Reflective Abilities of Undergraduate Dental Students in a Public Sector Medical College in Pakistan

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Abstract

Aims:

Traditional teaching decreases students' motivation therefore researchers worked on reflection to mount Miller's pyramid from knowledge towards performance. Reflectors are self-directed and lifelong learners. Reflection heightens learning caliber and ameliorates educational outcomes. So this study was conducted to "Measure reflective abilities of undergraduate dental students in a public medical college."

Materials & Methods:

A descriptive, quantitative study was carried out at Bolan Medical College, Quetta from December, 2015-May, 2016. Reflection-in-Learning Scale was distributed to all (85) dental students. Participants filled RLS which was then collected; data was coded and entered in SPSS version-20. Analysis of Variance test compared Reflection-in-Learning Scale score among the academic years, Shapiro test checked its normality, and Tukey test examined post hoc multiple comparisons.

Results:

In total 85 participants 21 belonged to 1st year, 16 were from 2nd year, 20 and 28 from 3rd and 4th years respectively. Female participants made 72.9% and 76.5% participants were 20-22 years old. Overall RLS score was 81.52 ± 4.90. Third year scored 83.35 ± 4.87, 4th year scored 82.57 ± 4.10, 2nd year scored 81.31 ± 4.41, and 1st year scored 78.52 ± 5.34.
Conclusion:

This study provides insight of dental student’s reflective level and serves as a vehicle to examine their reflective abilities. Senior batches were good reflectors.

Keywords: Reflective Learning, Undergraduate Dental Students, Self-Assessment, Reflection-in-Learning Score

Introduction

Reflection connects recent cognition to the forgoing acquisition (Sobral DT, 2005) Reflective learners become critical thinkers, good professionals, (Koole et al., 2012) develop inter-personal/communication skills and case solving abilities and realize themselves, their beliefs and incentives deeply. (Kember et al., 2000) Traditional teaching/learning strategies (Smith, Woldt, Cottam, & Cederberg, 2011; Vaugh L & Baker R, 2001) decrease students’ learning motivation (Rashmi KA, 2012) therefore researchers of the nineteenth century (Sobral DT, 2000, 2001, 2005; Schon, 1984; Kolb, 1984; Boud, Keogh, & Walker, 1985;) created reflective writing that assisted them to mount Miller's pyramid from knowledge towards performance to build student’s self-directed and lifelong learning capacities and heighten their motivation.

Measuring reflective abilities help in appraising students’ learning abilities and cognizant about their learning behavior. Researchers (Sobral DT 2005, Boenink, Oderwald, De Jonge, Van Tilburg & Smal 2004, Amal SM 2010, Devi V, Mandal T, Kodidela S, Pallath V 2012) formulated and utilized different tools to measure the reflective level of medical and dental students. (Sobral DT 2005, Amal SM 2010, Devi V, Mandal T, Kodidela S Pallath V 2012, Chalmers, Dunngalvin & Shorten 2011, Chuan-yuan, Ying-tai, Ming-hsia & Jia-te, 2013) Although reflection has been assessed in Pakistan by researchers of Agha Khan University Hospital, Karachi (Gulzar & Lobo, 2009) University of Health Sciences, Lahore (Khan, Biggs, Tabasum, & Iqbal, 2012) Rehman Medical College, Khyber Pakhtunkhwa (Saeed MT, 2015) The Islamia University of Bahawalpur, (Buzdar & Ali, 2013) and Allama Iqbal Open University Islamabad (Hussain, 2011) but still no such work is carried out to measure reflective abilities of medical or dental students through Reflection-in-Learning Scale. This study, therefore, was started with the aim to; "Measure Reflective abilities of undergraduate dental students through Reflection-in-Learning Scale (RLS) in a government medical college, Quetta.”

Methodology

It was a descriptive, quantitative study carried out in Bolan Medical College, Quetta, Balochistan, Pakistan. Sampling strategy used was Census. Students of 1st, 2nd, 3rd and 4th years were recruited for the study. The study was started in December, 2015 and was completed in May, 2016. Ethical approval was taken from the University of Lahore; IRB No: 03/1609, dated 26.01.2016 and from Principal Bolan Medical College, Quetta; Letter No.Admin/BMC/2016/2416/18.

Before starting the research project, pilot study was carried out on twenty students to establish reliability and cognitive understanding of 3rd year BDS.

Eighty-five BDS students from 1st, 2nd, 3rd and 4th years were recruited to collect data with 14-items Reflection-in-Learning Scale, a self-assessed questionnaire, used in current study. Fourteen item RLS, formulated by Sobral DT in 2000, is a self-assessment questionnaire that describes the views of student's self-regulated learning. RLS has proven
construct validity and good internal consistency and is easily understood. Therefore, RLS was utilized in Bolan Medical College, Quetta. RLS assists to check the Reflection-in-Learning Scale of dental students in medical college lecture hall under the supervision of the principal investigator.

Before starting study participants filled the consent form. Study and its aim were explained to the participants. They were assured of anonymity; their identity would not be revealed in any publication resulting from this study. The participation was entirely voluntary where the participants might choose not to participate. Demonstrator of Dental Section from Bolan Medical College distributed the questionnaire in the lecture hall.

The final score of students was further divided into 4 sub-scales; participants scoring 14-34 have limited reflective level, 35-55 show partial reflection, students have copious level of reflection having 56-76 score whereas 77-98 was the maximum degree of reflection that participants of the study may have. (Amal SM, 2010) Students encircling Likert scale 7 were recommended high mastery of reflective level whereas they come to be competent reflective for encompassing option 6, display basic/acceptable reflective on scale 5, exhibit minimally acceptable/progressing reflective degree of reflection on scale 4, crude/emerging on scale 3 and inappropriate on 1 and 2 of Likert scale. (Peirce, William Coordinator, 2007)

Time allotted for completion of RLS questionnaire was half an hour. Questionnaire was then collected, coded and entered in SPSS version-20. Frequency and percentage was given for each statement of Reflection-in-Learning Scale. Mean, median and standard deviation were also given for each statement of Reflective-in-Learning Scale. Shapiro Wilk test was used to check the normality of data. ANOVA was applied to compare the Reflection-in-Learning Scale score among academic years. A p-value < 0.05 was considered as significant.

Results

There were total 85 students of Bolan Medical College who participated in this study. Out of these 85 participants, 21 (24.8%) study subjects were from 1st year, 16 (18.8%) participants belonged to 2nd year, 20 (23.5%) of these study subjects were from 3rd year and 28 (32.9%) students were 4th year class. Majority of the participants were females (72.9%), fourteen participants (16.5%) were above the age of 23 years, whereas most of the students (76.5%) were in between the ages of 20-22 years.

Overall score (the mean ± SD) of all professional years in Reflective-In-Learning Scale questionnaire was 81.52 ± 4.90.

One way ANOVA test compares the RLS score among the academic years and revealed a statistically significant difference in mean RLS score among them. Table 1 presented difference in RLS Score among academic years.

The maximum score of RLS-14 was 98. Higher score indicates better reflective level and in current study highest score was 81.52 ± 4.90. The RLS score of 3rd and 4th year students was higher as compared to that of the 1st and 2nd year students. Participants of 3rd year scored 83.35 ± 4.87 whereas level of 4th year BDS was 82.57 ± 4.10. Tukey test demonstrated that the mean score of 1st year students was significantly less as compared to the 3rd year and 4th year students whereas no significant difference was observed between 3rd year and 4th year students. Similarly, there was no significant difference in mean score between 1st year and 2nd year students. ANOVA test indicates a statistically significant difference in mean RLS score between them (p-value=0.006) as 1st year VS 2nd year comparison value was 0.272, 1st year VS 3rd year was 0.007, 1st year VS 4th year was 0.016, 2nd year VS 3rd year was 0.554, 2nd year VS 4th year was 0.817 and 3rd year VS 4th year was 0.940 and is presented in table 2.
Discussion

Reflection is a meta-cognitive process that helps students to become good professionals and self-directed learners; it also assists in attitude development. (Sobral DT 2000, Chuan-yuan, Ying-tai, Ming-hsia, & Jia-te 2013) Researchers found relation between reflection, conceptualization and positive learning experience. (Sobral DT, 2000)

This descriptive and quantitative study measured the reflective level of 1st, 2nd, 3rd and 4th year BDS students; study presented participant’s encouraging results as majority (n=85) of these students actively participated in the study and filled the questionnaire. Maximum score of 14-item RLS is 98. In current study, the reflective abilities increases significantly in senior students of 3rd and 4th year who got high scores in RLS as compared to 1st and 2nd year BDS students whereas their overall 14-item RLS score was 81.52 ± 4.90. However, controversy existed in the results of our study and the results of Chalmers P who concluded that the level of reflection decreases with time. (Chalmers et al., 2011) Nevertheless, the apparent contrary conclusions may be due to the selection of different study designs. Chalmers P, by applying prospective observational study on one group, repeated measures to examine the changes in the reflective level of 103/110 study participants. (Chalmers et al., 2011) Whereas in current study, the reflective level of participants was distinguished by utilizing an observational study design in a single sitting. On the other hand, Sobral DT (in 2000) applied comparative study design of 2 randomized groups over a period of 3 years and observed reflective level of his 103 participants; he demonstrated a refinement (81%) in RLS scores of study participants (n=81/103) over time. (Sobral DT, 2000)

Although Bolan Medical College is practicing conventional teaching strategies and students have adopted typical learning schemes, still the overall result of our study (81.52±4.90, maximum RLS score =98) shows that BDS students here have appreciable reflective abilities. This result is due to the availability of various mediums of communication including Internet, newspapers, mobile phones and television etc. which students are using freely to benefit themselves while the topmost driving force behind this result is their own wish and deep desire to acquire knowledge and raise the name of their families, people, province and their beloved country.

Participants of 3rd and 4th year BDS students in the current research project secured a significant RLS score as compared to 1st and 2nd year, whereas the difference between 2nd and 3rd year BDS was insignificant. The good results of 3rd and 4th year students indicated that these students are good in making decisions regarding the process of initial learning as compared to 1st and 2nd years. There was no significant difference in the mean score between 1st and 2nd year students. This low level was in fact due to non-clinical orientation of these students. (Sar & Nalbant, 2014) Moreover, self-monitoring of learning was happening more frequently in the 3rd and 4th year students as compared to the 1st and 2nd year category. It is also assumed that clinically rotated medical and dental students are able to make more educated decisions as they are working with their mentors who help them in enhancing their experience through their valuable comments and practice; these mentors are highly-experienced professionals and are able to work on all 3 types of reflection (reflection-before-action, reflection-in-action and reflection-on-action) thus, reflective students in their clerkships are more capable of solving cases, medico-legal issues and un-certain conditions and their views are clearer as compared to those students who are non-reflective practitioners either of pre-clerkships or clerkships. (Sobral DT, 2000; Boenink et al., 2004; Amal SM, 2010) The results of current study were correlated with the results of Amal SM (2010) who observed that these consequences during his Masters in Philosophy. He observed that the level of reflection is higher in senior dental students. (Amal SM, 2010)

Grant A, in his research, scrutinized RLS and self-efficacy in self-directed learning on medical students of two divergent colleges of UK. (Grant, Kinnersley & Field, 2012) The established results indicate a clear difference between students utilizing Problem Based Learning (PBL) curriculum with conventional lecture-based curriculum.
Students engaged with PBL scored significantly higher level for reflection-in-learning (p-value=0.001), self-efficacy in self-directed learning (p-value=0.001) and for deeper approach to learning (0.006).

The results of our study were correlated with that of Grant A and Sobral DT. (Grant et al., 2012; Sobral DT, 2000) As per Sobral DT study results interpreted and presented that 81% of the study participants presented a higher RLS score between the beginning and at the end of class (chi-square test; p-values= <0.0001). Heinerichs S, on the other hand, divided participants of his study into two groups; one SNAPPS (summarizing the history and findings, narrowing the differential, analyzing the differential, probing the instructor about uncertainties, plan management, selecting issue for self-directed study) and the other usual and customary. (Heinerichs, Vela, & Drouin, 2013) Usual and customary group was not trained for RLS and over view of the study whereas SNAPPS were trained and had an over view of RLS and the study itself. Usual and customary group scored higher i.e. 71.00 ± 8.37 in post test in RLS than SNAPPS group (p-value-0.003) though in the study of Amal, participants acquired more than 50% score with the mean ± SD 63.51 ± 13.00. (Amal SM, 2010)

Reflection is an effective tool for learning so awareness about the benefits of reflection should be lightened among dental students to improve and heighten their acquisition. Present study addressed the participants of only one medical college of Balochistan. Investigators should check the concept of students on reflection.

**Strength of the study**

This study is the first of its kind to be conducted in Balochistan as well as in Pakistan. Regardless of the difficulties the students of Bolan Medical College are facing, they have displayed good reflective abilities; the use of deep and organized learning strategies. Reflection-in-Learning Scale was appropriate for the assessment of the participants’ reflective abilities. According to Moon (2004), participants getting high RLS score possess an extensive and/or deep reflective learning ability which persuades preparedness for self-regulated learning and contributes to strengthen diagnostic abilities. This study also documented improvement in the medical context of clerk-ships students.

**Limitations of study**

Present study was established on self-reported questionnaire and addressed the participants of only one medical college in Balochistan where the strength of the male students was low. To get more generalized and reliable results, students of different medical colleges from other provinces should also be included and their reflective abilities should be measured.

The researcher of this study could not apply interventional study design which was used by other researchers to measure the reflective abilities of medical students. (Sobral DT, 2000b, 2005; Amal SM, 2010; Chalmers et al., 2011; Devi V, Mandal T, Kodidela S, Pallath V 2012; Chuan-yuan et al., 2013)

**Conclusion**

Overall Reflection-in-Learning Score of 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year BDS students of Bolan Medical College was 81.52 ± 4.90 (mean ±SD score). This total reflection-in-learning score suggested that students were more internally motivated to learn. Yet reflective practice is not utilized in dentistry but if we introduce and use it in our pre-clerks
and clerks, it can contribute a lot in students’ deeper learning approach as well as making them deep and critical thinkers and life-long learners.

**Recommendations**

Awareness about the benefits of reflection should be upraised among dental students to improve and heighten their acquisition. Reflective writing should be applied in pre-clerk and clerks years to make dental students good professionals.

**Geolocation information**

This study was accomplished in Bolan Medical College, Quetta, Balochistan, Pakistan, situated on Brewery Road. This medical college was established in 1972, approximately 5 kilometers from Sandeman Civil Hospital, in the center of Quetta city.

**Take Home Messages**

**Notes On Contributors**

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Appendices

Table No 1: Showing comparison of reflective-in-learning scale among groups

| Academic Year | Reflective-In-Learning Scale |  |  |  |
|---------------|-----------------------------|---|---|---|
|               | Mean ± SD | Minimum | Maximum | p- value |
| 1st year      | 78.52 ± 5.34 | 70.0 | 86.0 | 0.006 |
| 2nd year      | 81.31 ± 4.14 | 75.0 | 89.0 | 0.006 |
| 3rd year      | 83.35 ± 4.87 | 74.0 | 91.0 | 0.006 |
| 4th year      | 82.57 ± 4.10 | 75.0 | 90.0 | 0.006 |

*One Way ANOVA

Table No 2: Showing pair wise comparison among groups

| Multiple Comparison |  |  |  |
|---------------------|---|---|---|
| S. No. | Groups | Mean Difference | Std. Error | p-value |
| 1 | 1st year | 2nd year | -2.788 | 1.535 | 0.273 |
| | 3rd year | -4.826 | 1.445 | 0.007* |
| | 4th year | -4.047 | 1.335 | 0.017* |
The Scale of Reflection-in-Learning (RLS)

Please answer the items below in relation to your learning experiences in dental programme. Draw a circle around the scale number closer to your usual behavior. To what extent have I: [1 = never, 2 = very rarely, 3 = some times, 4 = when possible, 5 = often, 6 = when required, 7 = always]

| Q. No's | Questions                                                                 | Usual behavior of BDS students |
|---------|---------------------------------------------------------------------------|-------------------------------|
| 1       | Carefully planned my learning tasks in the courses and training activities of medical programme | 1: Never 2: Very rarely 3: Some times 4: When possible 5: Often 6: When required 7: Always |
| 2       | Talked with my colleagues about learning and methods of study              |                               |
| 3       | Reviewed previously studied subjects during each time                     |                               |
| 4       | Integrated all topics in a course with each other and with those of other courses and training activities |                               |
| 5       | Mentally processed what I already knew and what I needed to know about the topics or procedures |                               |
| 6       | Been aware of what I was learning and for what purposes                   |                               |
| 7       | Sought out interrelations between topics in order to construct more comprehensive notions about some theme |                               |
| 8       | Pondered over the meaning of the things I was studying and learning in relation to my personal experience |                               |
| 9       | Conscientiously sought to adapt myself to the varied demands of the different courses and training activities |                               |
| 10      | Systematically reflected on how I was studying and learning in different contexts and circumstances |                               |
| 11      | Mindfully summarized what I was learning day in, day out, in my studies   |                               |
| 12      | Exerted my capacity to reflect during learning experience                 |                               |
| 13      | Diligently removed negative feelings in relations to aims, objectives, behaviors, topics or problems pertaining to my studies. |                               |

*The mean difference is significant at the 0.05 level.

** Tukey test
Constructively self-assessed my work as a learner

Declarations

The author has declared that there are no conflicts of interest.

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