

# Strength of Motivation among Public and Private Dental Students for the Field of Education: A Comparative and Correlational Study

Mian Saad Ahmed<sup>1</sup>, Faisal Hassan<sup>2</sup>, Shahab Ullah<sup>3</sup>, Fazlina Shaid<sup>4</sup> and Muhammad Sabih<sup>5</sup>

<sup>1</sup>Department of Forensic Medicine, Khyber Medical College, Peshawar, Pakistan

<sup>2</sup>Hayatabad Medical Complex, Peshawar, Pakistan

<sup>3</sup>Khyber Medical University, Institute of Dental Sciences, Kohat, Pakistan

<sup>4</sup>Department of Physiology, Khyber Medical College, Peshawar, Pakistan

<sup>5</sup>Student, Khyber Medical College, Peshawar, Pakistan

## ABSTRACT

**Objective:** To compare and correlate the strength of motivation for the field of education among public and private dental students of Khyber Pakhtunkhwa.

**Study Design:** Cross-sectional analytical study.

**Place and Duration of the Study:** Khyber College of Dentistry (KCD), KMU Institute Dental Science (KIDS), Peshawar Dental College (PDC), and Dental Section, Women Medical College (DS,WMC) from October to December 2019.

**Methodology:** A multi-staged proportionate random sampling was used to enrol a calculated study population of 398 students. After following set criteria and taking informed written consent, a pre-designed performa including demographics and strength of motivation for medical school-revised (SMMS-R) questionnaire was distributed. Extracted data was analysed using SPSS version 25.0, where descriptive and inferential statistics were applied.

**Results:** The mean age of the sample (398) was  $19.24 \pm 0.941$  years, in which public and private sector students were 207 (52%) and 191(48%) respectively. Gender ratio was 1:5.4 for males and females. The intermediate score mean was  $877 \pm 75.6$ . The SMMS-R score had no significant difference in public and private sector with median of 3.3 (3.0-3.7) and 3.3 (2.9-3.5), respectively ( $p=0.883$ ). SMMS-R was significantly correlated with "willingness to sacrifice" and had a maximum correlation coefficient ( $r=0.841$ ).

**Conclusion:** There was no significant difference in the strength of motivation between public and private sector dental students. Furthermore, in overall correlational aspects, significant results were recorded. The study also showed no impact of last educational institute attended on motivational powers.

**Key Words:** Motivation, Students, Dental, Strength of motivation for medical school - revised (SMMS-R), Public institute, Private institute.

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## INTRODUCTION

According to Maslow, motivation is the reason behind all human behaviours, nature and action.<sup>1</sup>As the field of dentistry is regarded as one of the most reputable profession, the students choosing this career are deemed as highly motivated.

Although since 1930, a wide range of studies are being conducted to observe motivation or driving force of a student toward education, the higher education took to this area of research late in the century as it was assumed that a student joining higher education is highly motivated.<sup>2,3</sup>

Since then, new dimensions have been opened in the field of medical and dental education, highlighting the utmost importance of driving force in the field.<sup>4,5</sup>It is this motivation that drives a person towards success and goals achievement.<sup>6</sup> The general consensus now is that motivation among medical and dental students enhances the respect, self-actualisation and knowledge with understanding. Motivation becomes the strength in the student to cross all hurdles in life, it gives the student courage to sacrifice, and it becomes the driving force which prompts the student to complete his education.<sup>6</sup> The initial days of the career in dental or medical sciences lay the foundation for creating this

Correspondence to: Dr. Mian Saad Ahmed, Department of Forensic Medicine, Khyber Medical College, Peshawar, Pakistan

E-mail: saadahmedmian@gmail.com

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balance and sets the momentum for the utilisation of motivation.<sup>7</sup> This motivation keeps student involved in learning, teaches him/her perseverance in failure, and propels the student towards academic and career excellence.<sup>8</sup>

To study motivation among students in the field of medical and dental education, a range of tools are utilised, inspired by self-determination theory.<sup>9</sup> Among them, majority are designed to determine the intrinsic and the extrinsic type of motivation including tools like self-regulation questionnaire (SRQ) and the academic motivational scale (AMS).<sup>10</sup> The need to assess strength of motivation among students for readiness, ability to sacrifice, skill to handle setbacks, and all such aspects promoting the students further in career, prompted the researchers to design a 16-item tool, known as the strength of motivation for medical school (SMMS).<sup>11</sup> Subsequently, in a validation study, a revised version with 15 items in three different sub-classes was adopted for better results.<sup>12</sup>

Considerably, less information is available for comparison and correlation of motivation in two different sectors of education for dentistry, particularly in Pakistan.<sup>13</sup> The recommendations extracted from such a study can be used to improve different aspects, which are necessary to motivate a student more towards his field. The aim of this study was to determine the difference in motivational strength among different sectors (Public and Private) of dental education.

### METHODOLOGY

This cross-sectional, comparative, and analytical survey-based study was conducted among bachelor of dental sciences (BDS) students from October to December 2019. The ethical approval was taken from Institutional Research and Ethical Review Board, Khyber Medical College, Peshawar. The study was completed in four different Dental Colleges namely, Khyber College Dentistry (KCD), Peshawar; KMU Institute of Dental Sciences (KIDS), Kohat; Peshawar Dental College (PDC), Peshawar; and Dental Section of Women Medical College (DS,WMC), Abbotabad. KCD and KIDS being public, and PDC and DS,WMC being private institutes.<sup>14</sup> For a study population of 825 students, (Public: 447 [KCD: 57.27%, 256, KIDS: 42.73%, 191], Private: 378 [PDC: 49.74%, 188, DS,WMC: 50.26%, 190]), a sample of 398 (Public: 207 [KCD: 57.49%, 119, KIDS: 42.51%, 88], Private: 191 [PDC: 49.74%, 95, DS,WMC: 50.26%, 96]), calculated using formula for finite population

$$n = \frac{z^2 \times p(1 - p)}{e^2} \div \left( 1 + \frac{z^2 \times p(1 - p)}{e^2 N} \right)$$

(CI=95%, p=0.05, e=0.05, N = varies as per study population).<sup>15</sup> Multi-stage, proportionate random sampling was used to enrol the sample in this study. Students of any gender, age, and professional year were included in the study population; whereas, students with any psychological or mental illness were excluded.

After taking informed written consent, a pre-designed and pre-validated questionnaire, including few demographic compo-

nents, was self-administered among students. Due to a multi-directional approach, strength of motivation for medical school-revised (SMMS-R) was adopted in this study. This tool assess the motivational strength among students for readiness, ability to sacrifice, skill to handle setbacks, and all other such aspects promoting the students further in career. A 15-item-tool, strength of motivation for medical school-revised (SMMS-R), is further categorised into three subclasses namely, willingness to sacrifice (Q # 5,7,9,10, and 12); readiness to start (Q # 1,3,6,11, and 15), and persistence (Q # 2,4,8,13, and 14).<sup>12</sup> Likert chart with values from 1-5 was used to record response of each question, where 1 is strongly disagree while 5 is strongly agree. The total score range being 15-75. Out of 15 questions, 7 questions follow the reverse order with 1 as strongly agree; whereas, 5 as strongly disagree (Q # 2, 4,8,9,11,13, and 14). The value of 5 was taken as highly motivated for the field of education, while 1 was least motivated.<sup>16</sup>

The data was analysed using SPSS version 25.0. The normality of data was checked by Kolmogorov-Smirnov test, in which a significant value of ≤0.05 was recorded for all variables showing the data will not follow normal distribution curve; and thus, non-parametric statistical tests were applied. The internal consistency of the SMMS-R was checked using Cronbach's Alpha. Descriptives were calculated for categorical and numerical variables as frequencies, percentages, mean, SD, median and IQR; while, for comparison or to see difference among two numerical variables, Mann-Whitney U-test was applied and Pearson correlational coefficient was used to measure the correlation. P value of ≤0.05 was considered statistically significant.

### RESULTS

Three hundred and ninety-eight participants from four different colleges and two different setups had a mean age of 19.24 ± 0.941 years. The overall gender distribution showed female predominance with 336 (84.4%) females, and 62 (15.6%) males, as both the private institutions had zero male population. In total, 207 (52%) were from public sector, while 191 (48%) were from private sector. The mean of intermediate score was 927 ± 29.69 for public sector, while 822.79 ± 72.87 for private sector.

The SMMS-R questions were evaluated for internal consistency and a Cronbach's Alpha of 0.69 was recorded showing the items were consistent internally. Table I depicts the response of public and private sector students. The study findings showed a mean of total score of "willingness to sacrifice" among students of public sector as 16.62 ± 3.381; while in private sector students, the mean was 16.30 ± 3.632. The mean of total score of "readiness to start" among students of public sector was 15.55 ± 3.313, while in private sector it was 16.03 ± 3.504. Lastly, the mean of total score of "persistence" among students of public sector was 17.65 ± 2.996; while in private sector, it was 17.28 ± 3.25. The mean score for willingness to sacrifice, readiness to start, persistence, and total SMMS-R was 3.2 (2.8 - 3.8) and 3.2 (2.8 - 3.8) [p = 0.575], 3.0 (2.6 - 3.6) and 3.2 (2.8 - 3.6) [p = 0.163], 3.6 (3.2 - 3.8) and 3.6 (3.0 - 3.8) [p = 0.204], and 3.3 (3.0 - 3.7) and 3.3 (2.9 - 3.5) [p = 0.883], respectively.

**Table I: Public and private distributions of strength of motivation for medical school-revised (SMMS-R) items responses.**

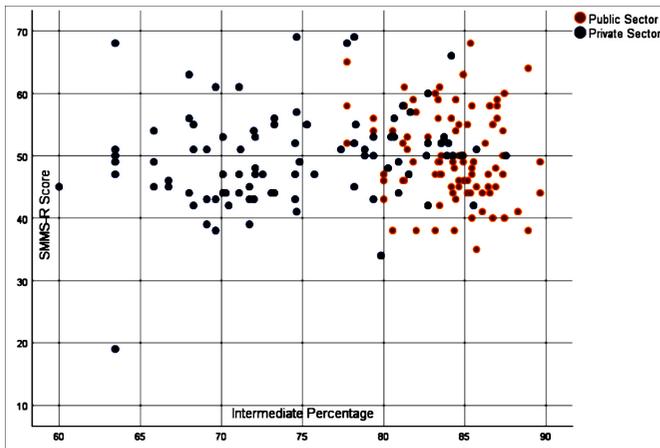
SMMS-R Item		SD	D	U	A	SA
I would always regret my decision if I hadn't availed myself of the opportunity to study medicine/ dentistry.	Public	19 (9.2%)	68 (32.9%)	44 (21.3%)	43 (20.8%)	33 (15.9%)
	Private	33 (17.3%)	46 (24.1%)	25 (13.1%)	53 (27.7%)	34 (17.8%)
I would quit studying medicine/ dentistry if I were 95% certain that I could never become the specialist of my choice.	Public	39 (18.8%)	81 (39.1%)	45 (21.7%)	35 (16.9%)	7 (3.4%)
	Private	51 (26.7%)	78 (40.8%)	36 (18.8%)	12 (6.3%)	14 (7.3%)
I would still choose medicine/ dentistry even if that would mean studying in a foreign country in a language that I have not yet mastered.	Public	26 (12.6%)	52 (25.1%)	39 (18.8%)	64 (30.9%)	26 (12.6%)
	Private	37 (19.4%)	46 (24.1%)	36 (18.8%)	62 (32.5%)	10 (5.2%)
As soon as I would discover that it would take me ten years to qualify as a doctor, I would stop studying.	Public	46 (22.2%)	96 (46.4%)	30 (14.5%)	26 (12.6%)	9 (4.3%)
	Private	34 (17.8%)	68 (35.6%)	37 (19.4%)	40 (20.9%)	12 (6.3%)
Even if I could hardly maintain my social life, I would still continue medical training.	Public	8 (3.9%)	35 (16.9%)	40 (19.3%)	81 (39.1%)	43 (20.8%)
	Private	22 (11.5%)	25 (13.1%)	39 (20.4%)	74 (38.7%)	31 (16.2%)
I wouldn't consider any other profession than becoming a doctor.	Public	26 (12.6%)	62 (30%)	34 (16.4%)	52 (25.1%)	33 (15.9%)
	Private	26 (13.6%)	45 (23.6%)	32 (16.8%)	55 (28.8%)	33 (17.3%)
I would still choose medicine/ dentistry even if that meant I would never be able to go on holidays with my friends anymore.	Public	20 (9.7%)	59 (28.5%)	46 (22.2%)	57 (27.5%)	25 (12.1%)
	Private	20 (10.5%)	44 (23%)	32 (16.8%)	68 (35.6%)	27 (14.1%)
I would stop studying medicine/dentistry if I started scoring low marks and failing tests often.	Public	60 (29%)	103 (49.8%)	26 (12.6%)	14 (6.8%)	4 (1.9%)
	Private	59 (30.9%)	96 (50.3%)	20 (10.5%)	10 (5.2%)	6 (3.1%)
If studying took me more than an average of 60 hours a week, I would seriously consider quitting.	Public	45 (21.7%)	114 (55.1%)	35 (16.9%)	8 (3.9%)	5 (2.4%)
	Private	53 (27.7%)	91 (47.6%)	35 (18.3%)	10 (5.2%)	2 (1%)
I intend to become a doctor even though that would mean taking CME/CDE courses two evenings a week throughout my professional career.	Public	12 (5.8%)	60 (29%)	43 (20.8%)	70 (33.8%)	22 (10.6%)
	Private	14 (7.3%)	41 (21.5%)	63 (33%)	71 (37.2%)	2 (1%)
It wouldn't really bother me too much if I could no longer study medicine/dentistry/dentistry.	Public	27 (13%)	56 (27.1%)	68 (32.9%)	38 (18.4%)	18 (8.7%)
	Private	6 (3.1%)	11 (5.8%)	22 (11.5%)	100 (52.4%)	52 (27.7%)
I would like to become a doctor, even if that would mean giving precedence to my work over my family.	Public	25 (12.1%)	57 (27.5%)	35 (16.9%)	78 (37.7%)	12 (5.8%)
	Private	23 (12%)	61 (31.9%)	55 (28.8%)	42 (22%)	10 (5.2%)
I would quit studying as soon as it became apparent that there were no jobs or resident positions after graduation.	Public	45 (21.7%)	93 (44.9%)	34 (16.4%)	28 (13.5%)	7 (3.4%)
	Private	29 (15.2%)	77 (40.3%)	38 (19.9%)	35 (18.3%)	12 (6.3%)
I would not have chosen medicine/dentistry if it would have caused me to accumulate substantial financial debts.	Public	12 (5.8%)	62 (30%)	44 (21.3%)	45 (21.7%)	44 (21.3%)
	Private	9 (4.7%)	40 (20.9%)	57 (29.8%)	67 (35.1%)	18 (9.4%)
I would be prepared to retake my final high school exams to get higher marks if this would be necessary to study medicine/dentistry.	Public	20 (9.7%)	48 (23.2%)	33 (15.9%)	65 (31.4%)	41 (19.8%)
	Private	28 (14.7%)	33 (17.3%)	37 (19.4%)	77 (40.3%)	16 (8.4%)

SA = Strongly agree, A = Agree, U = Uncertain, D = Disagree, SD = Strongly disagree, R = Reverse, PB = Public sector, PR = Private sector.

**Table II: Correlation of SMMS-R and its subclasses among public and private dental students.**

Variable	1	2	3	4	5	6	7	8
Willingness to sacrifice (Public)	1.00	-0.070	0.573*	-0.019	0.274*	-0.033	0.836*	-0.056
Willingness to sacrifice (Private)		1.00	-0.077	0.611*	0.060	0.192*	-0.044	0.847*
Readiness to start (Public)			1.00	-0.008	0.178*	0.002	0.792*	-0.040
Readiness to start (Private)				1.00	-0.006	0.040	-0.015	0.775*
Persistence (Public)					1.00	0.026	0.618*	0.037
Persistence (Private)						1.00	-0.004	0.541*
Total SMMS-R (Public)							1.00	-0.029
Total SMMS-R (Private)								1.00

\* Significant correlation at 0.05, SMMS-R = Strength of Motivation for Medical School-Revised. SMMS-R = Strength of Motivation for Medical School-Revised.



**Figure 1: Comparison of intermediate examination percentages with SMMS-R.**

Table II shows the findings of correlational statistics. All the inter-variables were significantly correlated with a maximum correlational coefficient of 0.841 between “willingness to sacrifice” and total SMMS-R. Similarly, Table II shows that all the intra-variables like public to public and private to private were mostly significantly correlated. However, the inter-variables like public to private had no significant correlation; in which, “willing to sacrifice” in private had the highest correlational coefficient with total SMMS-R in private sector with a  $r=0.847$ .

Figure 1 shows a scatter plot to compare intermediate examination percentages with SMMS-R total score. In the figure, the intermediate percentages are taken at x-axis, while SMMS-R scores at the y-axis. The figure shows that maximum of the private students had an intermediate percentage of below 75%, while the SMMS-R score was between 30-60 among most students. In public sector institutes, most of the students were above 75% of intermediate scores; whereas, in SMMS-R score, they were between 30-60 points just like private ones.

## DISCUSSION

This comparative cross-sectional study was devised to compare and correlate the strength of motivation among students from public and private sector dental colleges of Khyber Pakhtunkhwa. In brief, the results revealed no significant difference in the motivational strength of public and private sector students, where public sector led the scores with 3.3 (3.0 - 3.7) over private sector with 3.3 (2.9 - 3.5). Statistically, all the variables were

significantly correlated. However, while the intra-sector variables were significantly correlated in both educational sectors, the inter-sector variables had no significant correlation. The result also showed that the motivational strength is irrespective of previous academic performances.

The internal consistency with Cronbach’s Alpha as 0.69, means that the data is near to be internally consistent. The alpha value of near to 0.70 indicates a good reliable tool.<sup>16</sup> This questionnaire had an internal consistency of 0.79, when it was adopted by Kusrkar, *et al.*,<sup>12</sup> a value somewhat different to the one recorded in this study. Various other studies conducted around the world validated the internal consistency of this tool; a study conducted in Canada on 372 students also showed the tool to be good in reliability ( $\alpha=0.78$ ).<sup>16</sup> Another study conducted on 449 students, recorded an  $\alpha < 0.70$ , which is acceptable; however, one must be cautious in using such results as in this study.<sup>17</sup> The reliability and internal consistency of a tool is very important in conducting cross-sectional survey based studies, the results of this study shows a good consistency of the tool used.

The main objective of the study was to compare strength of motivation among public and private dental college students. The study recorded a total motivation strength of  $49.72 \pm 7.41$  (mean:  $3.31 \pm 0.49$ ), in which the public sector dental colleges had a strength of  $49.82 \pm 7.30$  (mean:  $3.32 \pm 0.49$ ); while, the private sector had a total strength of  $49.61 \pm 7.55$  (mean:  $3.31 \pm 0.50$ ). These results coincides with a study conducted in the Western world, having a total motivational score of 48.2.<sup>17</sup> In another study conducted in China on 930 students, the data revealed a motivation strength of  $3.27 \pm 0.51$ , again quite close to the results of this study.<sup>18</sup> In Netherlands, a research based on 357 students, revealed a motivational score of 54.88, unlike scores recorded in this study.<sup>19</sup> The study shows that in “willingness to sacrifice” and “persistence”, the students of public sector dental colleges scored better than private sector; whereas, in “readiness,” private sector dental students are ahead of the public sector students. The study also recorded no significant difference in both the categories of dental education.

In correlational aspects of this study, a significant correlation was recorded with in the overall variables, also documented by Kusrkar, *et al.*,<sup>12</sup> showing the strong consistency. The intra-sector variables within public and private dental colleges also exhibited a significant correlation, while inter-sector correlation was not significant. This shows that SMMS-R and its variable

within single category had a considerable relationship with each other; however, the strength varies.

The study also monitored the effect of intermediate examinations result, which is a pre-requisite for entrance to the dental education on SMMS-R. Surprisingly, it was noted that there is no notable effect of this exam. A study conducted in Thailand on 140 students, revealed a weak correlation of GPA at high school with strength of motivation ( $r = <0.30$ ).<sup>20</sup>

## CONCLUSION

The study concluded an immaterial distinction in the quality of inspiration among public and private sectors of dental students. In correlational perspectives, a noteworthy outcome was recorded overall; while in various instructive divisions (public and private), a large portion of the intra-segment factors had a significant relationship. In contrast, inter-factors items had an inconsequential connection. The investigations, likewise, demonstrated no effect of last instructive institute attended on inspirational forces.

### CONFLICT OF INTEREST:

The authors declared no conflict of interest.

### ETHICAL APPROVAL:

Ethical approval was taken from Institutional Research and Ethical Review Board in its 14<sup>th</sup> sitting on 28<sup>th</sup> Feb 2019.

### AUTHORS' CONTRIBUTION:

MSA: Conception, analysis, interpretation, drafting, and final approval.

FH: Acquisition of data, drafting, critical revision, and final approval.

SU: Acquisition of data, critical revision, and final approval.

FS: Conception, critical revision, and final approval.

MS: Acquisition of data, drafting, and final approval.

## REFERENCES

- Maslow AH. Motivation and personality. New York; Harper and Row: 1970.
- Kusurkar R, Ten Cate T, van Asperen M, Croiset G. Motivation as an independent and a dependent variable in medical education: A review of the literature. *Med Teach* 2011; **33(5)**: e242-62. doi: 10.3109/0142159X.2011.558539.
- Pelaccia T, Viau R. Motivation in medical education. *Med Teach* 2017; **39(2)**:136-40. doi: 10.1080/0142159X.2016.1248924.
- Barker J, Olson J. Medical students' learning strategies: Evaluation of first-year changes. *J Miss Acad Sci* 1997; **(42)**: 96-100.
- Kusurkar R, Croiset G, Ten Cate O. Implications of gender differences in motivation among medical students. *Med Teach* 2013; **35(2)**:173-4. doi: 10.3109/0142159X.2012.737056.
- Grolnick WS, Ryan RM. Autonomy in children's learning: An experimental and individual difference investigation. *J Pers Soc Psychol* 1987; **52(5)**:890-8. doi: 10.1037//0022-3514.52.5.890.
- Kyndt E, Dochy F, Struyven K, Cascallar E. The direct and indirect effect of motivation for learning on students' approaches to learning through the perceptions of workload and task complexity. *Higher Education Research & Development* 2011; **30(2)**:135-50. doi.org/10.1080/07294360.2010.501329
- Liang JC, Chen YY, Hsu HY, Chu TS, Tsai CC. The relationships between the medical learners' motivations and strategies to learning medicine and learning outcomes. *Med Educ Online* 2018; **23(1)**:1497373. doi: 10.1080/10872981.2018.1497373.
- Ferriz-Valero A, Østerlie O, García Martínez S, García-Jaén M. Gamification in Physical Education: Evaluation of Impact on Motivation and Academic Performance within Higher Education. *Int J Environ Res Public Health* 2020; **17(12)**:4465. doi: 10.3390/ijerph17124465.
- Kusurkar R, Croiset G, Galindo-Garre F, Ten Cate O. Motivational profiles of medical students: association with study effort, academic performance and exhaustion. *BMC Med Educ* 2013; **13**:87. doi: 10.1186/1472-6920-13-87.
- Nieuwhof MG, Ten Cate OT, Oosterveld P, Soethout MB. Measuring strength of motivation for medical school. *Med Educ Online* 2004; **9(1)**:4355. doi.org/10.3402/meo.v9i.4355
- Kusurkar R, Croiset G, Kruitwagen C, ten Cate O. Validity evidence for the measurement of the strength of motivation for medical school. *Adv Health Sci Educ Theory Pract* 2011; **16(2)**:183-95. doi: 10.1007/s10459-010-9253-4.
- Cosme D, Berkman ET. Autonomy can support affect regulation during illness and in health. *J Health Psychol* 2020; **25(1)**:31-7. doi:10.1177/1359105318787013.
- Pakistan Medical & Dental Council (PMDC). Recognized dental colleges in Pakistan. [Cited on: 18<sup>th</sup> April 2020]. Available from: [http://www.pmdc.org.pk/RECOGNIZED\\_DENTALCOLLEGES\\_IN\\_PAKISTAN/tabid/167/Default.aspx](http://www.pmdc.org.pk/RECOGNIZED_DENTALCOLLEGES_IN_PAKISTAN/tabid/167/Default.aspx).
- Daniel WW. Biostatistics. A Foundation for Analysis in the Health Sciences. 7th edition. New York: John Wiley & Sons, 1999. [Cited on 4th April 2020]. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1002/bimj.4710370610>.
- Abbiati M, Severac F, Baroffio A, Pelaccia T. Construct and predictive validity of the strength of motivation for medical school-revised (SMMS-R) questionnaire: A french validation study. *Can Med Educ J* 2019; **10(3)**:e39-e48.
- Wouters A, Croiset G, Schripsema NR, Cohen-Schotanus J, Spaai GWG, Hulsman RL, et al. Students' approaches to medical school choice: relationship with students' characteristics and motivation. *Int J Med Educ* 2017; **8**:217-26. doi: 10.5116/ijme.5921.5090.
- An M, Kusurkar RA, Li L, Xiao Y, Zheng C, Hu J. Measurement invariance of the strength of motivation for medical school: A multi-group confirmatory factor analysis. *BMC Med Educ* 2017; **17(1)**:116. doi: 10.1186/s12909-017-0958-4.
- Wouters A, Croiset G, Galindo-Garre F, Kusurkar RA. Motivation of medical students: selection by motivation or motivation by selection. *BMC Med Educ* 2016; **16**:37. doi: 10.1186/s12909-016-0560-1.
- Kunanithaworn N, Wongpakaran T, Wongpakaran N, Paiboon-sithiwong S, Songtrijuck N, Kuntawong P, et al. Factors associated with motivation in medical education: A path analysis. *BMC Med Educ*. 2018; **18(1)**:140. doi: 10.1186/s12909-018-1256-5.

