



ASSESSMENT OF QUALITY OF FOOD SERVICES IN THE CAFETERIA OF MEDICAL SCHOOLS OF KARACHI, PAKISTAN. MULTICENTER STUDY

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ABSTRACT

Background and Objective: Food services quality is an important factor for medical student's health. The objective of this study to determine the quality of food services at different medical schools of Karachi, Pakistan

Methods: A cross sectional study was conducted in the three medical institutes of Karachi. A total of 1315 medical students was enrolled by simple random sampling. Structured questionnaire were used to determine the quality of food. Multiple regression analysis was used to examine the effects of predictors with overall satisfaction level toward quality of food by students.

Results: Mean age of medical students was 21 ± 2.34 SD. The students in preclinical year were 29% [AOR: 0.71 (95% CI: (0.56-0.89),] found more 'dissatisfied' with cafeteria services. students who consumed snacks 26% were [OR: 0.74 (95%CI: (0.57-0.97),] found more 'dissatisfied' with cafeteria services than those who did not consume snacks at cafeteria .The students who consumed cold drinks 27% were found [OR: 1.27 (95% CI: (1.00-1.62), more satisfied with services

Conclusion: The result of study concluded that majority of medical students were 'dissatisfied' with overall quality of cafeteria services. There is need for improvement for quality of food services by implementation of good quality policy.

KEYWORDS : Quality; Cafeteria; Services; Satisfaction; Medical; Students; Food

INTRODUCTION

Quality assessment is increasingly becoming an important aspect of post consumption evaluation of cafeteria services by consumers. Quality assessment involves eliminating defects in performers who failed to carry out the required services. It addresses safety and quality of both products and processes. To maintain food quality regular monitoring is necessary in terms of hygiene, cost, clean, safe, and well taken care of food with good presentation and served in a proper manner [1]. The quality assessment plays a major role in determining the originality and accuracy of a system as higher the level of satisfaction the higher will be the level of students' patronizing their energy, body fuel and mental health [2]. Universities are becoming increasingly aware of the importance of quality assessment of students in delivery of cafeteria services. This is due to increasing number of college and university students [3, 4].

Students are sandwiched between the intensity of time to be devoted to their studies and time to pursue their nutritional requirements. So patronize the cafeteria services as alternative source to take food and beverages [5]. A number of studies have focused on cafeteria food attributes in developed and developing countries. A study at residential hostel cafeterias, Malaysia [6] identified mean scores on students' satisfaction towards food attributes using a rating scale of 1 (totally dissatisfied) to 5 (totally satisfied). Mean score above 3.40 in this study inclined towards satisfaction. Food quality (mean score=2.27), food cost (mean score=2.13), cafeteria atmosphere (mean score=3.42), cafeteria staff (mean score=3.60), waiting time (mean score=2.41) clearly explained the students were not satisfied with food quality, food cost and waiting time but satisfied with operating atmosphere. According to Raman, 55.40% of university students not frequently eat at cafeteria due to bad food quality and 6.0% students feels that the cafeteria environment is not satisfactory [7]. Food could be dangerous if not properly handled, prepared and stored. Studies of universities students suggest a high proportion have unhealthy diets in the United States as well as in Europe, especially in term of fruit consumption, meat eating, and high fat food [8].

Very few studies have been conducted to explore the quality assessment of medical students in developing countries. This study will be helpful to identify the quality of services and determine the significant factors leading to quality of services which can have great impact on satisfaction and health of students. The main objective of the study is to determine the quality of food services in cafeteria at medical schools of Karachi.

MATERIALS AND METHODS

This cross-sectional study was carried out in medical institutes of

Karachi, Sample size was calculated by using mean satisfaction level 3.0 ± 0.923 SD of satisfied students towards hygiene and cleanliness of cafeteria services in previous study [6]. Therefore 1315 is the total sample size for this study.

The survey takes up a simple random sampling design. There are 21 recognize medical institutes in Karachi including 14 private and 7 public medical colleges with ratio of 2:1 [9]. Two private and 1 public medical institute were selected in order to generalize our finding accurately. Weighted samples were taken from each institution i.e. 655 medical students were taken from a public medical institute, whereas 328 and 327 medical students from each private medical institute respectively. Students were listed in step with their roll numbers provided by medical institutes to make sampling frame. Total ranges of students at public medical institute 1500 and weighted sample is 655 thus at random choose 1st students by random number table and move down the columns choosing applicable numbers that may determine 655 students. Similarly, for private medical institutes' randomly select first number and move down until identify 328 and 327 respectively. But for equal distribution in each year of study we enrolled 655 medical students from Public medical institute while 330 students from private medical institutes as well in order to obtained final sample, which was 1315.

Research ethical committee of university was approved the documents then researcher was explained the objective of study to all study participants. Written informed consent was obtained. A structured questionnaire was filled by principal investigator. Questionnaire have four section. Section one for socio-demographic data. Section two is about the type of cafeteria food items consumption, cost, and recommended food items to friend. Section three evaluates food quality, food cost, cafeteria atmosphere, cafeteria staff behavior and waiting time. Respondents were ask to evaluate on five-point Balance rating scales ranging from poor (1) to excellent (5) [10-12]. Quality of food in cafeteria was assessed by 13 items rating scale (Poor to Excellent). Similarly, cost of food in cafeteria was assessed by 05 items, atmosphere at cafeteria and cafeteria staff was assessed by 04 items and waiting time was assessed by 01 item. Section four determine satisfaction levels of students regarding quality of services provided by cafeteria.

Students were included from those medical institutes which have at least one cafeteria for their students and who used cafeteria once in his/her period of study. Students using cafeterias outside campuses or bring lunch and beverages from home were excluded.

Data was analyzed using software of Statistical package of Social Sciences (SPSS version 16). Descriptive statistics were run to determine mean and standard deviation for continuous variables (Age and How many rupees you spent at cafeteria per month) and frequency and percentage for nominal variables (gender, medical institutes, year of study, type of food item consumed, recommend cafeteria food to friend and how satisfied are you with cafeteria services). A separate descriptive analysis was done to determine the overall mean and standard deviation of quality assessment variables (food quality, food cost, cafeteria atmosphere, cafeteria staff and waiting time). Likert scale item responses were summed or transformed to create a score for a group of items for purpose of analysis. To quantify students' overall satisfaction with cafeteria services a mean response ≤ 2.49 indicates 'dissatisfaction' level among students while >2.49 indicates satisfaction [13].

Logistic regression was done to determine unadjusted and adjusted relationship between the independent variables and dependent variables (Students' satisfaction with cafeteria services). The differences in mean and standard deviation of transformed quality assessment variables (food quality, food cost, cafeteria atmosphere, cafeteria staff and waiting time) between gender and type of medical institutes were assessed by Independent sample *t*-tests at a 95% confidence level and P-value ≤ 0.05 was taken as significant.

Odds ratios with their confidence intervals were obtained of the different categories of independent variables.. Univariate analysis was done using independent variables including age, gender, type of medical institutes, Year of study, consume meals at cafeteria, consume snacks at cafeteria, consume cold drinks at cafeteria, consume hot drinks at cafeteria and spend money at cafeteria. Independent variables having biologically plausible association with the outcome, irrespective of their significance in univariate analysis, were assessed further in the multivariate regression analysis. For statistically significant model P value ≤ 0.05 was used.

RESULTS

The mean age of the students was 21 ± 2.34 SD. About 40.4 % of the medical students belong to age ≤ 20 years. Out of total medical students, 27.7 % were male and 72.3 % were female. There were 50.2 % students from private medical institute and 60 % of students were from clinical years (3rd year to 5th year). Majority (71.8 %) of medical students consumed snacks while only 31.3 % consumed meals at cafeteria. About 64.9% medical students consumed cold drinks while only 34.9 % consumed hot drinks at cafeteria. The average daily amount spent on food and drinks at cafeteria by medical students were mean 48 ± 24.55 SD Pakistani Rupees. About 73.6 % of medical students spend ≤ 50 Pakistani rupees daily at cafeteria. Only 31.2 % of the students recommend food and drinks to his/her colleague. Socio-demographic characteristics of medical students of Karachi described in **Table 1**.

Overall mean score of quality of food (2.40 ± 0.56 SD), cost of food (2.39 ± 0.76 SD), atmosphere at cafeteria (2.14 ± 0.82 SD), cafeteria staff attributes (2.20 ± 0.78 SD) and waiting time given for food (2.27 ± 1.01 SD) represented that medical students were 'dissatisfied' from all attributes of cafeteria. Distribution of mean satisfaction level of quality assessment variables have been summarized in **Table 2**.

When male and female medical students were compared, female were found more 'dissatisfied' with quality of food, cost of food, atmosphere at cafeteria and cafeteria staff than male while male were more 'dissatisfied' waiting time given for food as compared to female. There was no significant mean difference in all quality assessment variables between genders. When we compared public and private medical institute, the medical students who studied at private medical institute were found more 'dissatisfied' with quality of food, cafeteria staff and waiting time given for food as compared to students who were at public medical institute. There was no significant mean difference in quality of food, cafeteria staff and waiting time. Regarding cost of food attributes and atmosphere at cafeteria, medical students belong to private medical institute were found more 'dissatisfied' than students of public medical students. There was significant mean difference (*t* value=2.187, P value ≤ 0.02) in cost of food and atmosphere at cafeteria (*t* value=2.180, P value ≤ 0.02) was observed between public and private medical institute. The mean differences of quality assessment variables by gender and type of medical institutes are shown in **Table 3**.

In univariate analysis, medical students whose age ≤ 20 years were 28 % [COR: 0.72 (95% CI: 0.57-0.91), P value ≤ 0.00] less 'satisfied' with cafeteria services than those age > 20 years. Pre-clinical medical students were 31 % [COR: 0.69 (95% CI: (0.55-0.87), P value ≤ 0.00] less 'satisfied' with cafeteria services than clinical year students. Medical students who consumed snacks were 26 % [COR: 0.74 (95% CI: (0.57-0.95), P value ≤ 0.02] less 'satisfied' with cafeteria services than those who did not consume snacks. In multivariate analysis, pre-clinical medical students were 29 % [AOR: 0.71 (95% CI: (0.56-0.89), P value ≤ 0.00] less 'satisfied' with cafeteria services than clinical year medical students. Similarly, those medical students who consumed snacks were 26 % [AOR: 0.74 (95% CI: (0.57-0.97), P value ≤ 0.03] less 'satisfied' with cafeteria services than those who did not consume snacks at cafeteria. In addition, those medical students who consumed cold drinks were 27 % [AOR: 1.27 (95% CI: (1.00-1.62), P value ≤ 0.04)] more 'satisfied' with cafeteria services than those who did not consume cold drinks at cafeteria. When adjustment of gender, age, type of medical institute, consumed meal at cafeteria, consumed hot drinks at cafeteria and spend money at cafeteria were carried out. Multivariate conditional logistic regression analysis of variables associated with students' satisfaction with cafeteria services has been summarized in **Table 4**.

DISCUSSION

This study was carried out to determine the levels of satisfaction towards cafeteria services among medical students in Pakistan. This study had a large sample of medical students studied at public and private institutes, provided further insight to the differential distribution of level of satisfaction between males and females as well as type of medical institutes.

The result of this study showed that female medical students were enrolled for medical field more as compared to male students. Majority of the medical students belong to clinical year consumed snacks and cold drinks at cafeteria. This could be due to more time was spent at colleges or universities for their clinical rotations. These findings were consistent with the findings of previous study conducted in Finland [14], observed that students were found consuming unhealthy food like snacks and cold drinks at cafeteria because they were found busy in study assignments. In this study, majority of medical students spend ≤ 50 Pakistan Rupees on food and drinks at cafeteria. This is consistent with the findings of another study carried out in district Charsadda of Khyber Pakhtun Khwa province of Pakistan [15]. It showed that students spend ≤ 20 Pakistan Rupees on food at cafeteria. Similar findings were reported by a study conducted at Seongnam city in Gyeonggi province [16]. The results showed that due to busy study schedule of the students, they want to take those food items which required less waiting time at cafeteria. The food items which were easily available at cafeteria were of less cost than other types of food.

The result of the study showed that majority of medical students was 'dissatisfied' (63.6 %) with overall cafeteria food services. This could be due to that these services did not meet the standard or expectation of students. They expect high quality of food and drinks. This dissatisfaction expressed by the students showed clearly that they have less time to consume and more expectation on quality of food and drinks served at cafeteria. A similar finding was observed in a study conducted at Universiti Teknologi MARA Terengganu (UiTMT) in Malaysia [17].

Quality of food, cost of food, atmosphere in the cafeteria, cafeteria staff attitude or hygiene and waiting time given for food were the major determinants of quality assessment and influencing student's satisfaction towards cafeteria services. These quality assessments variables of students' satisfaction were identified in earlier studies [11]. Quality of food is the most important determinant among all. The result of this study showed that medical students were 'dissatisfied' from quality of food served at cafeteria. Because majority of medical students rated 'poor', when we looked at each attribute related to quality of food like flavor, taste, quality, presentation and availability of food. These are basically sensory characteristics of food which may stimulate physiological effects such as hunger, thirst and appetite to influence customer to go to cafeteria but any deviation from these accustomed sensory characteristics may result in customer dissatisfaction. The finding remains consistent in previous study conducted at UiTMT in Malaysia [18]. So overall, on campus quality of food did not meet with student's expectation or satisfaction. In addition another study from the same country found that students were

not 'satisfied' with overall quality of food [6]. The result of this study suggested that overall mean of cost of food inclined towards dissatisfaction. Because majority of medical students rated 'poor', when we looked at each attribute related to cost of food like eating meal, snacks, hot drinks, and cold drinks fits my budget and food prices matches' quality. Cost of food is the most important criterion for the students when they make decision to purchase. Similar finding were reported in a study conducted at UiTMT in Malaysia [6]. Another study from the same country highlighted that on-campus cost of food was not meeting with customers' expectations or satisfaction [18]. Atmosphere at cafeteria is also one of the appealing determinants. This study showed that medical students were 'dissatisfied' with overall atmosphere cafeteria. Because majority of medical students rate 'Poor', when we looked at each attribute related to atmosphere like cheerful, clean atmosphere, comfortable seats and seating arrangement. Cafeteria environmental factors refer to the upstream influences that impact behavior on a food quality, and variety of food. Similar results were noted in an earlier study conducted at UiTMT in Malaysia [6] with overall mean score inclined towards dissatisfaction. Cafeteria staff is also one of its determinants. In this study majority of medical students rate 'Poor', when we looked at each attribute related to staff like attitude, appearance, and cleanliness and trained staff. Similar results were noted in an earlier study conducted at UiTMT in Malaysia [6]. This study revealed that medical students were 'dissatisfied' with waiting time given for food. Similar finding were observed in a study conducted at UiTMT in Malaysia [6].

This study showed that younger students were 31 % less satisfied with cafeteria services than older students while those medical students who consumed snacks were 26 % less satisfied with cafeteria services than those who did not consume snacks at cafeteria. This finding is consistent with the findings of previous study conducted at New

Zealand [19] where older students bought more food and 24 % more satisfied than younger students. In contrast, among older students, snacks consumed by the students were 4.8 times more satisfied than those who did not consume snacks. In this study, all factors evaluated for association were entered in the logistic regression model and showed positive association with year of study, consumed snacks at cafeteria and consumed cold drinks at cafeteria. Similar findings were observed in earlier study conducted at New Zealand [19].

The limitations of this study could be the nature of study design which is cross-sectional; thus the cause and effect relationship could not be established. The target group of this study was medical students who were studying at medical institutes; hence generalization of the findings could be limited to only the medical students. Finally some element of bias cannot be excluded as individuals mostly dissatisfied with cafeteria services may not use cafeteria too much.

CONCLUSION

The study concluded that, medical students were 'dissatisfied' with overall performance of cafeteria services. Among medical students, females were more likely to eat meal and spend money per day at cafeteria. However, they were more 'dissatisfied' with overall performance of cafeteria services as well as rate quality of food, cost of food and atmosphere at cafeteria were labeled as 'Poor' than males.

Notes

Funding

No funding provided for this research.

Conflicts of interest

No potential conflict of interest relevant to this article was reported.

Table 1: Distribution of socio-demographic characteristics of medical students of Karachi (n =1315)

Characteristics	Frequency (n)	Percentage (%)
Age (Years) mean ± SD 21 ± 2.34		
≤ 20	531	40.4
> 20	784	59.6
Gender		
Male	364	27.7
Female	951	72.3
Medical Institute		
Public Medical Institute	655	49.8
Private Medical Institute	660	50.2
Current Year of study		
Pre-clinical	526	40
Clinical	789	60
Meal consumed at cafeteria		
Yes	412	31.3
No	903	68.7
Snacks consumed at cafeteria		
Yes	944	71.8
No	371	28.2
Cold Drinks taken at cafeteria		
Yes	853	64.9
No	462	35.1
Hot Drinks taken at cafeteria		
Yes	459	34.9
No	856	65.1
Daily expense on food at cafeteria (PAK Rupees) mean ± SD 48 ± 24.55		
≤ 50	968	73.6
> 50	347	26.4
Recommendation of food to colleague		
Yes	410	31.2
No	905	68.8

Table 2: Distribution of mean satisfaction level of Quality assessment variables

Variables	Overall Mean (M)	Standard Deviation (SD)
Quality of Food	2.40	0.56
Cost of Food	2.39	0.76
Atmosphere at Cafeteria	2.14	0.82
Cafeteria Staff	2.20	0.78
Waiting Time	2.27	1.01

Note: To quantify student satisfaction with cafeteria services, mean response was validated as: Mean response ≤ 2.49 indicates dissatisfaction.

Table 3: Mean Difference of Quality assessment variables between gender and type of medical institutes

Variables	Male (Mean± SD)	Female (Mean± SD)	p value*	Public Medical Institute (Mean± SD)	Private Medical Institute (Mean± SD)	p value*
Quality of Food ^{II}	2.44±0.54	2.39±0.57	0.13	2.43±0.57	2.38±0.55	0.11
Cost of Food	2.40±0.73	2.39±0.78	0.80	2.44±0.78	2.34±0.75	0.02*
Atmosphere at Cafeteria	2.19±0.85	2.13±0.80	0.24	2.19±0.85	2.10±0.77	0.02*
Cafeteria Staff	2.21±0.75	2.19±0.79	0.77	2.24±0.77	2.17±0.78	0.09
Waiting Time	2.24±1.05	2.29±1.00	0.38	2.30±1.01	2.25±1.01	0.35

II 5 likert scale (5=excellent-1=poor)

* P value was calculated by Independent sample t test and significant at the ≤0.05 level

Table 4: Multivariate Analysis of variables associated with students' satisfaction with cafeteria services

Variables	Crude Odd Ratio (COR)	95 % CI	P value	Adjusted Odd Ratio (AOR)	95 % CI	P value
Gender						
Male	0.81	(0.63-1.04)	0.11			
Female	1.00	-	-			
Age (Years)						
≤ 20	0.72	(0.57-0.91)	0.00*			
> 20	1.00	-	-			
Type of Medical Institutes						
Public Medical Institute	0.80	(0.64-1.00)	0.06	0.81	(0.65-1.02)	0.08
Private Medical Institute	1.00	-	-	1.00	-	-
Year of Study						
Pre-clinical	0.69	(0.55-0.87)	0.00*	0.71	(0.56-0.89)	0.00*
Clinical	1.00	-	-	1.00	-	-
Consume meals at cafeteria						
Yes	1.06	(0.83-1.35)	0.61			
No	1.00	-	-			
Consume snacks at cafeteria						
Yes	0.74	(0.57-0.95)	0.02*	0.74	(0.57-0.97)	0.03*
No	1.00	-	-	1.00	-	-
Consume cold drinks at cafeteria						
Yes	1.23	(0.97-1.55)	0.07	1.27	(1.00-1.62)	0.04*
No	1.00	-	-	1.00	-	-
Consume hot drinks at cafeteria						
Yes	0.86	(0.68-1.09)	0.23			
No	1.00	-	-			
Spend money at cafeteria (PAK Rupees)						
≤ 50	0.89	(0.69-1.15)	0.40			
> 50	1.00	-	-			

*P value was calculated by logistic regression and significant at the ≤0.05 level

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