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Perception of Educational Environment in a Private Medical College in Central India

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ABSTRACT There is a growing recognition of the importance of educational environment in effective student learning. There is a proven correlation between educational environment and valuable outcome of student's achievement, satisfaction and success. As learning environment affects student's motivation and achievement, it is important to get feedback from the students on how they feel about their learning environment. This study was designed to compare students' perception of educational environment among high achievers (HA) and under achievers (UA) and to identify gender differences in perception. Dundee Ready Education Environment Measure (DREEM) inventory (questionnaire) was given to MBBS (Bachelor of Medicine and Bachelor of Surgery) students. DREEM is a validated and a universal diagnostic inventory for assessing the quality of educational environment. At the end of the questionnaire students were asked to respond to an open ended question. Mean scores and standard deviation for each item was derived. Comparison of items between HA and UA and the two genders was done by unpaired t-test. Perception of educational environment rated by the present sample was average. DREEM domain scores in HA and UA revealed that as compared to HA,UA had significant positive perception regarding teachers, academic atmosphere and social self perception. Overall no significant difference in individual items and all five domains were seen in two genders. The results indicate that there is need for further enhancement in educational environment for more effective learning. Few problem areas require remedial steps.

INTRODUCTION

There is a growing recognition of the importance of educational environment in effective student learning. Student's perception of the environment within which they study has a significant impact on their behavior, academic progress and sense of well being (Bassaw et al. 2003). There is a proven correlation between educational environment and valuable outcome of student's achievement, satisfaction and success (Genn 2001). More importance need to be given to the perception of students to improve the educational environment as perceptions are also associated positively with learning outcomes, learning approach and attitude towards studying (Mayya et al. 2004)

As learning environment affects student's motivation and achievement, it is important to get feedback from the students on how they feel about their learning environment (Abraham et al. 2008). Academic achievements assume importance and are a key factor for personal progress and personal worth (Padma 1991). Results of previous studies have identified differences in perceptions of high academic achievers and under achiever students of the same educational environment. Gender wise differences in perception were also found in few studies (Abraham et al. 2008). Student's perception of the educational climate can be influenced by the growing diversity of the students' population, educational infrastructure and their expectations. Hence it becomes important to assess students' perception of their educational environment with a view to optimize education. Student's perception of educational environment can also be a basis for implementing modification and to optimize educational environment (Gade et al. 2013).

Thus the present project was designed to study the perception of high achiever and under achiever students regarding educational environment and assess gender differences in perception. The study intends to suggest corrective measures to improve the educational environment.

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Objectives

1) To study comparison of students' perception of educational environment among high achievers and under achievers of NKP Salve Institute of Medical Sciences and Research Center (NKPSIMS), Nagpur.
2) To study gender differences in perception of educational environment.

METHODOLOGY

After ethical clearance from the institutional ethics committee of NKP Salve Institute of Medical Sciences and Research Center, Nagpur, this cross sectional study was conducted from July 2012 to September 2012. Dundee Ready Education Environment Measure (DREEM) inventory (questionnaire) was given to MBBS (Bachelor of Medicine and Bachelor of Surgery) students of II and final part I. Before administrating DREEM 50 item questionnaire to students, they were explained the purpose of this data collection. Participation in the study was optional and anonymity was assured. DREEM questionnaire was administered to students after their scheduled lecture.

To identify gender difference students were asked to tick F/M (Female/Male) option on the top of questionnaire to indicate their gender. At the end of the questionnaire students were asked to respond to an open ended question *'If you could change three things about medical college in which you are studying, what would they be?* (Whittle et al. 2007).

The students who have experienced failure at least once in university examination during MBBS curriculum were labeled as under achievers (UA). Student who never experienced failure were labeled as academic high achiever (HA) (Mayya et al. 2004; Abraham et al. 2008). Hence students who had at least once appeared for summative (university) examination were included in the study.

DREEM is a validated and a universal diagnostic inventory for assessing the quality of educational environment. This questionnaire was developed by an international Delphi panel and it has been applied to a number of undergraduate courses for health professionals worldwide (Roff 2005).

DREEM contain 50 items (statements) regarding a range of areas directly relevant to the educational environment .The students were asked to read each statement and respond using a five point Likert scale ranging from strongly agree to strongly disagree. Items were scored as follows

4=strongly agree, 3= agree, 2= uncertain, 1=disagree, 0= strongly disagree.

However, negative statements were scored in reverse order. That is

4=strongly disagree, 3= disagree, 2= uncertain, 1=agree, 0= strongly agree.

On this scale, a higher score indicates a more positive response.

The 50 item DREEM has a maximum score of 200, indicating the ideal educational environment. It consists of the following five subscales:

i) Students Perception of Learning (SPL) - 12 items, maximum score-48
ii) Students Perception of Teachers (SPT)- 11 items, maximum score-44
iii) Students Academic Self -Perception (SASP)- 8 items, maximum score-32
iv) Students Perception of Atmosphere (SPA)- 12 item, maximum score-48
v) Students Social Self –perception (SSSP)- 7 items , maximum score-28

The DREEM inventory was used to find out specific strengths and weakness within the educational environment by analyzing the responses to individual items given by students

- Items with a mean score of 3 and above were taken as positive points.
- Items with a mean score of 2 and below were taken as problem area.
- Items with a mean score between 2 and 3were considered as aspects of the learning environment that could be enhanced (Roff et al. 1997; Whittle et al. 2007).

Data Analysis

Data was analyzed using epi- info software 3.43 version. Mean scores and standard deviation for each item was derived. Comparison of items between HA and UA and the two gender was done by unpaired t-test and level of significance was considered as $p<0.05$.

RESULTS

The present study reports perception of two groups of students in the same academic environment. In this study total 152 students partici-

Table 1: Comparison of high achiever and under achiever

Domain	*Item No*	*Item*	*Mean HA*	*S.D.*	*Mean UA*	*S.D.*	*t-value*	*p value*
1.SPL	1	I am encouraged to participate in classes	2.56	0.87	2.6	1.1	0.22	0.82
	7	The teaching is often stimulating	2.42	0.85	2.5	0.8	0.48	0.63
	13	The teaching is student centered	2.12	0.96	2.0	1.2	0.59	0.55
	16	The teaching helps to develop my competence	2.43	0.90	2.8	0.9	2.07	0.04
	20	The teaching is well focused	2.56	0.84	3.1	0.6	3.39	0.001
	22	The teaching helps to develop my confidence	2.36	0.96	2.7	1.0	1.77	0.08
	24	The teaching time is put to good use	2.29	1.05	2.4	1.1	0.52	0.6
	25	The teaching overemphasizes factual learning	1.69	0.86	1.4	0.8	1.72	0.08
	38	I am clear about the learning objectives of the course	2.74	0.77	2.7	0.9	0.25	0.8
	44	The teaching encourages me to be an active learner	2.35	0.97	2.5	1.1	0.76	0.45
	47	Long term learning is emphasized over short term learning	2.43	0.96	2.6	1.0	0.88	0.37
	48	The teaching is too teacher centered	1.72	0.91	1.7	1.0	0.11	0.91
2. SPT	2	The teacher are knowledgeable	3.07	0.70	3.2	0.9	0.88	0.38
	6	The teacher are patient with patients	2.64	0.96	2.6	1.1	0.20	0.83
	8	The teacher ridicule the students	2.09	0.91	2.2	1.2	0.57	0.57
	9	The teacher are authoritarian	1.68	0.78	1.7	0.9	0.12	0.90
	18	The teacher have good communication skills with patients	2.84	0.89	3.0	0.9	0.9	0.37
	29	The teacher are good at providing feedback to students	2.24	1.01	2.8	0.9	2.84	0.005
	32	The teacher provide constructive criticism here	2.26	0.92	2.7	0.8	2.46	0.014
	37	The teacher gives clear examples	2.62	0.82	2.8	0.8	1.11	0.27
	39	The teacher get angry in class	1.89	1.02	1.9	1.2	0.048	0.96
	40	The teacher are well prepared for their class	2.69	0.89	2.8	1.0	0.61	0.54
	50	The students irritate the teachers	2.05	1.37	2.5	1.0	1.72	0.085
3.SASP	5	Learning strategies which worked for me before continue to work for me now	2.36	0.97	2.4	0.9	0.21	0.83
	10	I am confident about my passing this year	3.10	0.88	2.9	1.2	1.06	0.28
	21	I feel I am being well prepared for my profession	2.49	0.90	2.6	0.9	0.61	0.54
	26	Last year's work has been a good preparation for this year's work	2.52	0.96	2.8	0.8	1.51	0.13
	27	I am able to memorize all I need	2.08	0.95	2.3	0.8	1.20	0.23
	31	I have learned a lot about empathy in my profession	2.70	0.80	2.7	1.1	0	1
	41	My problem-solving skills are being well developed here	2.14	0.95	2.5	0.9	1.92	0.055
	45	Much of what I have to learn seems relevant to a career in medicine	2.75	0.78	2.9	1.0	0.91	0.36
4.SPA	11	The atmosphere is relaxed during the ward teaching	2.64	0.98	2.7	1.0	0.31	0.76
	12	This college is well time-tabled	2.13	1.20	2.7	1.1	2.43	0.016
	17	Cheating is a problem in this college	1.29	1.43	1.8	1.6	1.75	0.08
	23	The atmosphere is relaxed during lectures	2.44	1.05	2.5	0.9	0.29	0.77
	30	There are opportunities for me to develop inter-personal skills	2.32	1.10	2.7	0.9	1.79	0.074
	33	I feel comfortable in class socially	2.54	0.86	2.9	0.7	2.17	0.03
	34	The atmosphere is relaxed during tutorials/ seminars	2.36	1.21	2.7	1.0	1.45	0.14
	35	I find the experience disappointing	2.01	1.06	2.4	1.1	1.84	0.07
	36	I am able to concentrate well	2.55	0.88	2.8	0.8	1.45	0.15
	42	The enjoyment outweighs the stress of studying medicine	2.34	1.10	2.3	1.1	0.18	0.85
	43	The atmosphere motivates me as a leaner	2.21	1.03	2.4	1.1	0.92	0.36
	49	I feel able to ask the question I want	2.17	1.08	2.6	1.6	1.82	0.07
5. SSSP	3	There is good support system for students who get stressed	1.47	1.38	2.3	1.4	3.02	0.002
	4	I am too tired to enjoy the course	1.79	1.22	2.4	1.2	2.52	0.01
	14	I am rarely bored on this course	1.75	1.19	2.0	1.3	1.04	0.29
	15	I have good friends in this college	3.09	1.02	3.3	0.7	1.08	0.27
	19	My social life is good	3.04	0.77	3.1	0.4	0.42	0.67
	28	I seldom feel lonely	2.09	1.12	2.2	1.1	0.49	0.62
	46	My accommodation is pleasant	2.42	1.17	2.4	1.2	0.085	0.93

pated. In a sample of 152 participants, 31 were found to be Under achievers (UA) and remaining 121 were labeled as High achiever s(HA). Out of 152 students 89 were females and 63 were males.

Table 1 showed the mean DREEM item score of HA and UA. Total mean score of HA and UA were116.53/200 and 126.50/200 respectively. Overall scores of HA and UA were same, reflecting that perception of educational environment rated by the sample was average.

Positive items (having score 3 or above) in both HA and UA participants were item no. 2 and 18 from SPT, item no. 10 from SASP and item number 20 only for under achiever from SPL. There were seven individual negative items in Table 1. In both HA and UA category items having negative scores were item no 25, 48 from SPL group whereas from SPT they were item no 9 and 39.In SPA item no 17 had negative score which was the lowest score. From SASP group no item had negative score. In SSSP maximum items (3, 4, and 14) had negative score.

In Table 1, six individual items (20, 29, 32,33,3 and 4) having significant difference ($p<0.01$) between the HA and UA students are highlighted.

Mean DREEM domain scores in HA and UA (Table 2) revealed that as compared to HA, UA had significant positive perception regarding teachers ($p<0.0002$), academic atmosphere ($p<0.0001$) and social self perception ($p<0.01$). All five domain of educational environment were 3rated by HA and UA students as average in this institute.

No significant difference in individual item among female and male student were seen except item no. 17 and 25 (Table 3). Total score of female and male participants was 117.64/200 and 119.94/200 respectively. Overall no significant difference in all five domains was seen in two genders (Table 4).

Figure 1 showed opinion of students about the open ended question-All students (100%) gave suggestions on infrastructure of the college and fees paid to the institute. But no opinion was given by UA about college uniform, cheating problem and college timing.

DISCUSSION

The DREEM inventory was used to identify specific strengths and weakness within the educational environment of NKP Salve Institute of

Table 2: Mean (SD) DREEM domain scores showing comparison of high achiever and under achiever

Domain	*MeanHA*	*SDHA*	*Mean UA*	*SDUA*	*p-value*
SPL	27.9	5.3	29.0	6.3	0.32
SPT	24.8	4.0	28.3	6.8	0.00029
SASP	20.1	4.0	21.1	4.6	0.23
SPA	25.0	5.4	30.4	5.6	0.0001
SSSP	16.0	3.5	17.7	3.02	0.014
Total	22.75	6.15	24.03	7.68	0.33

Table 3: Items showing significant differences between female and male

Item No.	*Item*	*Mean F*	*S.D.*	*Mean M*	*S.D*	*t value*	*pvalue*
25	The teaching overemphasizes factual learning	1.49	0.77	1.81	0.93	2.45	0.015
17	Cheating is a problem in this college	1.08	1.37	1.84	1.52	3.42	0.0007

Table 4: Mean (SD) DREEM domain scores showing gender comparison

Domain	*Mean F*	*SDF*	*Mean M*	*SDM*	*p-value*
SPL	27.7	5.4	28.7	5.3	0.26
SPT	25.3	4.4	25.6	5.0	0.69
SASP	20.3	4.1	20.5	3.8	0.76
SPA	25.9	5.7	25.6	5.6	0.75
SSSP	16.2	3.5	16.4	3.4	0.73
Total	23.07	6.29	23.36	6.3	0.51

Medical Sciences, a private medical college of central India by analyzing the responses to individual items given by students. The DREEM inventory identifies areas of poor scores or negative perception where remedial actions are needed.

Learning environment in any medical institute is important for effective management of learning (Genn 2001) as well as for modifying the curriculum (Genn et al. 1986). Also student's perception of the learning environment is found to influence their behavior (Till 2004). Learning is an outcome of one's interactive experience with the environment. Learning is a process which results in a relatively permanent change in the behavior of the learner (Santosh Kumar 2000).

In this study, according to both groups of students (HA and UA), perception about learning showed that the present day teaching overemphasizes factual learning and the teaching is too teacher centered. Same perception was found in other studies (Whittle et al. 2007; Lokuhetty 2010). These responses to learning indicate that there is a need for change in curriculum. Perception about learning showed that UA feel teaching is well focused ($p<0.001$) as compared to HA. That may be because HA are more dependent on self study as compared to UA who depends more on teachers for guidance. From this researchers can interpret that HA are in androgogy phase whereas UA still in pedagogy phase.

Most students in both groups opined that teachers were authoritarian and they got angry in class. Same perception was found in another study (Mayya et al. 2004).These items are the areas of concern and the most difficult area of educational environment to change.

The educational environment in medical college is the responsibility of the educators. It is recognized globally that medical education has to go beyond the mere teaching and learning of medicine. It must be made more relevant, efficient and effective (Pai 2002). Amongst all disciplines, medicine is the field where student sees what the teacher does and imitates him. Teacher has to be a role model for students not only for knowledge and skill, but also for the moral values.

Students who have positive views of their teachers are likely to demonstrate achievement oriented behaviors. Many underachievers exhibited problems with authorities, including problems with teachers (Mandel et al. 1988).

In this study both HA and UA perceived the teachers as knowledgeable. They also opined that the teachers have good communication skills. Among HA and UA significant difference was seen regarding the fact that teachers are good at providing feedback to students ($p<0.005$) and teachers provide constructive criticism to students ($p<0.01$).There was a relatively positive perception of UA regarding teacher which may be because of the fact the teachers were taking additional efforts to teach them. It showed that a positive attitude towards the teachers did not correlate directly with the academic achievement. Academic self-perception and motivation appeared to be a stronger predictor of academic achievements than the attitude towards the institute or the teachers. There is a positive relationship with level of motivation and approaches to learning (Entwistle 1989). According to them low academic achievement is characterized by less satisfaction with the educational environment. In their study UA had significantly lower scores on perception of teacher, academic atmosphere and social self perception as compared to HA.

The teaching learning activities should occur in an atmosphere where the basic needs of students are fulfilled (Santosh Kumar 2000). In present study perception of students regarding educational atmosphere showed that HA were more comfortable in the class than UA ($p<0.03$). HA felt free to ask questions (Mean H 2.17, UA 1.6).This low confidence of UA to ask question might be one of the a reason for academic under achievement. UA may either lack motivation or self regulation skills or both. They may not understand that strategic behavior along with efforts result in better academic achievement (Borkowski et al. 1994).

Both groups of students had no negative response regarding their academic self –perception. They were very much confident about their passing.

Negative items (score below 2) were indicated as problem areas. These areas require further investigations and remedial steps. In both groups (HA and UA) lowest negative perception was found regarding problem of cheating during exams. This problem correlated with the problem mentioned in the open ended question. Negativity was seen in many items of social self

perception by both HA and UA, especially about support system for students who get stressed. This item is the cause for concern and requires further corrective measures. Same results were noted in another study about the support system (Whittle et al. 2007). In the present study students were not happy regarding stress management. This is an issue which needs to be attended urgently.

HA were relatively more optimistic about support system as compared to UA ($p<0.002$). In a supportive environment students perform better. Motivated learners in supportive environment have high levels of self efficacy (Lokuhetty 2010). Regarding social self perception UA were enjoying the course more as compared to HA ($p<0.01$). Similar finding was reported in another study (Abraham et al. Inaugural issue 2008). In the present sample both groups of students were positive about friends and social life.

Findings of this study revealed that maximum items were rated as average (score 2-3) by both groups of students. These are the areas which needs further enhancement to improve the educational environment. Educational environment makes an important contribution to student learning (Whittle et al. 2007) and it is one of the most important factors in determining the success of an effective curriculum (Abraham et al. 2008). Curriculum is a vision and road map to meet the academic objectives (Desai 2009). Hence for effective management of learning, understanding the educational environment and introduction of appropriate changes is necessary.

Curriculum development in medical education would consist of changes in the learning environment of medical institute (Boomer 1982). In this study highest score was found regarding learning. It indicates that in this domain student's perception was moving in positive direction. There are few issues those require changes. In the present study there were only seven items with negative score as compared to study conducted by Mayya and Roff (2004) at Manipal where they found 24 items of score less than 2.

In the present study mean DREEM domain scores in HA and UA showed that as compared to high achiever under achiever had significant positive perception regarding teachers (0.0002), academic atmosphere and students self perception. In another study academic UA had significantly higher scores than academic HA in the domains SPL and SPT (Abraham et al. 2008) whereas higher score for academic HA was found in study conducted by Mayya and Roff (2004).

In this study no gender difference in total DREEM item score and domain score was found. It indicates female and male students both perceived educational environment in the same way. This result indicates that there is no need of special support system for a particular gender. Same results were noted by other study (Abraham et al. 2008). Female student's score was significantly high in a study conducted in Bangladesh (Nahar et al. 2010). A comparative study of data from another undergraduate medical school showed that female students were significantly less pleased with the educational environment of the institution. According to them gender differences in perception of the educational environment might well emerge in particular academic or cultural context and with particular curricula (Mayya et al. 2004).

An interesting finding in the present study was that both genders had negative opinion regarding factual teaching and cheating problem during exams in this college, but female students as compared to male counterpart appeared more sensitive about these issues. ($p<0.015$, $p<0.0007$)

At the end of the questionnaire students were asked to respond to an open ended question. Various suggestions and complaints were given by students in response to this open ended question. The open ended question was *'If you could change three things about medical college in which you are studying, what would they be?"*

Maximum numbers of students were not satisfied with the infrastructure and cafeteria of the institute. Suggestion on upgradation of basic amenities and recreation facilities were given. Few student felt the need of stress handling programme and introduction of some kind of motivational activity. They also gave suggestions regarding teaching pattern which were shared with the authorities. Assurance was given by authorities that corrective measures will be taken in the coming term. Results of these measures will be considered in the second phase of the study.

Considering the stress of a vast curriculum and new atmosphere among students, the college has started an activity *'Anubandh'*. This is a Teacher-student mentorship programmer. This activity was started in year 2012. Students of I

MBBS were divided into groups of 15 each, with two students from immediate senior batch and two teacher incharge. The purpose of *'Anubandh'* was to develop a support system for students. This innovative student friendly activity is still in infancy. Other student friendly activities in this institute are annual social gathering, Student welfare council and Drop Box for suggestions and opinions.

These opinions of students correlated with perception for DREEM inventory. This qualitative data provides support and insight in to the results obtain from DREEM inventory. This will be further helpful for optimizing education.

CONCLUSION

The DREEM Inventory had provided an overview of student's opinion of NKP SIMS and showed areas of concern to be looked into. The present study revealed that overall perception of high achiever and under achiever student about educational environment is average. Results of this study showed that compared to high achiever under achiever had significant positive perception regarding teachers, academic atmosphere and students self perception. No difference in perception was found in both genders. These results indicate that there is need for further enhancement in educational environment for more effective learning.

RECOMMENDATIONS

Few problem areas require remedial steps. The results were shared with authority so as to bring about desired changes. The effect of which will be measured in Phase II of this study. Such a study requires further expansion to explore reasons of poor score items. It will be then convenient for higher authorities to formulate remedial measures. In future this type of study should be repeated to monitor changes in student's perception.

LIMITATIONS

DREEM inventory has been used in this study to compare different groups of students. By DREEM questionnaire researcher can identify problem areas of educational environment. Even in other studies, DREEM inventory was used for same purpose as well as to compare different medical institutes. The drawback with this inventory is that it does not provide any suggestions for improvement of educational environment.

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REFERENCES

Abraham RR, Ramnarayan K, Pallath V, Torke S, Madhavan M, Roff S 2008. Perception of academic achievers and under achievers regarding learning environment of Melaka Manipal Medical College (Manipal Campus), Manipal, India, using the DREEM Inventory. *South East Asian Journal of Medical Education,* 1: 18-24.

Abraham R, Ramnarayan K, Vinod P, Torke S 2008. Students' perceptions of learning environment in an Indian medical school. *BMC Medical Education,* 8: 8-20.

Bassaw B, Roff S, Roopnarinesing S, Lisle JD, Teelucksing S, Gopaul S 2003. Students' perspectives on the educational environment, Faculty of Medical Sciences, Trinidad. *Med Teach*, 25(5): 522-526.

Boomer G (Ed.) 1982. *Negotiating the Curriculum*. Sydney, Australia: Ashton Scholastic.

Borkowski JG, Thorpe PK 1994. Self-regulation and motivation: A life-span perspective for underachievement. In: DH Schunk, BJ Zimmerman (Eds.): *Self –regulation of Learning and Performance: Issues and Educational Applications*. Hillsdale, NJ: Lawrence Erlbaum Associates, pp. 45-73.

Desai M 2009. Changing face of pharmacology practical for medical undergraduates (Editorial). *Indian J Pharmacology,* 41(4): 151-152.

Entwistle N, Kozeki B, Tait H 1989. Pupils' perceptions of school and teachers. II- Relationships with motivation and approaches to learning. *British Journal of Educational Psychology,* 59: 340-350.

Gade S, Chari S 2013. Students' perception of undergraduate educational environment in multiple medical institutes across central India using DREEM inventory. *National Journal of Integrated Research in Medicine*, 4(5): 2290.

Genn JM, Harden RM 1986. What is medical education here really like? Suggestion for action research studies of climates of medical education environments. *Medical Teacher,* 8(2): 111-124.

Genn J 2001. AMEE Medical Education Guide No 23 (Part 1): Curriculum, environment, climate, quality and change in medical education – a unifying perspective. *Med Teach*, 23(4): 337-334.

Lokuhetty MDS, Warnakulasuriya SP, Perera RIR, DeSilva HTR, Wijesinghe HD 2010. Student's perception of educational environment in a medical faculty with an innovative curriculum in Sri Lanka.

South-East Asian Journal of Medical Education, 4(1): 9-15.

Mandel HP, Marcus SI 1988. *The Psychology of Underachievement: Differential Diagnosis and Differential Treatments.* New York: John Wiley and Sons.

Mayya SS, Roff S 2004. Students' perceptions of educational environment: A comparison of academic achievers and under-achievers at Kasturba Medical College, India. *Education for Health*, 17(3): 280-291.

Nahar N, Talukder MHK, Khan MTH, Mohammad S, Nargis T 2010. Students' perception of educational environment of medical colleges in Bangladesh. *BSMMUJ*, 3(2): 97-102.

Padma MS 1991. *Correlates of Achievement – A Trend Report. Fourth Survey of Educational Research, New Delhi.* National Council of Educational Research and Training, pp. 807-809.

Pai PM 2002. The role of an educator. In: PS Bhuiyan, NN Rege, AN Supe (Eds.): *The Art of Teaching Medical Students*. Mumbai: Medical Education Technology Cell, Seth GS Medical College and KEM Hospital, pp. 11-14.

Roff S, McAleer S, Harden R, Al-Qahtani M, Ahmed A, Deza H, Groenen G, Primparyon P 1997. Development and validation of the Dundee Ready Education Environment Measure (DREEM). *Med Teach*, 19(4): 295-299

Roff S 2005. The Dundee ready Educational Environment Measure (DREEM) - a generic instrument for measuring students' perception of undergraduate health profession curricula. *Medical Teacher*, 27(4): 322-325.

Kumar S 2000. Teaching learning Principles-Implications and applications In: N Ananthkrishan, KR Sethuraman, Santosh Kumar (Eds.): *Medical Education, Principle and Practice.* 2nd Edition. JIPMER, Pondicherry: Alumni Association of National Teacher Training Centre, pp. 179-189.

Till H 2004. Identifying the perceived weakness of a new curriculum by means of the Dundee Ready Education Environment Measure (DREEM) Inventory. *Medical Teacher,* 26(1): 39-45.

Whittle S, Whelan B, Murdoch-Eaton DG 2007. DREEM and beyond: Studies of the educational environment as a mean for its enhancement. *Education for Health*, 20(1): 1-9.