived the construct in the tool as something positive and felt that it was recommended by their surroundings, they were more likely to practice it. Comparing the outcomes of the present research to those of Maat et al. reveals a good model fit. However, the earlier study was conducted on high school students with a sample size of 1887.²⁴

For assessing the reliability of a scale, the most widely used marker is Cronbach's alpha. Even though its use and analysis can be subject to lapses. According to recommendations, it is important to assess the matrix of correlations of the individual items and to look for inter-item correlations.²⁵ A maximum value of 0.90 can be accepted.²⁵ Most of the items displayed good alpha reliabilities in the current study.

The current study has limitations, like the sample size was too small to be generalised and was taken from a single university.

After the tool's first implementation, it is possible to do follow-up research to see how it affected the students' professionalism.

Conclusion

The constructed tool contained 21 items. The tool's content validity, reliability and construct validity ranged from satisfactory to good. It can be used to evaluate medical student professionalism in the local context. Using this instrument in the clinical setting, it is envisaged that the professionalism of students in the local context can be evaluated to improve patient care.

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