FACTORS AFFECTING THE USE AND ATTITUDE TOWARDS MEDICAL RESOURCES AND EDUCATIONAL METHODS IN A SAUDI MEDICAL SCHOOL

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Medical colleges are using various teaching methods and educational resources in education. In order to explore the attitude of medical students towards these educational methods and resources and the factors playing a major role in their use in a medical school in an Arabic culture, a self answered questionnaire was directed to 283 medical students in their clinical years. Questions on the possible factors which affect the attendance and the use of these education resources were also included. Traditional methods of teaching, lectures, and clinical rounds were found to be the backbone of the educational process in this college. Attendance to lectures was related to both quality of subjects and to the lecturer, emphasizing the importance of a good lecture and lecturer. Clinical bedside teaching was found to be a popular and effective way of teaching medical knowledge, skill, and patient interactions to medical students. The library in this college was the least used resource and student appreciation of its importance was very low. General recommendations are to reduce dependence on lectures gradually in clinical years and to introduce new methods of clinical teaching. *Ann Saudi Med 1994;14(3):209-214.*

The education process in medical colleges is aiming, in its broad term, to produce a competent general practitioner oriented to the health problems of the community.[1] In fulfilling this, colleges are using various teaching methods and educational resources. Although some medical colleges are using advanced methods such as computer-aided discussion of clinical cases, student discussion groups, integrated sessions and open seminars, traditional methods of teaching, namely lectures and clinical rounds, are still considered the backbone of this educational process and, clearly, the most feasible ones.[2] The medical library, on the other hand, is the most commonly available educational resource in most medical schools. It is the intention of this paper to explore the attitude of medical students toward these educational methods and resources and the factors playing a major role in their use in a medical school in an Arabic culture and to present some recommendations for their effective use.

The College and the Educational Process

The medical college in King Abdulaziz University in Jeddah, Saudi Arabia operates an undergraduate program for six years following secondary school. The first three years are for basic medical science teaching while the other three years are dedicated to clinical teaching. Teaching in the clinical years is performed in the form of bedside

teachings (clinical sessions or rounds) and formal 50 minute lectures.

The quantity of lectures and clinical rounds varies in various years but generally, lectures encompass 35% to 40% of the curriculum with clinical sessions making up the remaining 60% to 65%. Slide presentations and overhead transparencies are commonly used in lectures. Student presentation of clinical cases is the usual method of clinical sessions that are followed by comments, short group discussion and explanation by the accompanying tutor. Students who do not attend 20% of their lectures or clinical sessions are penalized by deducting part of the marks allocated for their interval exams or preventing them from sitting for final exams. The medical library of this college in the male campus opens 10 to 12 hours daily. It contains various assigned textbooks, study corners, audiovisual aids, a wide range of medical journals and some reference books in clinical medicine and basic medical sciences. Another smaller library is located in the female section. In this Islamic country, the college is actually a two-in-one college, as segregation of the sexes is a fundamental pillar of the training.[3] Hence, two separate libraries are available for females and males while lectures and clinical rounds are repeated for each sex by the same or a different tutor.

Subjects and Methods

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The present study was conducted by administering a detailed questionnaire to medical students in the fourth, fifth, and sixth years (N=367 students), inquiring about personal characteristics, hobbies and social activities, his/her grade for the previous academic year and his/her use and attitude towards educational methods and resources; namely, lectures, clinical sessions, and library. Questions on the possible risk factors that might affect the attendance and the use of these educational resources were put to students with extra space for personal opinion. In order to obtain students' opinions freely, they were requested not to write their names. Personality traits of the students were studied using Eysenck Personality Test,[4] where two scales were considered (namely neuroticism scale and introversion/extroversion scale). A total of 284 students from the whole group returned the questionnaire.

Statistical Analysis

Data were analyzed using IBM PC and Statgraphics Version 4 statistical package.[5] Data were subjected to simple statistical methods as well as to principal component regression technique,[6,7] where the following steps were performed:[8,9] 1) the original data were standardized (centered and scaled); 2) a cross-correlation matrix between the variables was prepared; 3) factors were extracted using the principal component solution without iteration. In this method, the main diagonal of the correlation matrix is not altered and the program extracted principal components that are defined as exact mathematical transformation of the original variables. A variable can be decomposed into components and predicted exactly from these components; 4) the extracted components were rotated using "Varimax" type of rotation to obtain orthogonal factors with simple structures; and 5) regression of the dependent variable was performed on the rotated components using stepwise regression technique. The variable was considered significant if the P value was <0.05.

Results

The sample comprised 77.4% of total students in three clinical years; 39% in the fourth year, 31% in the fifth year, and 30% in the sixth year. The male to female ratio of our study population was 1.4:1 and the ratio of single to married students was 1:2.7. The majority of students were nonsmokers (85.9%). The age distribution was as follows: 22 to 23 years (32.4%); 24 to 25 years (62.0%); and 26 years or more (5.6%).

Figure 1 shows the use of various educational methods and resources in both sexes. Answers to questions regarding the student's attitude and use of various

FIGURE 1. Use of methods and resources by medical students according to sex.
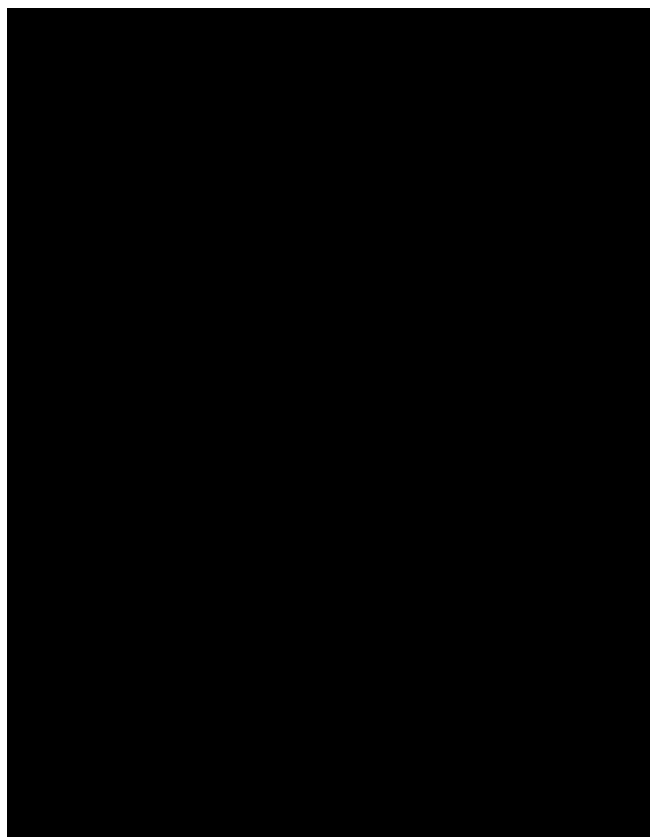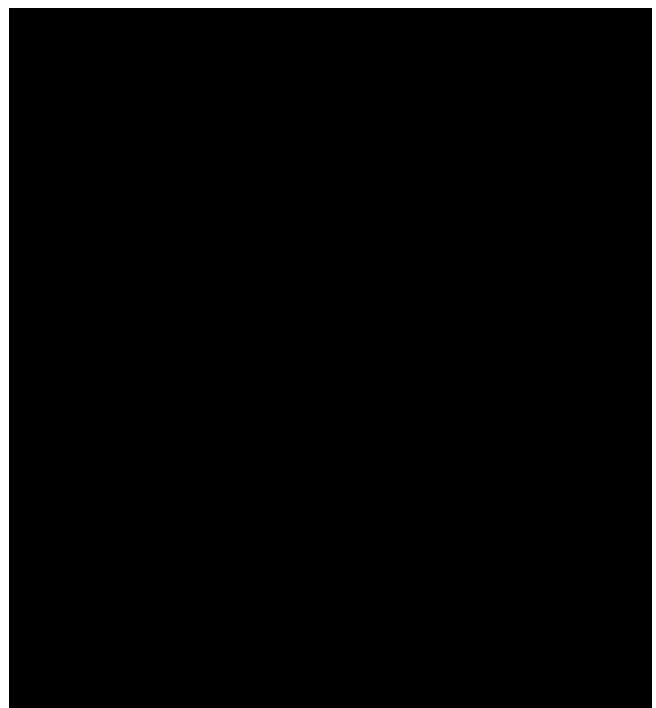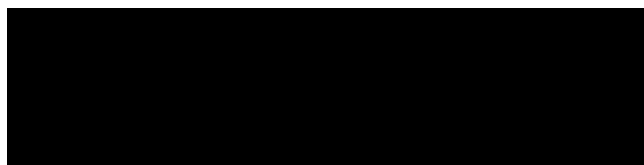
FIGURE 2. Attitude of medical students towards educational methods and resources according to sex.

TABLE 1. *Use and attitude of medical students towards educational methods and resources.*

Item	% Said Yes
Lectures	
Lectures are important for success	56.5
Attended most of the lectures (>90%)	74.1
Reasons for attendance:	
Scientific material presented	91.5
Personality of the lecturer	73.4
Time of the lecture is suitable	64.5
Recording of attendance	55.8
Employment of audiovisual aids	50.7
Unavailability of textbooks	40.8
High marks allocated to the subject	28.8
Clinical Rounds	
Clinical rounds are important for success	94.5
Attend all the clinical rounds	89.4
Reasons for not attending clinical rounds:	
Personality of the tutor not convincing	10.2
The session subject was not useful	07.0
Training hospitals are far from the University	06.0
No recording of attendance	03.0
Library	
Use of library is important for success	16.6
Used library regularly	20.7
Reasons for not using library:	
Lack of time	66.0
Library is too noisy	39.5
Unavailability of good textbooks	21.1

TABLE 2. *Relationship of lecture attendance to personal and social factors.*

	Attending lectures				
	Yes (n=210)		No (n=73)		
Factors	n	%	n	%	x^2
Sex					
Male	103	66.0	53	34.0	
Female	107	84.3	20	15.7	11.23***
Live on University Campus					
Yes	59	65.6	31	34.4	
No	151	78.2	42	21.8	4.52*
Presence of father at home					
Present all year	127	79.4	33	20.6	
Travels occasionally	57	77.7	17	23.0	
Travels most of the time	7	38.9	11	51.1	
Dead	18	64.3	10	35.7	15.86***
Smoking habits					
Non-smokers	192	78.7	52	23.3	
Smokers	18	46.2	21	53.8	18.59***
Joining Private Clubs					
Yes	25	58.1	18	41.9	
No	183	77.2	54	22.8	6.90***
Permission to be away from home					
Yes	83	66.9	41	33.1	
No	127	80.4	31	19.6	6.60**
Permitted to return home late					
Yes	101	67.8	48	32.2	
No	109	81.9	24	18.1	7.42**

*=P<0.05; **=P<0.01; ***=P<0.001.

educational resources and methods, and factors that attract or deter them are included in Table 1. The majority (94.5%) of the students considered clinical rounds an important factor for success and 56.6% felt the same regarding attendance to lectures, while only a minority (16.6%) had the same attitude toward the use of the library (Figure 2). The actual use of these educational methods and resources by students showed similar trends (89.4%, 74.1%, and 20.7% respectively).

The main reasons that attracted students to attend lectures were the scientific material presented (91.5%) and personality of the lecturer (73.4%), while only 28.8% of the students considered marks allocated to the subject as an important factor for attending lectures. The main factors that deterred students from attending clinical rounds regularly were personality of the tutor, the feeling that the subject of the session was useless, and the far location of the training hospitals from the faculty of medicine.

A total of 225 students (79.3%) in both sexes did not use the library and 187 of them (66%) felt that the main reason for this was the lack of time in their busy schedule. Several social and personal factors of the students were significantly associated with their attendance to lectures (Table 2). Females regularly attended lectures compared to males (P<0.005). Living in campus accommodations was associated with less attendance to lectures (P<0.05). A positive relationship was found between the presence of the father at home and attendance to the lectures (P<0.005). Students who smoked or joined private clubs were less likely to attend lectures (P<0.005), as well as students who were allowed to be away from home or to come late to the home (P<0.01).

Educational variables associated with attendance to lectures are cited in Table 3. There was a negative relationship between high rank of academic year and attendance to lectures, as sixth year students attended less than fifth and fourth year students (P<0.05). Students with high grades in the previous year (very good or excellent) were significantly better attendees to lectures (P<0.05). There was a positive association between attendance to clinical rounds and the frequent use of library with attendance to lectures (P<0.001; P<0.05 respectively). A highly positive relationship was found, as expected,

between positive attitude toward lectures and attendance (*P*<0.001).

Table 4 depicts the relationships between rotated principal components and various variables. It is obvious that each factor (after rotation) is identified mainly with one of the original variables; for example, the correlation coefficient (r) between factor one and the variable (academic year) is 0.94, i.e., 88.34% (which is r^2) of the variance in the variable (academic year) was explained by factor one, or the weight of factor one was mainly determined by the academic year variable while other

TABLE 3. *Relationship of lecture attendance and educational factors.*

	Attending lectures				
	Yes (n=210)		No (n=73)		
Factors	n	%	n	%	X^2
Academic Year					
Fourth	89	80.9	21	19.1	
Fifth	66	75.9	21	24.1	
Sixth	55	63.9	31	36.1	7.43*
Previous Year Grade					
Failed	13	76.5	4	23.5	
Passed	60	65.9	31	34.1	
Good	93	73.2	34	26.8	
Very good	36	90.0	4	10.0	
Excellent	7	100	0	0.0	10.98*
Attended Clinical Rounds					
100%	187	72.2	62	27.8	
>75%	8	50.0	8	50.0	
50% - 75%	0	0.0	1	100	7.59*
Use of Library					
Yes	53	84.1	10	15.9	
No	157	71.4	63	28.6	4.14*
Feel that lectures are important for success					
Yes	126	82.9	26	17.1	
No	72	60.5	47	39.5	17.00***

*=*P*<0.05; **=*P*<0.01; ***=*P*<0.001.

TABLE 4. *Correlation between factors and various variables.*

Factor No.	Variables	r
1	Academic year	0.94137
2	Last year grade	0.95604
3	Having friends	0.96958
4	Smoking habits	0.97674
5	Permitted to study out	0.96800
6	Join university activities	0.95962
7	Marital status	0.97488
8	Family size	0.97063
9	Campus residence	0.98096
10	Permitted to be away from home	0.97368
11	Monthly expenditure	0.94660
12	Extrovert personality trait	0.96058
13	Permitted to return home late	0.92662
14	Sex	0.93396
15	Join private clubs	0.97063
16	Neuroticism personality trait	0.91734
17	Age of the student	0.90446

variables have very low correlation with factor one. In other words, factor one can be used to represent the variable academic year only. The remaining factors showed similar relationships with different variables and each factor mainly represented the corresponding variable.

When these factors were used in the regression analysis to explain the variation in the outcome variable namely nonattendance to lectures (Table 5), it was found that factors representing the academic year of the student, previous year grade, smoking habit, joining private clubs, allowed to be away from home, monthly expenditure, family size, and sex were significantly associated with attendance to lectures. Attendance to clinical sessions was similarly affected by the above mentioned variables in a similar regression analysis.

Discussion

The use of various methods of teaching is dictated mainly by the structure of the curriculum, teacher preference, and the available resources. The use of the lecture method is still a cornerstone of medical teaching but many researchers are studying the superiority of other methods of clinical teaching on traditional lectures. Moore and Schare et al.[10,11] noted that performance of students taught by lectures and by problem-based learning (PBL) was identical but students preferred PBL to lectures. Harvey and Vaughan[12] found that lectures were the least favored teaching activity among nurses when studying their attitude towards 10 methods of clinical teaching. Ferreira[13] recommended less use of traditional lectures in clinical years and the wide use of integrated sessions. In the traditional Saudi culture, it seems that lectures still have a major role in medical education and students cannot be weaned completely from them, as 56.5% of students have a positive attitude toward lectures and 74.1% of them were regular attendees. Direct reasons related to lecture attendance in this college were related to both the subjects presented and the method of presentation as well as to the personality of the lecturer. More than half of the students found the use of audiovisual aids in a lecture as a good reason for attending and 73.4% were influenced by the personality of the lecturer. Attendance to lectures was fairly highly related to absence-taking during lecture and only minimally to the magnitude of marks allocated to the subject. This supports the importance of good lectures and the lecturer as a vehicle to train medical students and this point was echoed by the World Conference of Medical

TABLE 5. *Regression equations describing the relationship between factors and their representing variable with nonattendance to lectures.*

Factor No.	ß	t-value	
1	-0.0604	-2.2707	*
2	0.0590	2.2267	*
3	-0.0111	-0.4201	

4	-0.0744	-2.8040	**
5	-0.0270	-1.0168	
6	-0.0040	-0.1576	
7	-0.0304	-1.1479	
8	-0.0635	-2.3909	**
9	0.0058	0.2192	
10	-0.0522	-1.9626	*
11	-0.0532	-2.0027	*
12	-0.0647	-2.4396	*
13	-0.0236	-0.8876	
14	-0.0366	-1.3796	
15	-0.0662	-2.4950	**
16	-0.0277	-1.0419	
17	-0.0345	-1.2980	

*=$P<0.05$; **=$P<0.01$; ***=$P<0.001$.

Education, which stressed that medical teachers must acquire a set of skills that encourages and facilitates learning, especially independent and self learning.[1] This surely applied to teaching in the clinical field where bedside teaching is used to deliver medical knowledge and train future doctors in skills of communication, clinical examination, and patient management. It was obvious that clinical teaching by bedside teaching in small group discussion was a popular and favored way of teaching medical knowledge, skill, and patient interactions to medical students in this college. This can be seen from the homogenous high attendance and the positive attitude to clinical rounds from all years in both sexes (Figures 1 and 2). This is in agreement with Levenkron et al.[14] findings in their comparative study of effective teaching by patient instruction and small discussions, which resemble the method used in this college. It is still too early and premature to apply the highly sophisticated type of clinical teaching in our college such as computer assisted learning, since there is still controversy regarding the value and application procedure as well as to the influence on achievement compared to the traditional small group discussion in bedside teaching.[15,16] These methods need a well-structured curriculum and a dedicated and well-trained faculty staff for their implementation.

When studying the effect of several variables on the attendance and use of various educational methods and resources, it was obvious that variables of wide diversity were showing influence and they should be grouped for easier interpretation. Multiple regression analysis has been widely used as a standard technique to study the partial effect of predictor independent variables on an outcome variable,[7,8] but when the correlation matrix of all independent variables was examined, it was found that most of these variables were highly correlated ($r > 0.4$). In fact, when regular regression analysis was performed, only three variables out of the 17 independent variables turned out to be significant in explaining the variance in the outcome variable; namely, nonattendance to lecture, although most of these 17 variables were significant at the simple bivariate analysis level (Tables 2 and 3). This is

related to the effect of multicolinearity in these highly intercorrelated data.[8,9] Factor analysis solved this problem by abstracting the net effect of each variable in a factor. It showed reasons for not attending lectures or clinical rounds to lie within three different areas: 1) student personality represented by extroverted personality, sex, smoking habit, and staying outside for long periods of time. These factors seem to be in logical harmony, as those who were attending more were nonsmokers, less prone to be extroverted, females, and not allowed to stay out of the home for a long time in the Saudi culture; 2) the socioeconomic status of the student, showing students with high expenditure, large family size, and those joining private clubs to be less attendant to lectures. This relationship of attendance to socioeconomic status is difficult to interpret. It is surely related to the dominant socioeconomic level and the culture of the society studied. We can only assume that some students from rich families are less motivated to attend and students with large family size who might have more family involvement and less time for attendance; and 3) educational factors related to attendance were represented by previous year achievements and the academic year as expected. The association of late clinical years with less attendance supports the recommendation by Ferreira[13] to reduce dependence on lectures to a minimum gradually in clinical years. The use of the library was found to be very low in this college. Direct reasons for this were related to time pressure on medical students (66%), the noisy environment, and the book service. These factors might explain the low rate of library use to a large extent but not the negative feeling towards its importance for success. The latter finding is extremely alarming, as only 16.6% of our future doctors felt positive towards the library. This point will need to be studied more in depth, since it will definitely affect their free reading out of assigned textbooks and capability for future research and will have a negative influence on their continued medical education after graduation. The persistent influence of the traditional pattern of premedical education in secondary schools in Saudi Arabia that depends on student memorization of assigned books and less use of library or outer sources in readings can be thought of as one of the important factors worth further research. Another factor might be related to the curriculum structure of this college that does not encourage self learning or library assignments.

In conclusion, lectures have a major role in the teaching process in this college and attendance was related to both the quality of subjects and to the personality of the lecturer in addition to the use of audiovisual aids. This supports the importance of good lectures and dedicated lecturers in training medical students. Clinical bedside teaching was found to be a popular and effective way of teaching medical knowledge, skill, and patient interactions to medical students. Most of the students had a positive attitude and

high attendance. Library use was low and students described a disturbingly low appreciation for its role. Further research is needed to investigate this alarming phenomenon. General recommendations are to reduce dependence on lectures gradually in clinical years and to introduce new methods of clinical teaching.

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