RESEARCH ARTICLE

An assessment of pharmacy students' empathy levels in Malaysia

Syed Shahzad Hasan[1,2*], Muneer Gohar Babar[1*], Kheng Kai Chan[1*], Syed Imran Ahmed[1*], Shahid Mitha[1*]

[1]International Medical University, Jalan Jalil Perkasa 19, Bukit Jalil, Kuala Lumpur, 57000, Malaysia
[2]School of Pharmacy, The University of Queensland, 20 Cornwell Street, Woolloongabba, 4102, Brisbane, Australia

J. Adv. Pharm. Edu. & Res.

ABSTRACT

This study examined the validity and reliability of the student version of Jefferson Scale of Empathy-Health Profession (JSE-HPS) in a sample of pharmacy students and to subsequently use JSE-HPS to assess empathy levels in first to fourth (final) year pharmacy students in public and private universities in Malaysia. The JSE-HPS was administered to 719 first to fourth (final) year pharmacy students; 313 were enrolled at a public university and 406 at a private university in Malaysia. Both descriptive and inferential statistics were performed using SPSS® version 18. The JSE-HPS demonstrated good internal consistency (Cronbach's α = 0.70). A three-factor solution emerged and included 'perspective taking', 'compassionate care' and 'standing in patient's shoes' factors, accounting for 16.4%, 16%, and 7.6% of the variance, respectively. The total mean empathy score was 83.02±8.23, the actual score ranged between 46.05 and 113.25. Overall, males and students of Malay origin were more empathic than females and students of other ethnic origins. Junior students (year one and two) were more empathic than senior students (year three and four), and public university students had significantly higher mean empathy score compared to those enrolled at a private university (83.89 versus 82.34, p=0.012). This study confirms the construct validity and internal consistency of the JSE-HPS for measuring empathy in pharmacy students. Empathy scores among students vary depending on type of university and year of study.

Keywords: Empathy, pharmacy students, public, private, university, Malaysia

INTRODUCTION

Empathy earns global attention and cited as the backbone of patient care in recent years.[1] Empathy is one of the basic "ingredients" of good physician-patient relationships.[2-3] Empathy is often considered an important attribute for professionals in the health field,[4] and is directly linked to positive clinical outcomes.[5] Like many other English words, empathy also originates from Greek word "*empatheia*", meaning 'feeling into'.[6] Empathy was first introduced in the context of patient care by Hojat (2007), as predominantly cognitive (rather than emotional) attribute that involves an understanding (rather than feeling) of experiences, concerns and perspectives of the patients, combined with a capacity to communicate this understanding.[3] Pedersen (2009) defines empathy succinctly as the "appropriate understanding of the patient".[7] Both empathy and sympathy involve sharing,[8] but the concept of empathy lies on cognitive understanding,[9] whereas sympathy involves sharing emotions with the patients.[10-11]

Numerous studies have reported a decline in empathy level among undergraduate medical students as they progress through their professional education,[12-16] as well as during their post-graduate training.[17] While this decline is commonly reproduced in studies, there are still some studies that found senior students as being significantly more empathetic than junior students.[18-20] A longitudinal study by Hojat et al (2009) found no significant change in the first 2 years of medical school but a significant decline in empathy by the third year that continued throughout the students' medical training.[15] However, a cross-sectional study in Iran did not find variations in empathy scores.[21] Some studies linked "erosions" in empathy level with the learning context, the "hidden curriculum", student difficulties in dealing with stressors in medical education, and poor role modeling in the academic and clinical workplaces.[15, 22-23]

Empathy is considered to be equally important in pharmacy education and practice.[24] Despite the fact that empathy influences adherence to medical recommendations,[25] reduces medical errors,[26]

Address for correspondence

Dr. Syed Shahzad Hasan
School of Pharmacy, The University of Queensland,
20 Cornwell Street, Woolloongabba, 4102
Brisbane, Australia
Email: shahzad.syed@uqconnect.edu.au

Access this article online
www.japer.in

and facilitates patients' satisfaction,[27] only few studies have examined empathy level in pharmacy students.[28-29] A study by Fjortoft et al (2011), found that empathy level in first year pharmacy students is comparable to those reported for medical students,[3, 29] and physicians.[10] Few studies have explored potential differences in empathy levels between students from different health disciplines using the Jefferson Scale of Empathy.[12, 28] In one study, pharmacy students were found to have the lowest empathy scores on entering the first year of training, with little change in their empathy scores on completion of the first year, as compared to nursing, dental and medical students.[12] Another study found nursing students with significantly higher levels of empathy as compared to pharmacy students.[28] Due to the significant decline in empathy level, numerous approaches have been suggested in order to improve pharmacy students' empathy such as providing communication-skills training,[28] participating in service activity,[30] attending workshop about aging,[31] and patient empathy modeling.[24]

Several instruments are available to examine empathy level such as Interpersonal Reactivity Index,[32] The Empathy Scale,[33] The Emotional Empathy Scale,[34] and Jefferson Scale of Physician Empathy (JSPE).[3, 10, 14, 19] JSPE is a well-validated, content-specific and context-relevant instrument, and exists in two versions, the physician version and the student version.[3, 10, 19] The generalization of findings within the pharmacy schools is uncertain, since the published literature is mainly restricted to medical schools or few pharmacy schools in developed countries. Few studies have been reported about the measurement properties of the Jefferson Scale of Empathy-Health Profession Students version (JSE-HPS) among pharmacy students.[29] The primary aim of this study was to examine the validity and reliability of the student version of JSE-HPS in a sample of pharmacy students and to subsequently use to assess empathy levels in first to fourth (final) year pharmacy students in a public and private university in Malaysia.

MATERIALS AND METHODS

Study design and population

This cross-sectional study was carried out among first to final-year (4th year) undergraduate pharmacy students using a well-validated, self-administered Jefferson Scale of Empathy-Health Profession Student Version (JSE-HPS). In order to gain a general picture of empathy among pharmacy students, one public (government-funded) university, University Kebangsaan Malaysia (UKM) and private university, International Medical University (IMU). One staff member from each university coordinated the distribution and collection of the anonymous questionnaires. The study was approved by the International Medical University's research and ethics committee (IMU-REC) and permission to collect data was obtained from the Dean Office of UKM.

The Jefferson Scale of Empathy - (JSPE-HPS)

A widely used, student version of Jefferson Scale of Empathy was used in this study.[14, 18-20, 29, 35-36] The scale was developed by the Jefferson Medical College, and was originally developed for medical students,[36] and was later modified to be applicable to practicing physicians and other health professionals.[10] The psychometric properties of this scale have been reported as satisfactory and the construct validity of the scale has been examined previously.[13, 29, 36] The instrument was found to be reliable (0.89 and 0.87) among medical students and residents, respectively.[36] The instrument consists of 20 items answered on 7-point Likert scale which are scored from 1 (strongly disagree) to 7 (strongly agree). Among the 20 questions, 10 negatively worded items in the scale were reverse scored.[20, 29] The total score ranges from 20-140; a higher score indicates a behavioral tendency favoring empathic engagement in patient care.[13]

Data collection

During the data collection phase, one of the researchers approached each cohort of students at IMU to provide information about the study and distribute the questionnaires to the students. Questionnaires were posted via courier service to the coordinator at UKM, together with a copy of the ethical approval letter, participant information sheets and consent forms. Convenience sampling was used to enroll all the eligible respondents during the study period. The researchers were instructed not to lead the students in their answers but to elucidate the questions when it was necessary to clarify the points. The participants were briefed by the researchers before filling up the questionnaire. The participants were approached after major teaching and learning sessions to obtain higher response rate. Informed consent was obtained from all participants. Responses from first to final year pharmacy students were collected at the beginning of the semester. The content and the teaching methods remained stable over the period in which the information was collected. Participation was voluntarily and all information gathered was kept confidential

Statistical analyses

Both descriptive and inferential data analyses were performed using SPSS® version 18 with 0.05 as the level of significance. Descriptive statistics was used to generate summary estimates on the participants by type of university and study year. Since JSPE-HPS has not been previously used in Malaysia, we conducted a Principal Component Analysis (PCA),[37-38] to examine the underlying components of JSE-HPS in pharmacy students. In order to achieve a favorable ratio (>10:1) of respondents over instruments items, a minimum of 200 participants were required to conduct factor analysis.[38] Next we performed Kaiser-Meyer-Olkin test (KMO) to measure sampling adequacy of > 0.7.[18] An Eigenvalue of > 1 was used for retaining factors in PCA.[37] However, potential bias can be introduced by the use of > 1 cut-off value,[37] and therefore we also inspected the Scree plot, as a superior factor selection method to determine the appropriate number of factors to retain for rotation.[39] Bartlett's test of sphericity was used to measure significant correlations between variables.[18] The corrected item-total score correlations were also examined. Internal consistency was analysed using Cronbach's alpha. Independent T-test and one way analyses of variance (ANOVA) including post hoc tests were computed to examine differences in empathy scores related to gender, age and ethnic groups, type of university and year of study.

RESULTS

Out of 1,011 students who were requested to participate in the study, 719 accepted and successfully completed the questionnaire, with a response rate of 71.1%. The number of students from each university who participated in the study is presented in Table 1. Of the total sample, 596 students were females (82.9%), 384 aged between 21-23 years (55.4%) and 492 were Chinese (68.4%). There was a good representation of students from each of the four years of study; 34.4% from first year, 19.6% from second year, 22.7% from third year, and 23.4% from final year. Similarly there was a good representation of students from public and private universities; 43.6% from public university, and 56.4% from private university.

Table 2 summarized the descriptive statistics of the study. The total mean empathy score for 719 students was 83.02 with the standard deviation of 8.23. The actual score ranged between 46.05 and 113.25. The Cronbach's alpha value of the scale was 0.70 which indicates acceptable, satisfactory reliability. An analysis of the individual JSE-HPS items showed that respondents tended to answer all items.

Principal Component Analysis (PCA)

The 20 items of JSE-HPS were entered into iterated PCA with varimax rotation (Kaiser Normalization).

The KMO test of sampling adequacy was applied prior to factor extraction, which resulted in overall index of 0.84, suggesting that the sample was adequate for factor analysis. The Bartlett's test for sphericity showed that the inter-correlation matrix was factorable (Chi-Square $_{(190)}$ = 2946.4, p < 0.001). Inspection of the corresponding Scree plot and identification of an 'elbow' point after which the inclusion of additional factors does not result in substantial gains in 'variance explained' yielded the existence of at least three factors, with eigenvalues more than one. Based on the plot of the eigenvalues that leveled off after the third factor, a 3-factor solution was selected. The loadings of individual items on these three factors are presented in Table 3.

The three underlying factors were labeled as "perspective taking", "compassionate care" and "standing in patient's shoes". Eleven items had the highest factor coefficients (≥0.3) on the first extracted factor, which accounted for the largest proportion of the variance before rotation (16.4%). Seven items under "compassionate care" and 2 items under "standing in patient's shoes" had significant factor loadings (>0.3), accounted for 16%, and 7.6% of the variance, respectively. The total variance explained by the three dimensions of empathy was 40%. Cronbach's alpha values were acceptable for all three identified factors, and ranged from 0.63 for factor 3 to 0.75 for factors 1 and 2.

Comparisons of empathy scores

Table 4 demonstrates the overall mean scores of JSE-HPS measures. The mean empathy score for males (mean=84.85, SD=9.07) was significantly higher than the mean empathy score for females (mean=82.64, SD=8.00), p=0.013. Participants aged between 18 to 20 years had highest empathy mean score (83.63±8.44). No significant difference in empathy scores between the age groups; similarly, post hoc testing did not demonstrate any statistically significant difference. Overall, Malay students (mean=84.51, SD=8.90) had higher mean empathy score compared to Chinese (mean=82.50, SD=7.95) and Indian (mean=82.02, SD=7.70) students. Students in public university had significantly higher mean empathy score compared to students in private university (83.89 versus 82.34, p=0.012). Students in the second year had higher mean empathy score compared to students in other study years, significantly higher than fourth year students (p<0.001). Students in the fourth year of study had lower empathy scores compared to students in other study years.

After stratification by type of university, we found that female students enrolled at public university (84.03±8.23) had the highest mean empathy score compared to females (82.17±8.22) enrolled at private university and male students enrolled at both, public and private universities (Table 5). Participants aged 24 years and older had highest empathy mean score in public university (84.51±6.97), but had lowest empathy mean score in private university (81.99±9.45). Students in the second year of study had the highest mean empathy score compared to students in other study years.

DISCUSSION

The main objectives of this study were to describe and summarize the psychometric properties of JSE-HPS, including its internal consistency and factor structure and to assess the empathy level among pharmacy students of public and private universities in Malaysia. The mean empathy score of 83 in this study is much lower than the average empathy scores of 103 – 114 reported by previous studies among medical,[16, 19, 39-41] and pharmacy students.[29] The findings suggest that empathy level among pharmacy students in Malaysia is lower compared to medical and pharmacy students in the US, Korea, Japan, South Africa, and Iran.[16, 19, 21, 29, 39-41] The total variance explained by the three dimensions of empathy instrument (40%) is similar to the ones reported by the previous studies among medical

students with S-version,[21, 39] and pharmacy students with HPS version.[29]

In our factor analysis, there were three underlying principal factors identified in the JSE-HPS instrument, namely "perspective taking", "compassionate care", and "standing in patient's shoes". Perspective taking describes the understanding of patient's concerns while compassionate care was labeled to explain the association of feeling and emotion with empathy understanding,[29] and is the core ingredient of empathy, while compassionate care is considered as an important aspect for healthcare provider-patient relationship.[10, 19, 29, 35, 42] "Standing in patient's shoes" indicates an ability to comprehend and reflect patients' concerns.[3, 6] These factors are similar to the prominent ones reported in previous studies, supporting the construct validity of this instrument for pharmacy students.[10, 21, 39, 42] However a study conducted in a pharmacy school in the United States (US) reported only two underlying components,[29] namely perspective taking and compassionate care. The reason being the authors did not follow Kaiser's suggestion to retain factors with an eigenvalue greater than one,[43] instead followed Velicer and Fava method, which suggests a minimum of 3 items per factor for a stable structure.[44]

Factor analysis does not reveal a value greater than 0.35 for items 18 and 19 (Table 2) in the instrument. Similarly the study among South African and Japanese medical students, and a study among pharmacy students in the US also revealed factor loading of less than 0.35 for items 18 and 19.[19, 39, 45] From this finding, it is evident that students had some difficulty with these two items. The remaining 18 items were answered consistently by the students, demonstrating a strong presence of empathy. Boyle et al suggested that item 18 has the most relevance to sympathy rather than empathy.[20] Similarly Looi suggested that item 19 has the most relevance to examine (1) the ability to render care and not necessarily empathy or, (2) the perception of empathy by physicians, patients or the public.[46] Despite these findings, there was a strong internal consistency for the JSE-HPS in this study as measured by Cronbach's alpha coefficient. However, our Cronbach's Alpha value of 0.70 is lower than those reported by the studies conducted elsewhere.[18, 29, 36]

Consistent with previous study by Grace et al,[47] our results indicated that male students obtained a higher total mean empathy score than female students. However after stratification by type of university, we found that female students enrolled at public university were more empathic than men.[10, 12-13, 18-20, 24, 28-29, 35] Previous studies argued that empathy is a feminine trait and that females are more receptive to emotional signals.[10, 20] Some explained this finding with help of evolutionary theory of parental as women tend to display more care-giving attitudes compared to men.[10, 19] No significant difference between students in different age groups was found and, as such, the results overall show the extent of empathy to be more similar than different across the various age groups.

Malaysia is a multi-racial country with three distinct ethnic groups. Malays are the dominant ethnic group, followed by Chinese and Indians in Malaysia. Malay students had higher empathy level compared to Chinese and Indian students in our study. This difference in empathy level could be a result of their different cultural values, religious beliefs or traditions.[39] It has been reported earlier that cultural differences, ethnicity, religious beliefs, and sex stereotyping may lead to empathy score disparity,[19, 42] and can also influence empathic engagement during clinical encounters.[39] Interestingly, public university students were more empathic than private university students in our study. There could be several reasons to explain this finding. For instance public universities in Malaysia have their own teaching hospitals which allowed their students to have more frequent visits to hospitals and patients, resulting in improvement of empathy level. Nevertheless, more researches should be carried out

to identify reasons as available literature is not adequate particularly in developing countries.

Several studies have investigated potential differences in empathy between students from different study year; however, there are still significant gaps in the literature.[13, 24, 28] Students in the second year of study had higher mean empathy score compared to students in other study years, whereas students in the fourth year had lowest empathy score in our study. Similar results can be seen in medical and dental students as well.[13, 24] This decline in student empathy appears to be a common phenomenon emerging in the literature.[14, 16, 20, 35] As empathy is a core "ingredient" of good health care professional-patient relationship,[2, 3] improving students' empathy is one of the important tasks of medical education.[42] However, empathy is generally only taught in a context where it is not formally evaluated and is rarely integrated into clinical teaching and learning.[4] Our findings of junior students being more empathic than senior students could be partially explained by the fact that participating universities covered certain aspects of empathy in year one and year two. As time progress, they tend to forget and focus on other subjects,[19] or students become 'hardened' or develop an emotional coping mechanism that distances themselves from the patients they work with once they gain clinical experience.[4] Idealism or eagerness to show positive attributes of healthcare provider embraced by junior students erode as they progress through their professional education.[12, 18] Other reasons include stressful workload, limited bedside interactions with patients and environmental factors.[13, 42]

LIMITATIONS OF THE STUDY

This study had several limitations that may affect its generalization. This study was completed early in the academic year, and students' responses may be based on learning experiences of the previous years. This study did not explore whether clinical experience or placements for the complete course had an overall impact on students' empathy. Those students who did volunteer to participate may themselves bias the results. Our assessment of empathy level was based on self-report measures of a validated instrument, and not on the actual behaviours. Lastly, our study was cross-sectional in design which did not allow for a baseline or tracking changes in empathy level across the year levels of the program.

CONCLUSION

The scale appears to be reliable based on good internal consistency, supporting the construct validity of this instrument for pharmacy students. The empathy level of students who participated in this study was much lower to the average empathy level reported by previous studies among medical and pharmacy students. Overall males and students of Malay origin were more empathic than females and students of other ethnic origins. Junior students (year one and two) were more empathic than senior students (year three and four). There was a significant difference recorded between students enrolled at public and private university. Findings should be confirmed in more diverse pharmacy student populations and to explore changes in empathy level in students, longitudinal studies are recommended.

ACKNOWLEDGEMENTS

We wish to record our appreciation for the administrative assistance of the International Medical University Postgraduate Office and our gratitude to the management and students of participated institutions.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

Table 1: Socio-demographics of pharmacy students, by type of university (N=719)

Variables	Overall N (%)	Public Uni N (%)	Private Uni N (%)	Association (p-value)
Gender				
Male	123 (17.10)	53 (7.40)	70 (9.70)	0.913
Female	596 (82.90)	260 (36.20)	336 (46.70)	
Age groups				
18-20	318 (44.20)	161 (22.40)	157 (21.80)	0.001
21-23	384 (53.40)	152 (21.10)	232 (32.30)	
24-26	17 (2.40)	0 (0.00)	17 (2.40)	
Ethnic groups				
Malay	176 (24.50)	160 (22.30)	16 (2.20)	0.001
Chinese	492 (68.40)	145 (20.20)	347 (48.30)	
Indian	36 (5.00)	5 (0.70)	31 (4.30)	
Others	15 (2.10)	3 (0.40)	12 (1.70)	
Year of study				
Year 1	247 (34.40)	98 (13.60)	149 (20.70)	0.421
Year 2	141 (19.60)	67 (9.30)	74 (10.30)	
Year 3	163 (22.70)	75 (10.40)	88 (12.20)	
Year 4	168 (23.40)	73 (10.20)	95 (13.20)	

Uni = University

Table 2: Descriptive Statistic for the JSE-HPS in pharmacy students (N = 719)

Items	
Score, Mean (SD)	83.02 (8.23)
Score, Median	82.35
25th Percentile Score	77.35
50th Percentile (Median) Score	82.35
75th Percentile Score	87.35
Possible Score Range	20-140
Actual Score Range	46.05 – 113.25
Alpha Reliability Coefficient	0.70

Note: JSE-HPS = Jefferson Scale of Empathy-Healthcare provider Student Version

Table 3: Summary of Factor Analysis and corrected item-total score correlations of the JSPE-HPS administered to 719 pharmacy students

Items (sequence in scale)	Rotated Factors Coefficients		
	Perspective taking	Compassionate care	Standing in patient's shoes
1) Health care providers should try to think like their patients in order to render better care. (**Q17**)	**0.641**	0.014	-0.037
2) Health care providers' understanding of the emotional status of their patients, as well as that of their families is one important component of the health care provider – patient relationship. (**Q16**)	**0.628**	-0.294	-0.047
3) Health care providers should try to stand in their patients' shoes when providing care to them. (**Q9**)	**0.606**	-0.187	-0.059
4) Patients value a health care provider's understanding of their feelings which is therapeutic in its own right. (**Q10**)	**0.601**	-0.098	0.095
5) I believe that empathy is an important factor in patients' treatment. (**Q20**)	**0.589**	-0.034	-0.172
6) Understanding body language is as important as verbal communication in health care provider - patient relationships (**Q4**)	**0.541**	-0.327	0.130
7) Health care providers should try to understand what is going on in their patients' minds by paying attention to their non-verbal cues and body language. (**Q13**)	**0.528**	-0.308	0.057
8) Patients feel better when their health care provider understands their feelings. (**Q2**)	**0.491**	-0.241	0.072
9) A health care provider's sense of humour contributes to a better clinical outcome. (**Q5**)	**0.483**	-0.172	0.136
10) Empathy is a therapeutic skill without which a health care provider's success is limited. (**Q15**)	**0.394**	0.173	-0.022
11) Health care providers should not allow themselves to be influenced by strong personal bonds between their patients and their family members. (**Q18**)	**0.309**	0.090	0.183
12) Asking patients about what is happening in their personal lives is not helpful in understanding their physical complaints. (**Q12**)	-0.108	**0.712**	0.035
13) I believe that emotion has no place in the treatment of medical illness. (**Q14**)	-0.125	**0.708**	0.052
14) Attention to patients' emotions is not important in patient interview. (**Q7**)	-0.157	**0.692**	0.076
15) Attentiveness to patients' personal experiences does not influence treatment outcomes. (**Q8**)	-0.110	**0.677**	-0.074
16) Patients' illnesses can be cured only by targeted treatment; therefore, health care providers' emotional ties with their patients do not have a significant influence in treatment outcomes. (**Q11**)	-0.090	**0.627**	0.165
17) Health care providers' understanding of their patients' feelings and the feelings of their patients' families does not influence treatment outcomes. (**Q1**)	0.007	**0.523**	0.050
18) I do not enjoy reading non-medical literature or the arts. (**Q19**)	-0.132	**0.323**	0.226
19) Because people are different, it is difficult to see things from patients' perspectives. (**Q6**)	0.093	0.074	**0.815**
20) It is difficult for a health care provider to view things from patients' perspectives. (**Q3**)	0.044	0.131	**0.803**
Cronbach's alpha coefficients	**0.75**	**0.75**	**0.63**
Percent of variance (%)	**16.4**	**16.0**	**7.6**

Table 4: Overall mean scores of JSPE-HPS measures (N = 719)

Variables	N	Mean	SD	P-value
Gender				
Male	123	84.85	9.07	0.013
Female	596	82.64	8.00	
Age groups				
18-20	318	83.63	8.44	> 0.05
21-23	384	82.56	7.99	
24-26	17	81.99	9.45	
Ethnic groups				
Malay	176	84.51	8.90	Malay vs Chinese = 0.028
Chinese	492	82.50	7.95	
Indian	36	82.02	7.70	
Others	15	84.78	8.82	
Type of university				
Public	313	83.89	8.21	0.012
Private	406	82.34	8.20	
Year of study				
Year 1	247	82.99	8.15	Year 2 vs Year 4 = 0.001
Year 2	141	85.00	9.18	
Year 3	163	82.85	7.52	
Year 4	168	81.55	7.92	

Table 5: Mean scores of JSPE-HPS measures, by public and private universities (N = 719)

Variables	Public Uni Mean score (SD)	Private Uni Mean score (SD)
Gender		
Male	83.27 (8.12)	83.20 (8.09)
Female	84.03 (8.23)	82.17 (8.22)
Age groups		
18-20	82.44 (7.36)	82.76 (8.32)
21-23	84.34 (8.54)	82.09 (8.04)
24-26	84.51 (6.97)	81.99 (9.45)
Ethnic groups		
Malay	87.05 (9.50)	84.74 (9.06)
Chinese	83.56 (8.12)	82.16 (8.15)
Indian	84.20 (6.68)	82.46 (8.03)
Others	88.40 (11.80)	84.07 (9.27)
Year of study		
Year 1	82.45 (7.04)	83.15 (8.83)
Year 2	85.89 (8.78)	83.15 (8.40)
Year 3	83.89 (8.44)	81.67 (6.72)
Year 4	83.18 (7.99)	81.07 (8.16)

REFERENCES

1. Spiro H. Commentary: The practice of empathy. Acad Med 2009; 84(9):1177-1179.
2. Reiss H. Empathy in Medicine: A Neurological Perspective. J Am Med Assoc. 2010; 304(14): 1604-1605.
3. Hojat M. Empathy in Patient Care: Antecedents, Development, Measurement, and Outcomes. New York, NY: Springer; 2007.
4. Boyle MJ, Williams B, Brown T, Molly A, McKenna L, Molly L, Lewis B. Level of empathy in undergraduate health science students. Int J Med Educ. 2010; 1(1).
5. Hojat M, Louis DZ, Markham FW, Wender R, Rabinowitz C, Gonnella JS. Physicians' empathy and clinical outcomes for diabetic patients. Acad Med. 2011;86(3):359-364.
6. Kohut H. Analysis of the Self: A Systematic Approach to the Psychoanalytic Treatment of Narcissistic Personality Disorders. International Universities Press; 1971.
7. Pedersen R. Empirical research on empathy in medicine–A critical review. Patient Educ Couns. 2009, 76:307-322.

8. Hemmerdinger JM, Stoddart SD, Lilford RJ. A systemic review of tests of empathy in medicine. BMC Med Educ. 2007; 7:24.
9. Lillo MD, Cicchetti A, Scalzo AL, Taroni F, Hojat M. Jefferson Scale of Physician Empathy: Preliminary psychometrics and group comparisons in Italian physicians. Acad Med. 2009; 84:1198-1202.
10. Hojat M, Gonnella JS, Nasca TJ, Mangione S, Vergare M, Magee M. Physician empathy: Definition, measurement, and relationship to gender and specialty. Am J Psych. 2002; 159: 1563-1569.
11. Nightingale SD, Yarnold PR, Greenberg MS. Sympathy, empathy, and physician resource utilization. J Gen Intern Med. 1991; 6: 420-423.
12. Nunes P, Williams S, Sa B, Stevenson K. A study of empathy decline in students from five health disciplines during their first year of training. Int J Med Educ. 2011; 2: 12-17.
13. Chen D, Lew R, Hershman W, Orlander J. A Cross-sectional Measurement of Medical Student Empathy. J Gen Intern Med. 2007; 22(10): 1434-1438.
14. Hojat MR, Mangione S, Nasca TJ, Rattner S, Erbmann JB, Gonnella JS, Magee M. An empirical study of decline in empathy in medical school. Med Educ. 2004; 38:934-941.
15. Hojat M, Vergare M, Maxwell K, Brainard G, Herrine S, Isenberg G, Veloski J, Gonnella J. The devil is in the third year: a longitudinal study of erosion of empathy in medical school. Acad Med. 2009, 84(9):1182-1191.
16. Chen D, Lew R, Hershman W, Orlander J. A Cross-sectional Measurement of Medical Student Empathy. J Gen Intern Med. 2007, 22(10):1434-8.
17. Hojat M, Gonnella J, Mangione S, Nasca T, Magee M. Physician empathy in medical education and practice: experience with The Jefferson Scale of Physician Empathy. Sem Integr Med. 2003, 1(1):25-41.
18. Magalhaes E, Salgueira AP, Costa P, Costa MJ. Empathy in senior year and first year medical students: A cross-sectional study. BMC Med Educ. 2011; 11:52.
19. Kataoka HU, Koide N, Ochi K, Hojat MR, Gonnella JS. Measurement of Empathy among Japanese Medical Students: Psychometrics and Score Differences by Gender and Level of Medical Education. Acad Med. 2009; 84:1192-1197.
20. Boyle MJ, Williams B, Brown T, Molly A, McKenna L, Molly L, Lewis B. Level of empathy in undergraduate health science students. Int J Med Educ. 2010; 1(1).
21. Rahimi-madiseh M, Tavakol M, Dennick R, Nasiri J. Empathy in Iranian medical students: a preliminary psychometric analysis and differences by gender and year of medical school. Med Teach 2010, 32:471-478.
22. Spencer J. Decline in empathy in medical education: how can we stop the rot? Editorials. Med Educ. 2004, 38:916-920.
23. Thomas MR, Dyrbye LN, Huntington JL, Lawson KL, Novotny PJ, Sloan JA, Shanafelt TD. How do distress and well-being relate to medical student empathy? A multicenter study. J Gen Intern Med. 2007, 22(2):177-83.
24. Chen TJ, LaLopa J, Dang D. Impact of Patient Empathy Modeling on Pharmacy Students Caring for the Underserved. Am J Pharm Educ. 2008; 72:40.
25. Vermeire E, Hearnshaw H, Van Royen P, Denekens J. Patient adherence to treatment: three decades of research. A comprehensive review. J Clin Pharm Ther. 1998; 26(5) : 31-342.
26. Stepien KA, Baernstein A. Educating for empathy: a review. J Gen Intern Med. 2006; 21(5):524-539.
27. Kim S, Kaplowitz S, Johnston MV. The effects of physician empathy on patient satisfaction and compliance. Eval Health Professions. 2004; 27(3): 237-251.
28. Wilson SE, Prescott J, Becket G. Empathy Levels in First and Third Year Students in Health and Non-health Disciplines. Am J Pharm Educ. 2012; 76 (2).
29. Fjortoft N, Van Winkle LJ, Hojat MR. Measuring Empathy in Pharmacy Students. Am J Pharm Educ. 2011; 75(6).
30. Brazeau CML, Schroeder R, Rovi S, Boyd L. Relationship between Medical Student Service and Empathy. Acad Med. 2011; 86(10):42-45.
31. Van Winkle LJ, Fjortoft N, Hojat MR. Impact of a Workshop About Aging on the Empathy Scores of Pharmacy and Medical Students. Am J Pharm Educ.2012; 76(1).
32. Davis MH. Measuring individual differences in empathy: evidence for a multidimensional approach. J Pers Sco Psychol. 1983; 44(1):113-126.
33. Hogan R. Development of an empathy scale. J Consult Clin Psychol. 1969; 33: 307-316.

34. Mehrabian A, Epstein NA. A Measure of Emotional Empathy. J Pers. 1972; 40(4):525-543.
35. Sherman JJ, Cramer A. Measurement of Changes in Empathy during Dental School. J Dent Educ. 2005; 69(3): 338-345.
36. Hojat MR, Mangione S, Nasca TJ, Cohen MJM, Gonnella JS, Erdmann JB, et al. The Jefferson Scale of Empathy: development of preliminary psychometric data. Educ Psychol Meas. 2001; 61: 349-365.
37. Costello AB, Osborne J. Best practices in exploratory factor analysis: four recommendations for getting most from your analysis. Pract Assess Res Eval. 2005: 10: 7.
38. Bentler PM, Yuan KH. Test of linear trend in eigenvalues of a covariance matrix with application to data analysis. Br J Math Stat Psychol. 1996: 49: 299–312.
39. Vallabh K. Psychometrics of the student version of the Jefferson Scale of Physician Empathy (JSPE-S) in final-year medical students in Johannesburg in 2008. S African J Bioethics Law 2001;4(2):1.
40. Roh M, Hahm B, Lee D, Suh D. Evaluation of Empathy Among Korean Medical Students: A Cross-sectional Study Using the Korean Version of the Jefferson Scale of Physician Empathy. Teach Learn Med. 2010, 22(3): 167-171.
41. Mangione S, Kane GC, Caruso JW, et al. Assessment of empathy in different years of internal medicine training. Med Teach 2002;24(4):370-373.
42. Gonullu I, Oztuna D. A Turkish Adaptation of the Student Version of the Jefferson Scale of Physician Empathy. Marmara Med J. 2012; 25: 87-92.
43. Kaiser H. The application of electronic computer factor analysis. Educ Psychol Meas. 1960;20(1):141-145.
44. Velicer WF, Fava JL. Effects of variable and subject sampling on factor pattern recovery. Psychol Methods. 1998;3(2): 231-251.
45. Kane GC, Gotto JL, Mangione S, West S, Hojat M. Jefferson Scale of Patient's Perception of Physician Empathy: preliminary psychometric data. Croat Med J. 2007;48:81-86.
46. Looi JCL. Empathy and competence. Med J Aust. 2008;188(7):414-416.
47. Grace Rose, Norman Frankel, Willard Kerr. Empathic and Socio-metric Status among Young Teenagers. J Gen Psycho. 1956; 89: 277-278.

How to cite this article: Syed Shahzad Hasan[1,2*], Muneer Gohar Babar[1*], Kheng Kai Chan[1*], Syed Imran Ahmed[1*], Shahid Mitha[1*]; An assessment of pharmacy students' empathy levels in Malaysia; J. Adv. Pharm. Edu. & Res. 2013: 3(4): 531-540.

Source of Support: Nil, **Conflict of Interest:** Nil