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Comparison of undergraduate educational environment in medical and nursing program using the DREEM tool

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Introduction: Educational environment (EE) in a health educational institute can bring about an enduring impact on the students' motivation, knowledge, critical thinking along with their social life. Therefore, identifying strengths and the need for change in the education environment is vital for the enhancement of the students' learning.

Objective: This study aimed to compare the perceptions of nursing and medical students about their EE in a private university, Karachi Pakistan.

Methodology: Data from two cross-sectional studies of 884 students from both medical and nursing schools of Aga Khan University was acquired and analyzed. EE was measured by a well-known inventory i.e. 'Dundee' Reading Educational Environment Measure -(DREEM). The scores were constructed using standardized guidelines. Mann-Whitney U test and two way ANOVA were used in statistical analysis.

Results: With 84.1% average response rate, the mean$\pm$SD DREEM score was measured as 126$\pm$20.3. Nursing students regarded more positive perception about their EE (127.3$\pm$19.3) as compared to medical students (124.6$\pm$21.3) and was found to be statistically significant (P=0.027). Medical students scored higher in the domain of Perception of Atmosphere (PoA); whereas, nursing students scored higher in Academic Self Perception (ASP). Both of the groups have rated lower scores on the domain of Perception of Teaching (PoT).

Conclusion: Both medical and nursing students appreciated the EE pertaining to Perception of Learning (PoA), Academic Self- Perception (ASP), Perception of learning (PoL) and Social Self-perception (SSP). The study showed that nursing students' perception on their EE was relatively more satisfactory than medical students. However, both medical and nursing students identified areas of improvement in the domain of Perception of Teaching *(*PoT). This finding indicates dire need to devise innovative teaching strategies both for medical & nursing education.

Introduction

Student satisfaction of their Education Environment (EE) is an important component for the ensuring quality of learning. The learning journey of a student comprises of their physical, cognitive, cultural, psychological, emotional, educational and motivational growth (Patil & Chaudhari, 2016; Tokuda et al., 2010). In addition to that, EE is found to be a one of the most important, known determinants for the students' growth, judgment, motivation, and accomplishments. EE encourages healthy competition and critical thinking among students (Imanipour, Sadooghiasl, Ghiyasvandian, & Haghani, 2015; Jawaid, Raheel, Ahmed, & Aijaz, 2013). It is also one of the substantial indicators for assessing the students' learning experiences along with the curriculum (Pai, Menezes, Srikanth, & Shenoy, 2014). Students' satisfaction is found to be strongly linked with the quality of the educational program. EE could further have an eventual impact on implementing clinical safe practices (Bakhshialiabad, Bakhshi, & Hassanshahi, 2015). EE is, thus, an essential aspect of an educational institutions, playing a vital role in endorsing students' motivation, success, independence, self-confidence, learning, and critical thinking skills (Imanipour et al., 2015). Outlining strengths and weaknesses of the

learning environment can, consequently, amplify the EE for the existing, along with the upcoming students in any programme of study, including medical and nursing students. The EE can be evaluated using the suitable and relevant evaluation tool.

Literature suggested that Dundee Ready Educational Environment Measure (DREEM) questionnaire has been the most comprehensive and reliable tool (Ali et al., 2012; Barcelo, 2016; Palmgren & Chandratilake, 2011; Roff et al., 1997) to assess learning environments for the past two decades (Palmgren & Chandratilake, 2011). The DREEM tool is commonly used to compare learning environments of various health institutions and courses (Ali et al., 2012; N. Imran, Khalid, & Jawaid, 2013; Palmgren & Chandratilake, 2011). In the past, there have been several studies conducted to compare medical and nursing students' perceptions using the DREEM tool to enhance curriculum and learning experiences. (Bakhshialiabad et al., 2015; Barcelo, 2016). Past literature suggested that several health care institutions have used the DREEM tool. St. Louis University compared views of medical laboratory science students and nursing students for improvement of their curriculum as well (Barcelo, 2016). While, Islamic Azad University, compared perception of medical, nursing and midwifery students regarding their EE (Farajpour, Raisolsadat, Moghadam, & Mostafavian, 2017). University of Huddersfield compared views of various medical science courses' students (Ousey, Stephenson, Brown, & Garside, 2014). The institution is offering nursing & medical education program successfully since the last three decades. Both program have independently assessed the learning environment. However, a comparison of both program has not been undertaken. Therefore, the purpose of the current study is to compare medical and nursing student's perceptions of the learning environment using the DREEM tool at Aga Khan University. Thus, this study could, potentially help faculty, Office of the Registrar, and Dean of Students' to develop necessary measures in enhancing both medical &

nursing students' experience of learning. This would provide the platform for improvement in curriculums & learning experiences.

Medical college: Aga Khan University Medical College (AKUMC)

The Aga Khan University Medical College (AKUMC) was the first private medical college established in 1983 in Pakistan. To date, AKUMC has graduated a total of 2385 graduates (1138 females &1247 males). This is a five year program with a spiral curriculum which is student centered and patient-orientated. It has multimodal pedagogical approaches like problem-based learning (PBL), interactive lectures, laboratory sessions, tutorials, clinical skills sessions and field visits.

Nursing School: Aga Khan University School of Nursing and midwifery (AKUSONAM)

The Aga Khan University School of Nursing (AKU-SONAM) was established in 1980 with the three years general nursing diploma programe, AKUSONAM was the pioneer in beginning the four year BScN program in 1997 in the country. To date 862 BScN's have graduated (700 females & 162males). BScN nursing program has both theory & practicum components. Teaching learning strategies include: problem based learning, case based tutorial, field visits, science laboratory skills, interactive lectures & clinical skills practicum.

Methodology:

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Study design and setting:

Two independent cross sectional studies were conducted. The first study was employed in June 2014 at AKUMC while the other study was conducted at AKUSONAM in May 2016

Sampling and sample size:

Using rule of thumb of 10 subjects per items(Costello & Osborne, 2005), the estimated sample size was 500. At the time of study, a total of 500 medical students were enrolled in AKUMC while 551 in AKUSONAM.

Universal sampling method was used to collect data from students. All the enrolled students in undergraduate programs of these institutes within the age range of 18 to 24 years, presented on the given data collection day and signed informed consent were included in the study. Students were informed about the selected time of data collection in a specified classroom setting via email. They were also ensured that non-participation would not affect their academic grades. The participants were gathered in the given time and venue. The self-administered questionnaire was distributed to the students. Students took an average of 15-20 minutes to complete the questionnaire which was then returned to the data collector.

Ethical considerations:

Ethical approval was obtained from Ethical Review Committee of the university to conduct both medical (ERC reference 3077-BBS-ERC-14) and nursing (ERC reference 4093-BBS-ERC-16) studies. Students were briefed about the study prior to collection of the data. They were ensured about the confidentiality and anonymity of the information. After taken the informed consent they were requested to complete the questionnaire of the study on the given time.

Research Instrument:

The questionnaire was comprised of two parts a) demographics and b) DREEM inventory. In the demographic part, common characteristics of the students were noted down including previous qualification, year of the study, degree program and living arrangements. The details of DREEM inventory is described in previous studies (Barcelo, 2016; Hamid, Faroukh, & Mohammadhosein, 2013; R Rehman, Ghias, Fatima, Hussain, & Alam, 2017; Rehana Rehman, Ghias, Fatima, Hussain, & Alam, 2016). Briefly describing, the DREEM inventory is a 50 item questionnaire originally developed by Roff et al. (Roff et al., 1997). The inventory is considered appropriate to use to any of the educational programs without restriction to use in culture and context. Each of the 50 item is measured in a 5-point Likert scale ranged from strongly disagree to strongly agree. There are 9 of the 50 items in the inventory are negative and hence recoded inversely when total DREEM scores were calculated. The DREEM scale is further divided into 5 subscales as Perception of Learning (PoL), Perception of Teachers (PoT), Academic Self-perceptions (ASP), Perception of Atmosphere (PoA) and Social Self-perception (SSP). Current study compared the total DREEM score, sub domain score s and items scores among medical and nursing. The maximum scores of each scale and subscale are defined in table 1. All the scores of DREEM overall scale and subscale had related defined interpretation as defined by Roff et al. (Roff et al., 1997).

Statistical analysis:

Data entry and management:

All the data were entered and analyzed in IBM SPSS v. 21. The negative item were recoded with 0 as strongly agree and 4 as strongly disagree. The scores were calculated by adding the specified items in each subscale and all the items for DREEM overall scale. To compare the scores within each subscale the percentage of scores from the maximum was also calculated by dividing each score from the maximum score and multiplying by 100.

Descriptive measures:

Mean with standard deviation was used to express the descriptive of the scores. Frequency and percentages were computed to demographic characteristics of the students.

Comparative analyses:

The comparative analyses of DREEM scale and subscales scores with respect to academic attributes have already published separately for medical (Rehana Rehman et al., 2016) and nursing students (Farooq, Rehman, Dias, & Hussain, 2018) . In this paper our focus was on to compare the scores between medical and nursing students.

Prior to running inferential statistics for comparison, data were checked for normality using Shapiro-Wilk's (SW) test and found non-normal as p value for the SW test was more than 0.05. Hence, Mann-Whitney U test was run to compare the scores of DREEM items and scales obtained by medical and nursing students.

Furthermore, to check whether DREEM score of both nursing and medical students were affected by their academic attributes, we stratified the comparison with their living status and year of study. For this purpose, two-way ANOVA was executed while taking degree program as

fixed factor. P values less than or equal to 0.05 was set as threshold to signify differences in the mean values of medical and nursing students.

Results:

Participants:

A total of 416 MBBS and 468 BScN students completed the study. The accumulated response rates were 83.2% from medical students and 84.9% from nursing students (average 84.1%). Male to female ratio among medical students was 1:1.3 while among nursing students it was 1:6.2. Hostel residency was more among nursing students (53.3%) as compared to medical students (46.7%). First year students were prominently more among medical students (24%) while the frequency of second year students was comparatively more among nursing students (33.8%).

Overall score:

The overall DREEM scores achieved by the student was (63%±10.2%) out of maximum score of 200 (Mean: 126.0±20.3). The highest score percentage was noted in the domain of ASP (69.4%±13.5%) and the lowest was observed for POT (54.5%±11.5%). The description of these scores is displayed in table 1.

DREEM scale and subscales scores between medical and nursing students:

Nursing students regarded more positive perception about their EE as compared to medical students (P=0.027). Perception about learning among nurses was also granted more positive by the nursing students (P=0.001). On the other hand, "teachers moving in the right direction" was

more positively prospected by the medical students (P=0.032). Nursing students felt more positive when asked about ASP (P<0.0001). Perception about atmosphere was not significantly different between medical and nursing students (P=0.610). However, SSP of medical students was comparatively better than nursing students (P=0.03). Table 2 presented the comparison of these score comparison between medical and nursing students.

Stratified comparison with living status and year of study taken into account:

The stratified analysis of living status revealed that overall DREEM scores of day scholar medical and nursing students was not significantly changed. The similar result was observed for PoL of day scholar and PoT of hostel resident (Table 3). On the other hand, among the day scholar nursing student scored lower in PoT, PoA nearly and SSP while scored higher in ASP. Among the hostel residents, nursing students attained higher in PoL, ASP, PoA and overall DREEM score.

When comparing the DREEM score of medical and nursing students in different years of degree program, we found that none of the DREEM scale and subscale was significantly different except for the ASP which was scored higher by nursing students from 1st to final year of BScN (Table 4).

Figure 1 shows trend in the scores of DREEM scale and its subscales stratified by medical and nursing programs over different years of study between hostel living and day scholar students.

Domain item-wise comparison between medical and nursing students:

We also checked the difference in means of each item between medical and nursing students (Table 5). It was observed that nursing student scored higher in 27 items than medical students; 9 from PoL, 3 from PoT, 6 from ASP, 8 from PoA and 1 from SSP. They were tied for 10 items; 2 from PoL, 3 from PoT, 2 from ASP, 2 from PoA and 1 from SSP. Medical students scored higher in 13 items; 1 from PoL, 5 from PoT, 2 from PoA and 5 from SSP.

Perception of learning (PoL) between medical and nursing students:

All the items in PoL except items "The teaching encourages me to be an active learner" and "Long term learning is emphasized over short term learning" were significantly different between medical and nursing students.

Perception of teachers (PoT) between medical and nursing students:

Medical students gave higher score to the teacher having knowledgeable (P=0.075), get ridiculed by the students (P<0.001), authoritarian (P<0.001), angry (P=0.001) and well prepared (P=0.095). Nursing student gave higher score to the teacher having good communication skills (P<0.001), gave good feedback (P<0.001) and get irritated by the students (P=0.088).

Academic Self-Perception (ASP) between medical and nursing students:

Nursing students scored higher in all the items of ASP except item 26 and 45 which yielded a tie in both groups. Well scheduled timetable (P<0.0001) and disappointing experiences (P=0.258) was observed higher in medical students.

Perception of atmosphere (PoT) between medical and nursing students:

On the other hand, relaxed ward (P=0.304), relaxed lecture (P=0.231), development of interpersonal skills (P=0.046), socially comfortable class (P=0.001), relaxed seminars (P=0.078), well concentration (P=0.002), enjoyments (P=0.198) and motivation (P=0.142) were regarded more by nursing students.

Social Self-Perception (SSP) between medical and nursing students:

Pleasing accommodation was the only item in SSP which was significantly praised more by the nursing students (P<0.001). Student support system (P=0.124), tiresome course (P<0.001), rarely bored with course (P=0.002), seldom lonely (P<0.001) and social life (P<0.001) were reported more by the medical students.

Discussion:

Students being vital stakeholders have great influence on the learning outcomes of any educational setting (Bakhshialiabad et al., 2015). It is thus important to identify their views regarding their learning environment. The current study found that overall nursing students had a more positive perception of their learning environment as compared to medical students. The mean DREEM scores was 124.6 for medical students and 127.3 for nursing students.

The plausible differences in mean DREEM scores of medical and nursing students could be differences in curriculum, faculty profile, academic requirement, enrollment criteria, number of year of study, clinical exposure and different socio economical background (Barcelo, 2016). Both the scores were relatively higher compared to other medical and nursing DREEM studies conducted in Pakistan (N. Imran et al., 2013; Jawaid et al., 2013; Khursheed & Baig, 2014;

Sarwar & Tarique, 2016; Victor, Ishtiaq, & Parveen, 2016). Literature suggests that scores more than 120 indicated a more student-centered approach to education along with a more innovative curriculum (Roff, 2005). This can be explained on the basis of induction of student centered approaches like Problem Based Learning, Case based tutorial and simulation based teaching strategies employed in both medical and nursing programs. However, studies conducted in Nepalese, Swedish, British and Australian nursing and medical students showed relatively higher DREEM scores ranging from 130-156 in comparison to the current study (Brown, Williams, & Lynch, 2011; Miles & Leinster, 2007; Ousey et al., 2014; Palmgren & Chandratilake, 2011; Rochmawati, Rahayu, & Kumara, 2014; Roff, McAleer, Ifere, & Bhattacharya, 2001). The difference in DREEM scores in comparison with the international DREEM scores could be due to differences in educational and cultural systems, faculty profile, subject offer enrollment criteria and applied methodology(Farooq et al., 2018).

In this study, nursing students living in hostels rated higher scores and were more positive about their EE in comparison to medical students. One of the plausible reason could be as majority of nursing students come from lower and middle income groups whereas, mostly medical students come from higher and middle income class. Nursing students coming from low to middle socio-economic and cultural backgrounds find a enhanced living standard. Furthermore, these students get an opportunity to intermingle with each other and discuss their problems with senior students already residing in the hostel. Moreover, they get an opportunity to access the facilities like swimming, library, Learning Resource Centre and other recreational activities.

There was no association found between year of study and perception about EE in the current study in both groups. This study finding is aligned with study by Ali, et al (2012) who found no statistical significant difference in the DREEM scores between junior and senior students (Ali et al., 2012). However, a study conducted with the medical laboratory science and nursing students, at a Philippine University, found dissimilar feedback from different years' of students regarding their perception on their EE (Barcelo, 2016). Plausible reasons for differences could be the different course and clinical offerings in different years of the program.

A conducive environment is vital for students' learning, happiness and success (Bakhshialiabad et al., 2015; M. Imran et al., 2016). Literature suggested that positive perception of learning environment and classrooms have great influence of students' sense of control, performance, satisfaction and achievement (Bakhshialiabad et al., 2015; Farajpour et al., 2017). In the current study, the subdomain analyses illustrated that medical student had comparatively more positive perception in the domain of PoA. In this domain, students appreciated that they had developed interpersonal skills during their academics. In addition, students also acknowledged that they were comfortable and relaxed during their classes, lectures and tutorial. Similar items were appreciated by past studies done on Indian, Pakistani and Swedish undergraduate students (Palmgren & Chandratilake, 2011; Patil & Chaudhari, 2016; Sarwar & Tarique, 2016; Sunkad, Javali, Shivapur, & Wantamutte, 2015).

Nursing students rated the highest in the domain of ASP. Consistent findings were also reported in the past studies (Barcelo, 2016; Jawaid et al., 2013; Sunkad et al., 2015). In current study, students also determined that their learning seemed to be relevant to their career and they further acknowledged that it helped them in excelling their exams. Our students reported that EE taught them to be empathetic with others. Similar finding were reported by students of University of

East Angila Medical School, private school of Nursing in the Southwest and Rafsanjan University of Medical Science (Bakhshialiabad et al., 2015; Miles & Leinster, 2007; Payne, 2013).

The lowest rated domain by both medical and nursing students was PoT. Similar findings were reported by previous studies as well (Palmgren & Chandratilake, 2011; Sunkad et al., 2015). In contrast, the Kohli & Dhaliwal (2013) study reported that the students reported highest in the same domain (Kohli & Dhaliwal, 2013). One of the lower rated sub-domain identified by both the medical and nursing student was that the teachers were authoritative and emphasizing too much on factual information. At the same time, study revealed that students irritated their teachers. These were the similar areas of problems reported by medical and nursing students in earlier studies (Barcelo, 2016; Patil & Chaudhari, 2016; Sunkad et al., 2015). Literature suggested that for more effective learning, teaching should predominantly emphasize more on methods of learning, rather than content delivery (Driessnack et al., 2011). Therefore, the role of teacher is vital for the student's professional growth and their competency. According to Gaberson and Oermann 2010, learners are found to switch to memorization when given too much information content and consequently, they learn the required material temporarily for a brief period of time, rather than acquiring it for long term to execute in future complex situations (Gaberson & Oermann, 2010). In the subdomain analysis of PoT in our study, both groups have rated higher scores and acknowledged that their teachers were knowledgeable, possessed good communication skills with patients and provided constructive feedback which allowed them to develop their core professional competencies.

Limitations

Due to cross sectional nature of study generalization of results needs to be done with cautions. The difference in socio economic and cultural back ground across group might have affected their perception regarding the DREEM construct. The nature of self-administered questionnaire may have led to under or over reporting of DREEM score. Therefore, involvement of multiple settings i.e. different healthcare institutions in future study could improve generalizability of the current investigation.

Conclusion

The current study indicated that overall nursing and medical students perceived positive perception about their learning environment. However, nursing students had more positive perception as compared to medical students. Nursing students had more positive perception in academic domain; whereas, medical students had more positive perception towards their learning atmosphere. Both medical and nursing students had identified the need for improvement in the PoT. The areas of concern raised by both medical and nursing students were authoritarian faculty and overemphasis given on factual learning. Thus, there is a need to address students' feedback and integrate it in innovative, engaging, and meaningful teaching and learning strategies for students. University is continuously working on modification of teaching learning strategies by means of curriculum review by faculty with students input. Moreover, ongoing faculty development sessions are held regularly to update faulty knowledge and skills. In addition, university has invested heavily in a simulation center. The purpose of this center was based on the premise of inter professional education, team work and critical thinking among nursing and medical students. All these measures in teaching strategies will foster an enabling

comprehensive learning environment for students. Further qualitative and longitudinal studies are recommended to identify in depth understanding of unveiled EE.

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