

## Correlation between the Learning Approaches and Perceived Stress of First Year Medical Students

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### Abstract

**Introduction:** Like all students, medical students too choose to use either a deep or a surface approach while learning, focussing on understanding or memorizing respectively. Stress is common in medical students and is commonly attributed to academic factors. The aim of our study therefore was to determine the relationship between learning approaches of first year medical students and their perceived stress levels using the Revised Two Factor Study Process Questionnaire (R-SPQ-2F) and Perceived Stress Scale (PSS), respectively. **Materials and methods:** The Revised Two Factor Study Process Questionnaire (R-SPQ-2F) and Perceived Stress Scale (PSS) were administered to 87 first year undergraduate medical students after their Internal Assessment examination in Physiology to determine their learning approaches and perceived stress levels respectively. Statistical analysis was done by calculating the Pearson product-moment correlation coefficient to find the relationship between the Deep and Surface Learning Approach scores with the PSS scores. **Results:** The majority of our first year medical students (60.9%) used a deep learning approach. There was a significant positive correlation between the surface learning approach scores and the Perceived Stress Scale scores ( $r = 0.335$ ,  $p = 0.002$ ,  $n = 87$ ). **Conclusion:** Our study revealed that there was a significant positive correlation between the surface learning approach scores and the Perceived Stress Scale scores in our first year medical students. Further studies can be done to study this relationship in more detail using instruments to diagnose actual stress and students with a surface approach could be guided to reflect on their ways of studying and encouraged to move in favour of a deep approach.

**Key words:** Learning approaches, Perceived Stress Scale, Revised Two factor Study Process Questionnaire, Stress, Undergraduate medical students

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**Introduction:** Marton and Saljo first described the concept of learning approaches in 1976 on the basis of how different students perceived a task and then learnt it.<sup>[1]</sup> Learning approaches describe the relationship between the student, the task and the context.<sup>[2]</sup> Students with a surface learning approach focus on memorizing, while students with a deep approach focus on understanding.<sup>[3]</sup> The motivation to learn is intrinsic in students using a deep learning approach; while students with a surface learning approach are extrinsically motivated by factors like fear of failure.<sup>[3]</sup> The intention of students with a deep learning approach is to master the study material and integrate it with their prior knowledge; while the intention of students with a surface approach is just to memorize the study material using short term memory so that it can be reproduced in the examination.<sup>[4]</sup> In addition to Bigg's Study Process Questionnaire (SPQ) and the Revised Two - factor Study process Questionnaire (R-SPQ-2F),<sup>[2]</sup> many other instruments like the Approaches to Study Inventory (ASI), Approaches to Study Skill Inventory for students (ASSIST), etc., are used to determine learning approaches of students.<sup>[5]</sup> The R-SPQ-2F yields the students' Surface and Deep approach scores and gives a Motive and Strategy score for each approach while the earlier Study Process Questionnaire (SPQ) had three approaches that included an achieving approach.<sup>[2]</sup>

Medical students too like other students choose to use either a deep or a surface approach while learning. The goal of instructors, according to Felder and Brent should be to induce a deep learning approach in their students.<sup>[3]</sup> Many studies have been done to investigate the relationship between learning approaches and outcomes or academic performance. Medical students who use a deep learning approach have been found to get high academic scores.<sup>[6]</sup> Fergusson who did a systemic review of the factors that are associated with success in medical school concludes that while a strategic learning approach was relatively consistently positively associated with final marks obtained by medical students, results of studies examining the relationship between students' deep and surface approaches with performance in examinations was inconsistent.<sup>[7]</sup> Gijbels et al points out that generally the assessment system is blamed in literature, as being the cause for the lack of significant positive correlation between a deep learning approach and academic performance.<sup>[8]</sup> They found that there was no significant relationship between their students' learning approaches and different components of problem solving that were measured by multiple choice questions and attributed this to other factors like students' perceptions of the assessment and the method of teaching that was used.<sup>[8]</sup>

Academic pressure can contribute to stress in students. Helmers et al studied

stress in different students and concluded that medical students were not greatly stressed compared to other groups, as although they had marginally higher subjective feelings of stress; their total-stress scores were below those of graduate students, law students and the general population.<sup>[9]</sup> Others however have found significant levels of stress in medical students, globally. Dyrbye systematically reviewed articles on medical student psychological distress and found that overall levels of psychological distress were higher in U.S. and Canadian medical students than in the general population and age-matched peers.<sup>[10]</sup> Firth studied 318 British medical students and found that their stress levels were higher than that of the general population and that there were no differences between male and female students.<sup>[11]</sup> Dahlin et al found that first year medical students in Sweden experienced more academic pressure than students of the third or sixth years, with the reported stress scores of female students being higher than male students.<sup>[12]</sup>

Saipanish studied students in a medical college in Thailand and found that 61% had some degree of stress, which was mainly caused by academic problems; specifically related to tests/examinations.<sup>[13]</sup> El-Gilany et al found that the prevalence of high perceived stress was nearly equal in male medical students in Egypt and Saudi Arabia.<sup>[14]</sup> Sreeramareddy et al found that the overall prevalence of psychological

morbidity was 20.9% in undergraduate medical students in Nepal and the most common causes were academic and psychosocial factors.<sup>[15]</sup> Sherina et al found that 41.9% of the 396 medical students whom they studied at a university in Malaysia had psychological stress.<sup>[16]</sup> In India too, Supre<sup>[17]</sup> and Shah et al,<sup>[18]</sup> found that the majority of their medical students perceived stress. Mane Abhay et al found that second to dental students, medical students had the highest perceived stress scores, when compared to physiotherapy, engineering, nursing and pharmacy students.<sup>[19]</sup> All three studies involving Indian medical students did not reveal any significant difference in stress levels among male and female medical students.<sup>[17,18,19]</sup>

Radcliffe et al who did a qualitative study on perceived stress in medical students using semi-structured interviews found that preparing for examinations and the work pressure involved in acquiring knowledge, skills and attitudes were considered the most common causes for stress.<sup>[20]</sup> They also found that students were more prone to stress during transition periods, like from school to college.<sup>[20]</sup> Other researchers also found that academic factors were perceived by medical students as being common causes of stress.<sup>[13,15,17,18,19]</sup> Mahajan reviewed the causes of stress in medical students and the consequences, coping strategies and stress management programmes and concluded that since it is a global phenomenon, it is

important to focus on its prevention, identification and management.<sup>[21]</sup> Wolf who considered medical education as a possible health hazard for many undergraduate medical students recommended using the principles of health promotion and disease prevention during the course of medical education also, so that burn-out and other problems are prevented or at least decreased.<sup>[22]</sup> In a twelve year longitudinal study involving UK medical graduates, McManus et al proved that approaches to work were determined by surface, deep and strategic study habits.<sup>[23]</sup> A surface-disorganized approach of doctors to work was found to be predicted by surface learning and higher neurotic scores while studying in medical school, while a deep approach to work was predicted by a deep learning approach and lower emotional exhaustion.<sup>[23]</sup> The perceptions of doctors about their workplace climate and workload were found to be predicted both by their approaches to work and by measures of stress, burnout and satisfaction with medicine as a career.<sup>[23]</sup>

It therefore seemed that stress levels were high in medical students globally and could affect their approach to their work as doctors, in addition to having deleterious effects on their health and affecting their academic performance as students. Since academic factors had been perceived as being common causes of this stress, we were interested in studying if there was any relationship between the

learning approaches of our first year medical students and their perceptions of stress. We chose to use the Perceived Stress Scale (PSS)<sup>[24]</sup> to measure their perception of stress.

**Aim:** The aim of this study was to determine the relationship between learning approaches of first year medical students and their perceived stress levels using the Revised Two Factor Study Process Questionnaire (R-SPQ-2F)<sup>[2]</sup> and Perceived Stress Scale (PSS)<sup>[24]</sup> respectively.

#### Materials and Method:

This cross-sectional study was conducted in the Department of Physiology of Vinayaka Mission's Kirupananda Variyar Medical College & Hospital (VMKVMCH) in Salem, South India, after obtaining clearance from the Institutional Ethical Committee. 87 out of the 100 first year medical students (43 males and 44 females) gave their consent for participating in the study and the Revised Two Factor Study Process Questionnaire (R-SPQ-2F)<sup>[2]</sup> and Perceived Stress Scale (PSS)<sup>[24]</sup> were administered to them after their Internal Assessment examination in Physiology to determine their learning approaches and perceived stress levels respectively.

The Revised Two Factor Study Process Questionnaire (R-SPQ-2F)<sup>[2]</sup> has 20 questions about the students' usual way of studying. The students were asked to be honest and to choose the single best

response which described their way of studying. Scoring was done according to the instructions of the R-SPQ-2F. Deep Approach and Surface Approach main scores and the Motive and Strategy subscale scores for each approach were determined.

The Perceived Stress Scale <sup>[24]</sup> which is the most widely used instrument for measuring perceived stress was chosen as it was a short, easy to understand global measure of perceived stress, with established validity and reliability.<sup>[24,25]</sup> There are 10 items in the version of PSS that we used.<sup>[24]</sup> The items basically ask about the participants' thoughts and feelings in the last one month and participants are asked to answer how often they felt a particular way using a 5-point Likert scale, ranging from 0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often and 4 = very often.<sup>[24]</sup> As there are positively stated items also in the PSS, the PSS scores were calculated as

### **Results:**

Of the 87 first year medical students, who participated in the study, 53 students (60.9%) preferred a deep learning approach; 30 students (34.5%) preferred a surface learning approach and 4 students (4.6%) had equal scores on both deep and surface scales. The mean Perceived Stress Scale (PSS) scores of the first year medical students in our study was found to be  $21.02 \pm 5.238$ .

instructed, by reversing responses to the four positively stated items (items 4,5,7 and 8) and then totaling the score of all 10 responses.<sup>[24]</sup>

Means and standard deviations for the two main scales and four subscales of the R-SPQ-2F and the Perceived Stress Scale scores were calculated. IBM SPSS 20 was used for statistical analysis. Pearson product-moment correlation coefficient was determined to find the relationship between the Deep and Surface Approach scores and subscale scores and the Perceived Stress Scale scores. In addition, gender-wise analysis of learning approaches was also done using the Z- test of two proportions. The learning approach main scale and subscale scores and Perceived stress scale scores of male and female medical students was also compared using the unpaired Student's t-test.

There was a significant positive correlation between the surface learning approach scores and the Perceived Stress Scale scores of first year medical students ( $r = 0.335$ ,  $p = 0.002$ ,  $n = 87$ ). A significant positive correlation between surface motive scores and the Perceived Stress Scale scores ( $r = 0.242$ ,  $p = 0.024$ ,  $n = 87$ ) was also observed (Table-1).

**Table 1: Correlation between the learning approaches of first year medical students and their Perceived Stress Scale (PSS)<sup>[24]</sup> scores**

S No.	Parameter	Pearson correlation	p-value
1.	DA v/s PSS	-0.198	0.066
2.	SA v/s PSS	0.335	0.002*
3.	DM v/s PSS	-0.184	0.089
4.	DS v/s PSS	-0.054	0.620
5.	SM v/s PSS	0.242	0.024*
6.	SS v/s PSS	0.197	0.068

Results expressed as Pearson product-moment correlation coefficient (Pearson Correlation) for scores obtained by the first year medical students (n=87) in the Deep Approach (DA) main scale; Surface Approach (SA) main scale; Deep Motive (DM) subscale; Deep Strategy (DS) subscale; Surface Motive (SM) subscale and Surface Strategy (SS) subscale of the Revised Two Factor Study Process Questionnaire (R-SPQ-2F)<sup>[2]</sup> versus their Perceived Stress Scale (PSS)<sup>[24]</sup> scores; \* p-value of <0.05 being taken as significant.

No significant differences were found between the deep or surface learning approach scores or motive and strategy subscale scores or Perceived Stress Scale scores of male and female first year medical students in our study.(Table 2)

**Table 2: Comparison of the learning approach scores and Perceived Stress Scale (PSS)<sup>[24]</sup> scores of male and female first year medical students.**

	Males (n = 43)	Females (n = 44)	t	df	p-value
DA	30.44 ± 6.89	30.95 ± 5.16	-0.393	85	0.695
SA	26.58 ± 6.39	25.48 ± 6.86	0.776	85	0.440
DM	15.98 ± 3.56	16.11 ± 3.49	-0.181	85	0.857
DS	14.86 ± 3.79	15.30 ± 3.32	-0.570	85	0.571
SM	12.63 ± 4.01	12.11 ± 3.95	0.602	85	0.549
SS	14.42 ± 3.97	13.59 ± 3.79	0.995	85	0.323
PSS	20.42 ± 5.20	21.61 ± 5.27	-0.659	85	0.290

Learning approaches scores of male (n=43) and female (n=44) first year medical students expressed as the means and standard deviations of deep approach (DA) and surface approach (SA) main scores and the deep motive (DM), deep strategy (DS), surface motive (SM) and surface strategy (SS) subscale scores obtained using the Revised Two Factor Study Process Questionnaire (R-SPQ-2F)<sup>[2]</sup> and their Perceived Stress Scale (PSS)<sup>[24]</sup> scores; with corresponding t values and degrees of freedom (df) obtained using the unpaired Student t test ; p-value of <0.05 being taken as significant.

53.5% of males and 68.2% of females preferred a deep approach, while 39.5% of males and 30% of females preferred a

surface approach and the difference was not significant.(Table-3).



**Table 3: Comparison of the learning approaches of male and female first year medical students.**

Learning Approach	Males (n = 43)	Females (n = 44)	Z-score	p-value
Deep	23 (53.5%)	30 (68.2%)	-1.4043	0.162
Surface	17 (39.5%)	13 (30%)	0.9801	0.327
Equal	03(7%)	01 (2%)	1.0474	0.029

Learning approaches of male and female first year medical students expressed as the number and the percentage (in brackets) of male and female first year medical students who had a deep or surface learning approach and those who had equal scores on the deep and surface learning approaches, determined using the Revised Two Factor Study Process Questionnaire (R-SPQ-2F); Z- scores calculated using Z- test for two proportions; p-value of <0.05 being taken as significant.

### **Discussion:**

Significant positive correlations between the surface approach scores and the surface motive subscale scores of the R-SPQ-2F<sup>[2]</sup> (which was used to determine the learning approaches) and the Perceived Stress Scale (PSS)<sup>[24]</sup> scores of first year medical students were found. No significant correlations were found for the deep approach or the other subscale scores. While correlation does not imply causation, and while we only measured perceived stress (the PSS is not used to diagnose stress), still these results assume significance for teachers interested in addressing the academic factors that could cause stress in their medical students.

As suggested by Felder and Brent, a deep learning approach should be encouraged in students.<sup>[3]</sup> Such an approach would mean that students study to understand the subject and they relate and integrate it with other learnt material; motivated by an interest in the subject and not by fear of failure.<sup>[3]</sup> The majority of first

year medical students in the medical college in which this study was done, which follows a didactic, non-problem based curriculum, were found to be employing a deep learning approach. Our study also showed that although the deep approach scores were negatively correlated with Perceived Stress Scale scores, the correlation was not statistically significant. One of the possible reasons for this could be the influence of other factors on both stress and learning approaches. While a deep learning approach does result in better academic performance,<sup>[6]</sup> inconsistent results have been found,<sup>[7]</sup> and other factors have been cited as being responsible for the discrepancy.<sup>[8]</sup> Although Supe found that stress was more in high achievers and felt that it could be due to higher expectations, he however did not find that there was any difference in stress experienced by Indian medical students with a Type A personality, when compared to others.<sup>[17]</sup>

In our study, 34.5% of students preferred a surface learning approach. Many studies have established that stress is present in medical students around the world,<sup>[10-16]</sup> and in India too,<sup>[17,18,19]</sup> and studies have emphasized the important role of academic factors in causing stress in students.<sup>[12,13,15,17,18,19,20]</sup> We found a statistically significant positive correlation between the surface approach scores and the Perceived Stress Scale (PSS) scores in our first year medical students. Like Mahajan<sup>[21]</sup> and Wolf<sup>[22]</sup> suggested, focus needs to be placed on promoting health and preventing stress in our medical students, globally. While the role of institutions conducting stress management programmes and teaching coping skills is undisputed, one of the many simple ways teachers themselves can help is by identifying their students' learning approaches and encouraging them to reflect on their way of studying. Students' learning approaches are determined by student characteristics, learning environment and learning outcomes, and if proper strategies are used, as stated by Serife, it may be possible to encourage surface learners to move towards a deep learning approach.<sup>[15]</sup> We also found a statistically significant positive correlation between the surface motive subscale scores and the Perceived Stress Scale (PSS) scores. Each approach in the R-SPQ-2F has a corresponding motive and strategy component. Students with a surface approach usually have an extrinsic

motivation to learn and learn because they have to do so in order to pass the course or to get a good job<sup>[3]</sup> or because they are afraid of failing.<sup>[23]</sup> Our results are therefore to be expected.

The mean Perceived Stress Scale (PSS) score of the first year medical students in our study was found to be  $21.02 \pm 5.238$ . This value is higher than the norms specified by Cohen et al.<sup>[24]</sup> It is to be remembered however that as the PSS is not a diagnostic instrument, there are no cut-offs for grading the degree of stress. Although the mean PSS score of our students seem to be lower than the PSS scores of different professional students in the study by Abhay Mane et al.<sup>[19]</sup> in which the PSS score of medical students was found to be  $27.0 \pm 7.2$ , they used the 14 item version of the PSS, while we used the 10 item version, hence the difference. There was no significant difference in the Perceived Stress Scale scores of male and female medical students in our study. This finding is in agreement with the findings of other studies,<sup>[11,17,18,19]</sup> three of which involved Indian medical students,<sup>[17,18,19]</sup> but differs from the finding of the study by Dahlin et al in which the scores of Swedish female medical students was higher than that of males.<sup>[12]</sup> In addition, there was no significant difference in the learning approach scores of male and female medical students in our study.

**Limitation of the study:** Limitations of our study include the fact that the results need not necessarily be representative of all



medical students or even of all first year medical students elsewhere in India (as the study was done in a small sample in one medical college); the possibility of bias; the cross-sectional design of the study; failure to determine data about stressors and coping strategies; not using an instrument specific for the medical profession and ignoring what some consider a third learning approach-the strategic approach. Also, while it could be argued that actually objectively diagnosing stress, and not merely eliciting perceptions could have been more informative; still, for the purpose of the present study, the PSS was considered adequate.

#### **Conclusion:**

Our study done to determine the relationship between learning approaches of first year medical students and their perceived stress revealed that there were significant positive correlations between the surface approach scores and the surface motive subscale scores of the R-SPQ-2F (which was used to determine the learning approaches) and the Perceived Stress Scale (PSS) scores. Further studies can be planned to investigate the relationship between learning approaches and stress in more detail using other instruments, preferably using a longitudinal study design rather than a cross-sectional design.

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