ORIGINAL ARTICLE

Empathy amongst doctors: an observational study

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ABSTRACT

Introduction: Empathy is the ability to put oneself in another's emotional space and experience what they feel. Either due to lack of experience or mundaness of practice, a state of empathy can become premised, and individuals become indifferent or detached. We aimed to explore the level of empathy among doctors at different levels of practice, age, gender, academics, non-academics and discipline.

Materials and Methods: This was a cross-sectional, observational study on empathy among doctors practicing in the private, public hospital sector and faculty at a medical university in Negeri Sembilan, Malaysia that utilised convenience sampling for data collection. The Toronto Empathy Questionnaire (TEQ) a validated tool was used to measure empathy.

Results: The questionnaire was completed by 127 doctors, 52% (n= 66) were males and 48% (n=61) females. There was no significant difference in empathy between male (M=46.44; SD=6.01) and female (M=45.05, SD=5.69) doctors; t (123) = 1.326, *p*=0.187. Pearson correlation coefficient was computed to assess the linear relationship between age and empathy and revealed no correlation between the two variables: r (125) =0.15, *p*=0.099. Medical-based doctors (M= 47.47, SD=5.98) demonstrated more empathy than surgical-based (M=44.32, SD=5.41); t (123) =-3.09, *p*=0.002. Those already specialised in their fields (M=47.38, SD=4.57) had more empathy than those who had not (M= 44.36, SD=6.52); t (123) =-2.96, p = 0.004. Doctors in the university (M=47.97, SD=4.31) tended to have more empathy than those in the public hospitals (M= 44.63, SD=6.27); t (117) =-2.91, *p*=0.004. Academicians had more empathy than non-academicians but there was no difference between those who were in clinical practice and not.

Conclusion: Our findings indicate that medical-based doctors demonstrate more empathy than surgical-based doctors, and there appeared to be no correlation between age and empathy. However, clinical experience and growth within the specialty seem to improve empathy. Doctors teaching in the university setting demonstrated more empathy than those practicing in the hospital setting.

Inclusion of empathy-related sessions in the undergraduate and post-graduate curriculum could bridge the gap in empathy noted with age, discipline, and experience in practice. Further research on empathy among doctors using a wider population in Malaysia and a TEQ questionnaire validated to the Asian population would provide better insight regarding this area of medical practice. Future research on outcomes of inclusion of programmes targeted at improving empathy to create awareness during practice would support patient satisfaction and safety.

KEYWORDS:
Empathy, medical education, gender, medical disciplines, age

INTRODUCTION

Empathy is a subjective feeling that is often underused and misunderstood yet important among professionals who work in the healthcare industry The origin of the word *empathy* dates back to the 1880s, when German psychologist Theodore Lipps coined the term "einfuhlung" (literally, "in-feeling") to describe the emotional appreciation of another's feelings. Empathy has further been described as the process of understanding a person's subjective experience by vicariously sharing that experience while maintaining an observant stance.[1]

Edward Bradford Titchener, a British Psychologist is credited for translating the German term from "Einfühlung" (or "feeling into") to Empathy in 1909.[2,3] Empathy, in layman's term, is described as the ability to "put oneself into another person's shoes" or feel another person's affect or emotional experience. Empathy does not have a precise definition and is understood differently by people. Keen stated that empathy means to recognise others' feelings the causes of those feelings, and to be able to participate in the emotional experience of an individual without becoming part of it.[4] Halpern has a slightly different description for the term empathy as being seen as a skill learned or an attitude of life, which can be used to try to come into contact with someone, to communicate and understand others' experiences or feelings.[5]

Empathy is partly underpinned by the Social Learning Theory (SLT) introduced in the 1960s by Albert Bandura that developed into Social Cognitive Theory (SCT) in the eighties, which propounds that learning occurs in a social context when there is a continued complementary relationship/ exchange between an individual, environment and behaviour.[6]

The level of empathy expressed varies across different professions, especially between the blue- and white-collar

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professions. One research identified general physicians to score higher on empathy, warmness and genuineness compared to other nonmedical professions such as lawyers and clergymen.[6,7] Expressing empathy in the health care field is very important to ensure patient satisfaction and positive health outcome. However, it has come to attention that the level of expressed empathy varies across different professions in the medical field perhaps even from undergraduate medical period.[8,9] There is also scarcity of research about empathy among practicing doctors in the local context compared to the same among medical students. There is a need to identify the time and areas where changes can be implemented to improve empathy among not just junior doctors but doctors at large. Hence, identifying level of empathy as a start towards something more defined would be important.

Literature search resulted in more research regarding empathy and medical undergraduates than those of the practicing doctors or post-graduates in Malaysia. This study aims to explore the level of empathy expressed by doctors at different levels of practice, age, gender, academic stand, level of practice and state of clinical practice. Several tools are available to measure the level of empathy like Jefferson Scale of Physician Empathy (JSPE), Toronto Empathy Questionnaire (TEQ), Therapist Empathy Scale (TES) and many more. However, a recent systematic literature review and meta-analysis of the past 10 years on assessment instruments and psychometric quality did not find a gold standard questionnaire to assess the level of empathy.[10] We chose to use the TEQ with permission as it had the items we were interested in and easy to complete in a short time, considering the busy schedules of the clinicians that participated in the research.

MATERIALS AND METHODS

This is a cross-sectional, observational study involving doctors in the private sector, public hospital and a medical university in Seremban, Negeri Sembilan, Malaysia. Convenience sampling method was employed to collect data over 4 months from February to May 2017. Questionnaires were distributed directly and through peers to doctors in these respective places.

The TEQ, available online, measures an individual's emotional ability to understand and respond to others. It was originally developed in English and takes 5–7 minutes to complete. The TEQ which is a self-report containing 16 items, each rated on a 5-point Likert scale from 'never' to 'often' was used as our measuring tool for empathy. Positively worded item [1, 3, 5, 6, 8, 9, 13 and 16] responses are scored as Never = 0; Rarely = 1; Sometimes = 2; Often= 3; Always = 4; so higher the scores the higher the level of empathy. Negatively worded items [2, 4, 7, 10 - 12, 14 – 15] are reversed and scored to get the same results. Higher scores indicate a higher level of empathy.[11]

This questionnaire was developed by reviewing other empathy instruments and found to be positively correlated with measures of social coding and other empathy measures. It has been proven to have high internal consistency, construct validity and test–retest reliability through the correlation with other tools of empathy like Empathy Quotient and Autism Quotient; the internal consistency, α=0.85 to α=0.87 and high test–retest reliability, r=0.81, p<0.001.[11]

The questionnaire was given out to doctors practicing in the public hospitals, private hospital, practicing as well as teaching and those who had stopped clinical work and were only involved in teaching. Doctors from all levels of practice were invited to participate in the study and ranged from house officers to specialists.

All participants were grouped; (1) by age, (2) discipline (surgical-based and medical-based), (3) state of clinical practice (clinically active and clinically inactive), (4) level of practice (broadly classified as specialists and non-specialists) and (5) academic stand (academician and non-academician) (6) Practice sector (private, public and university). We identified academicians as those who spent all or almost all their time teaching. Doctors who were clinically active and practicing in the hospitals were identified as non-academicians.

The disciplines categorised under Medical-based were Internal medicine, Radiology, Family Medicine, Psychiatry, Pediatrics, Emergency Medicine, Rehabilitation Medicine, Anesthesia & Critical Care and Dermatology and Surgical-based were Surgery, otorhinolaryngology, Ophthalmology, Obstetrics & Gynecology and Orthopedics. House officers and medical officers were also categorised accordingly depending on the departments they were attached to at the time of data collection.

The questionnaires were handed out to the participants personally and were collected. For those who did not respond to emails immediately, the questionnaires were sent to their place of practice and given time to revert.

Inclusion Criteria

Doctors working in the public and private hospital as well as those working in a university in Seremban, Negeri Sembilan, Malaysia who completed the TEQ questionnaire were included in the study.

Exclusion Criteria

Healthcare workers like nurses, medical assistants and others were excluded from the study.

Data Analysis

All personal information collected were kept safe and confidential by the principal investigator in a password safe folder. Data were collected and analysed using IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp. A test of normality was carried out on the distribution of the TEQ scores, and independent t-test and Pearson's Correlation Coefficient were used to analyse the data. The result was considered significant if the p value was found to be less than 0.05.

Ethical Approval

The proposal was submitted, and approval was obtained from the medical research and ethical committee, Ministry of Health; NMRR-16-1376-31345-(IIR).

RESULTS

The TEQ was completed by 127 doctors from the university(n=37), public (n=84) and private sector (n=6), of whom 52% (n= 66) were males and 48% (n=61) females. A test for normality of data distribution using the Shapiro-Wilk test was performed (W=0.986, *p*=0.217) and an independent t-test was conducted to analyse the empathy scores of the participants. However, there was missing information in some of the questionnaires accounting for differences in the total numbers (n=125 and n=124) for some of the sub-groups, respectively. Mean TEQ scores for doctors from private, public hospital and university were 48.17 (SD=4.07), 44.63 (SD=6.27) and 47.97(SD=4.31) respectively. Empathy was compared between the participants from university and public hospitals (n=119) as the number of participants from private hospitals was small (n=6).

Significant differences were noted in the sub-groups that were discipline-based, at level of practice, practice sector and academic stand. No statistically significant difference was identified for state of clinical practice and gender (Table I).

The TEQ consisted of 16 items and the reliability analysis of the items for this research resulted in Cronbach's Alpha, α=0.727. The overall mean of the total TEQ score for the doctors was 45.8 (SD=5.87), out of a maximum score of 64. The descriptive analysis of the scores for each item can be found in Table II.

The mean values for age appear to show that empathy increases with age but Pearson correlation coefficient computed to assess the linear relationship between age and empathy revealed no statistically significant correlation between the two variables: r (125) =0.15, *p*=0.099.

DISCUSSION

General Observation

Studies have looked at empathy and gender differences, various disciplines, age, race and changes with time. There is evidence of a decline in empathy that begins during the clinical years of medical school, which continues throughout residency training.[8,9,12-16] However, the findings are not consistent, as some report no change and even improvement in empathy as students progress through medical school.[17-20] Perhaps the different tests used as measurement tool and other factors like culture, environment, and curriculum strategies may be influencing factors. We did not compare scores from our research with other studies as the screening tools were not the same.

Stratta et al explored empathy in medical students and qualified doctors and participants identified that there was an empathy decline in themselves and their colleagues.[21] Stressful working environments, the prioritisation of patients' physical rather than psychological well-being, and the attitudes of senior colleagues were all suggested as possible causes. The Francis Report mentioned several reasons for the declining empathy among the healthcare personnel, namely compassion fatigue, overwork, excess demand, lack of continuity and failure to see the patient as a fellow human being.[22-23] It is reasoned that empathy is a skill that if included in the undergraduate and post-graduate curricula may mitigate the decline in empathy among doctors.[8,21]

We acknowledge that there are limitations as the TEQ was designed based on the western culture, primarily focuses on cognitive empathy without addressing the affective empathy and does not include the other nuances in empathy like intensity as well as appropriateness. However, another similar study conducted locally on empathy among medical students found the TEQ instrument valid and reliable for local Malaysian context.[16]

Age and Gender Differences

In our study, the mean values for age appeared to show that empathy increases with age though the Pearson's Correlation showed that age's effect on empathy was not significant. Contrary to our finding, increasing age has been shown to have a positive correlation with level of empathy both among non-surgical and surgical specialists.[24] Beadle et al in their review paper on impact of ageing on empathy had mixed findings in the literature on empathy and ageing, which they suggested could be related to methods used to study empathy. The inconsistent results they suggested could be due to inconsistent sample sizes, unequal numbers of men and women, and reduced capacity to generalise across cultures.[25] Our results could possibly be influenced by these factors as well, as our study population was only from one state in the country.

The majority of research reported that females, whether medical students, junior or senior doctors, were considerably more empathetic than their male counterparts.[8,12-15,26-33] Being female, married, and having children appeared related to higher empathy. Researchers suggest that females have more oxytocin, which promote emotional empathy while males have more testosterone, that inhibit empathy, while others explain the observed gender differences as being largely due to cultural expectations about gender roles.[34-36] Christov et al identified that there are social, contextual and cultural influences that influence the observed behavioural and neural differences in affective empathy between males and females. They also suggest that males vary more than females in some aspects of emotional processing and altruistic behaviour, and they appear to be less empathetic because of their higher discrimination in targeting helping behaviour whereas females appear more indiscriminately empathetic.[35]

Contrary to other research findings, our results did not reveal significant gender differences which were similar to some research.[24,37-38] Our findings may be as a result of a smaller sample size or that both female specialists and female non-specialists were grouped together for analysis. Specialists generally have been found to have higher empathy scores than non-specialists.[39]

Within the male population, using the Jefferson Scale of Physician Empathy (JSPE), it was found that male psychiatrists scored significantly higher than male surgeons.[40] However, this could be that male psychiatrist are non-surgical and research already show that non-surgical clinicians have more empathy than their surgical colleagues.

Table I: Comparison of differences in TEQ scores in the various sub-groups (discipline-based, state of clinical practise, level of practise, academic stand, practice sector and gender)

Groups	Total respondents	Mean TEQ score	Standard deviation	t	df	*p* value
Surgical based (n= 68)	125	44.32	5.410	-3.090	123	0.002
Medical based (n=57)		47.47	5.982			
Specialist (n=58)	125	47.38	125	-2.958	123	0.004
Non-specialist (n=67		44.36	6.515			
Clinically active (n=114)	125	45.75	5.982	0.088	123	0.930
Inactive clinically (n=11)		45.91	4.784			
Academicians (n=42)	124	47.55	4.522	-2.494	122	0.014
Non-academicians (n=82)		44.82	6.307			
University (n= 36)	119	47.97	4.306	2.914	117	0.004
Public Hospital (n=83)		44.63	6.270			
Female (n= 61)	127	45.05	5.69	1.326	123	0.187
Male (n= 66)		46.44	6.01			

Table II: Descriptive statistics of the TEQ items in this study

Items		N	Minimum	Maximum	Mean	Std. Deviation
1.	When someone else feels excited, I tend to get excited too	127	0	4	2.22	0.796
2.	I remain unaffected when someone close to me is happy	127	0	4	2.36	0.861
3.	It upsets me to see someone being treated disrespectfully.	127	0	4	3.40	0.789
4.	I remain unaffected when someone close to me is happy	127	0	4	2.91	0.836
5.	I enjoy making other people feel better	127	0	4	3.36	0.742
6.	I have tender, concerned feelings for people less fortunate than me	127	1	4	3.16	0.717
7.	When a friend starts to talk about his/her problems, I try to steer the conversation towards something else	127	0	4	2.91	0.801
8.	I can tell when others are sad even when they do not say anything	127	1	4	2.66	0.737
9.	I find that I am "in tune" with other people's moods	127	0	5	2.23	0.789
10.	I do not feel sympathy for people who cause their own serious illnesses	126	0	4	2.44	0.976
11.	I become irritated when someone cries	127	0	4	3.04	0.877
12.	I am not really interested in how other people feel	126	0	4	3.05	0.818
13.	I get a strong urge to help when I see someone who is upset	127	0	4	2.88	0.860
14.	When I see someone being treated unfairly, I do not feel very much pity for them	127	0	4	3.21	0.860
15.	I find it silly for people to cry out of happiness	127	0	4	3.09	0.877
16.	When I see someone being taken advantage of, I feel kind of protective towards him\her	127	0	4	2.81	0.843
	Valid N	125				

*Questions 2, 4, 7, 10, 11,12, 14 and 15 were recoded to reverse.

Following on, within specialty, female physicians had higher empathy scores than male physicians.[32]

State of Specialisation and Empathy

There is evidence that there is a negative correlation between empathy and burnout.[39,41] Our research showed that specialists demonstrated significantly more empathy than non-specialists (p=0.004). This was similar to research by Fereira et al who found a significant difference in Maslach Burnout Inventory (MBI) subscale scores (emotional exhaustion, depersonalisation, and lack of personal accomplishment) between residents and specialists.[39] Specialists, though bear more responsibilities, are more secure in their profession and may have more time to spend and thus empathise with their patients. Non-specialists, not settled in their specialisation, generally in-charge of all the tasks in the wards, with more stay in calls have relatively less time to spend with patients and face burnout more than those already specialised.

Commonly, progressing on to specialisation in a clinical field takes time and most are older by the time they do. Hence may explain the positive correlation between age and state of specialisation and level of empathy. However, there appears to be no correlation between the number of years of experience working as a doctor and the level of empathy.[24]

Surgical and Medical Disciplines

Our results showed that the clinicians from the medical-based disciplines demonstrated more empathy than the surgical-based clinicians (p=0.002). The results were similar to a few other studies, one being by Walocha et al who grouped physicians into surgical: non-surgical and found that non-surgical specialists displayed a higher level of empathy than their surgical counterparts.[24]

A review on empathy and its importance as it pertains to the surgeon–patient relationship and improving patient outcomes reported that there was a decline that began at clinical school.[9] According to them, surgeons are particularly susceptible to the decline in empathy as they move through their training and attribute it to lack of inclusion of empathy skills training within the surgical training program. They believe that empathy can be taught.

In a study by Hojat et al with control for gender, psychiatrists scored a mean empathy rating that was significantly higher than that of other physicians (anesthesiology, orthopaedic surgery, neurosurgery, radiology, cardiovascular surgery, obstetrics and gynecology and general surgery).[26]

Academicians and Non-Academics

As mentioned earlier, we identified academicians as those who spent all or almost all of their time teaching. Doctors who were clinically active and only taught a few sessions a week were identified as non-academicians. Academicians had higher empathy scores than non-academicians. Non-academicians being clinically active were challenged by factors that influenced their level of empathy like doctor–patient ratio within a period in the clinics, dealing with ward rounds and challenges of being on active calls, lack of sleep and many others. Academicians spend more time teaching and generally are not caught in the web of clinics, high patient load, procedures, ward work, call duties and the stress of juggling all these with teaching. They generally spend time with a smaller number of patients selected for discussions with students, thus being able to spend time and empathise with each patient.

Lustig in his letter to editor about Haslam's paper titled: the overview of the role of empathy in medicine, aptly summarised that "empathy is not an optional extra but a clinical competence essential for sound medical practice, no matter what our specialty. All clinical practice requires a doctor–patient relationship, the core skill of which is empathy".[42,43]

CONCLUSION

Our findings indicate that medical-based doctors demonstrate more empathy than surgical-based doctors. There appeared to be no correlation between age and empathy. However, clinical experience and growth within the specialty seem to improve empathy. Doctors teaching in the university setting demonstrated more empathy than those practicing in the hospital setting.

Inclusion of empathy-related sessions in the undergraduate and post-graduate curriculum could bridge the gap in empathy noted with age, discipline and experience in practice. Further research on empathy among doctors using a wider population in Malaysia and a TEQ questionnaire validated to the Asian population would provide better insight regarding this area of medical practice. Future research on outcomes of inclusion of programmes targeted at improving empathy to create awareness during practice would support patient satisfaction and safety.

LIMITATIONS

- We acknowledge that there are limitations as the TEQ was designed based on the western culture, primarily focuses on cognitive empathy without addressing the affective empathy and does not include the other nuances in empathy like intensity as well appropriateness.
- A larger sample with more representation from the private sector would have been preferable, but there were challenges due to logistics, like availability of doctors, especially in the public and private hospitals, due to their busy schedules.
- The population involved was from one state in the country.

REFERENCES

1. Hardee J. An overview of empathy. Permanente J 2003; 7(4) pp 51-54.
2. Greiner, Rae. "1909: The Introduction of the Word 'Empathy' into English." BRANCH: Britain, Representation and Nineteenth-Century History. Ed. Dino Franco Felluga. Extension of Romanticism and Victorianism on the Net. Web. [accessed 29/05/2023].
3. Frankel RM. The many faces of empathy. J Patient Exp 2017; 4(2): 55-6.
4. Keen S. Empathy and the novel. New York; Oxford: Oxford University Press; 2007.
5. Halpern J. What is clinical empathy? J General Internal Med 2003; 18(8): 670-4.
6. Bandura A. Social foundations of thought and action. Englewood Cliffs, NJ. 1986.
7. Truax CB, Altmann H, Millis WA. Therapeutic relationships provided by various professionals. J Commun Psychol 1974; 2(1): 33-6.
8. Bratek A, Bulska W, Bonk M, Seweryn M, Krysta K. Empathy among physicians, medical students and candidates. Psychiatria Danubina 2015; 27(suppl 1): 48-52.
9. Han JL, Pappas TN. A review of empathy, its importance, and its teaching in surgical training. J Surg Educ 2018; 75(1): 88-94.
10. Lima FF, Osorio FD. Empathy: assessment instruments and psychometric quality–a systematic literature review with a meta-analysis of the past ten years. Front Psychol 2021; 12: 781346.
11. Spreng RN, McKinnon MC, Mar RA, Levine B. The Toronto Empathy Questionnaire: Scale development and initial validation of a factor-analytic solution to multiple empathy measures. J Personal Assessment 2009; 91(1): 62-71.
12. Chen DC, Kirshenbaum DS, Yan J, Kirshenbaum E, Aseltine RH. Characterizing changes in student empathy throughout medical school. Med Teacher 2012; 34(4): 305-11.
13. Khademalhosseini M, Khademalhosseini Z, Mahmoodian F. Comparison of empathy score among medical students in both basic and clinical levels. J Adv Med Educ Prof 2014; 2(2): 88–91. PMID: 25512926; PMCID: PMC4235551.
14. Park KH, Roh H, Suh DH, Hojat M. Empathy in Korean medical students: findings from a nationwide survey. Med Teacher 2014; 37(10): 943–8. http://dx.doi.org/10.3109/0142159X.2014.956058
15. Shashikumar R, Agarwal K, Mohammad A, Kaushik C. Multiple cross-sectional assessments of empathy in medical undergraduate students. Ind Psychiatry J 2021; 30(1): 147.
16. Haque M, Lutfi SN, Othman NS, Lugova H, Abdullah SL. Empathy level among the medical students of National Defence University of Malaysia consuming Toronto empathy scale. Acta Medica Int 2018; 5(1): 24.
17. Bangash AS, Ali NF, Shehzad AH, Haqqi S. Maintenance of empathy levels among first and final year medical students: a cross sectional study. F1000Research. 2013; 2: 157.
18. Hegazi I, Wilson I. Maintaining empathy in medical school: it is possible. Med Teacher 2013; 35(12): 1002-8.
19. Santos MA, Grosseman S, Morelli TC, Giuliano ICB, Erdmann TR. Empathy differences by gender and specialty preference in medical students: a study in Brazil. Int J Med Educ 2016; 7: 153-7.
20. Blanco JM, Caballero F, Álvarez S, Plans M, Monge D. Searching for the erosion of empathy in medical undergraduate students: a longitudinal study. BMJ Open 2020; 10(12): e041810.

21. Stratta EC, Riding DM, Baker P. Ethical erosion in newly qualified doctors: perceptions of empathy decline. Int J Med Educ 2016; 7: 286–92.
22. Francis R. Report of the Mid Staffordshire NHS Foundation Trust public inquiry: executive summary. Stationery Office 2013.
23. Jeffrey D. Empathy, sympathy and compassion in healthcare: Is there a problem? Is there a difference? Does it matter?. Journal of the Royal Society of Medicine. 2016 Dec; 109(12): 446-52.
24. Walocha E, Tomaszewska I, Mizia E. Empathy level differences between Polish surgeons and physicians. Folia Medica Cracoviensia. 2013; 35 Vol. LIII, 2, 2013: 35-42.
25. Beadle JN, de la Vega CE. Impact of aging on empathy: review of psychological and neural mechanisms. Front Psychiatry 2019; 10: 331.
26. Hojat M, Gonnella JS, Nasca TJ, Mangione S, Vergare M, Magee M. Physician empathy: definition, components, measurement, and relationship to gender and specialty. Am J Psychiatry 2002; 159(9): 1563-9.
27. Magalhães E, Salgueira AP, Costa P, Costa MJ. Empathy in senior year and first year medical students: a cross-sectional study. BMC Med Educ. 2011; Dec; 11: 1-7.
28. Quince TA, Parker RA, Wood DF, Benson JA. Stability of empathy among undergraduate medical students: A longitudinal study at one UK medical school. BMC Med Educ 2011; 11: 90.
29. Tavakol S, Dennick R, Tavakol M. Empathy in UK medical students: differences by gender, medical year and specialty interest. Education for primary care. 2011; 22(5): 297–303.
30. Paro HB, Silveira PS, Perotta B, Gannam S, Enns SC, Giaxa RR, Bonito RF, Martins MA, Tempski PZ. Empathy among medical students: is there a relation with quality of life and burnout? Hermes-Lima M, editor. PLoS ONE 2014; 9(4): e94133.
31. Park C, Lee YJ, Hong M, Jung CH, Synn Y, Kwack YS, Ryu JS, Park TW, Lee SA, Bahn GH. A multicenter study investigating empathy and burnout characteristics in medical residents with various specialties. J Korean Med Sci 2016; 31(4): 590-7.
32. Cicek E, Yilmaz A, Aslanhan H. Evaluation of empathy and biopsychosocial approaches of medical faculty assistant doctors. J Educ Health Prom 2019; 8: 214.
33. Aziz AB, Ali SK. Relationship between level of empathy during residency training and perception of professionalism climate. BMC Med Educ 2020; 20(1).
34. Loon MJ. Gender differerence in human empathy. Theories on the Timbergen four" why's" (Master's thesis). 2009.
35. Christov-Moore L, Simpson EA, Coudé G, Grigaityte K, Iacoboni M, Ferrari PF. Empathy: gender effects in brain and behavior. Neurosci Biobehav Rev 2014; 46(4): 604-27.
36. Warrier V, Toro R, Chakrabarti B, Børglum AD, Grove J, Hinds DA, et al. Genome-wide analyses of self-reported empathy: correlations with autism, schizophrenia, and anorexia nervosa. Transl Psychiatry 2018.
37. Di Lillo M, Cicchetti A, Scalzo AL, Taroni F, Hojat M. The Jefferson Scale of physician empathy: preliminary psychometrics and group comparisons in Italian physicians. Acad Med 2009; 84(9): 1198-202.
38. 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 Teacher 2010; 32(11): e471-8.
39. Ferreira S, Afonso P, Ramos MDR. Empathy and burnout: A multicentre comparative study between residents and specialists. J Eval Clin Pract. 2020; 26(1): 216-222.
40. Dehning S, Reiß E, Krause D, Gasperi S, Meyer S, Dargel S, Muller N, Siebeck M. Empathy in high-tech and high-touch medicine. Patient Educ Counsel 2014; 95(2): 259-64.
41. Walocha E, Tomaszewski KA, Wilczek-Ruzyczka E, Walocha J. Empathy and burnout among physicians of different specialities. Folia Medica Cracoviensia. 2013; 53(2): 35-42.
42. Lustig M. Humanising medical practice: the role of empathy. The Medical Journal of Australia. 2008; 188(4): 263-4.
43. Haslam N. Humanising medical practice: the role of empathy. Med J Australia 2007; 187(7): 381-2.