Industrial Engineering Letters
ISSN 2224-6096 (Paper) ISSN 2225-0581 (online)
Vol.8, No.2, 2018

Comfortable Waiting Time of Patients at the OPD with Varying Demographics

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Abstract
This study investigated the comfortable waiting time of patients arriving at the OPD. The data was collected from private ABC hospital of Karachi, Pakistan by using questionnaire. 200 questionnaire responses were collected from the patients. Reliability of the questionnaire was calculated by using Cronbach alpha test (alpha=0.66). Five hypothesis were developed in order to reveal the difference in comfortable waiting time of patients having demographic characteristics i.e., gender, age groups, visiting time and monthly income of patients. The data was analyzed in the Statistical Package of Social Sciences (SPSS) version 22. Firstly, skewness and kurtosis of the data was computed, and the values did not come in normal range; therefore, one hypothesis was tested by Mann Whitney U test and rest of four hypothesis were tested by applying Kruskal Wallice test. Results indicated that the comfortable waiting time of males and females was same: whereas, it was not same across the different age groups and income groups: furthermore, patients having different OPD visiting experience (1^{st}, 2^{nd}, 3^{rd}) had the same comfortable waiting time.
Keywords: OPD, comfortable waiting time, demographics

I. Introduction and literature

Patient flow at the healthcare units i.e. Hospitals ha salways been the point of focus for the researchers in order to optimize the patient flow because of its impact on the patient satisfaction [1]. In the recent years, patient satisfaction is main issue of concern for the healthcare providers [2]. Service quality and the patient satisfaction are highlighted to be in relationship: Good service quality encourages patients to come again in the same hospital [3]. According to Kotler, Service quality is the difference between expected and actual service [3]. Today`s patients bear variety of opinions when they have to decide among the certain healthcare providers [4]. The satisfaction of patients and image of organization in their eyes are the most important factors which have an influence on the re-coming loyalty of patients [5].

Quality of healthcare services in Pakistani hospitals are highly ignored and processes` inconsistencies are not named as the main problem in healthcare facilities [6]. Increasing number of arriving patients has been observed with the increasing population and Pakistan is 6^{th} largest country with the population of 191.71 million having growth rate of 1.91% [7]. In this regard, the services should be improved and enhanced so that the people can be provided with the good healthcare services. Essential links in the healthcare services are the hospitals by which the lives of the people are directly affected [8]. Hospitals have an impact of the prevention of disease, because of them, the early detection, treatment and restoration of the disease is possible [9]. The major focus of hospitals is on the patients` occupancy and discharge so that the capacity of the hospital can be determined. The management and operations research techniques are capable of helping managers in coping with resources in terms of planning and management. [8]. A lot of literature is available, which explains the required reforms and their assessment and implementation as well. A Framework is required though, by which the performance can be standardized, judged and quantified [10].

In these days, congestion of patients at out-patient departments (OPDs), emergency departments (ED),

intensive care units (ICU) is mainly highlighted problem at the hospitals. This is the result of inaccurate planning and scheduling of queuing system at the site.

Queue is the common occurrence in daily life i.e. at hospitals. When the number of servers are less the number of patients arriving to get service, then the queue is supposed to be formed. OPD is the mostly visited section of any hospital [11]. Mainly, long queues are the most important problem at the hospitals, which they experience at their initial confrontation with the hospital. In the past decade, emergency departments were stressed in order to resolve the problem of overcrowding by paying the attention towards meeting the emergency needs [9]. Expectation of the people vary with the increasing

experience. It was evident from the cross sectional study conducted at the civil hospital Karachi, Pakistan that patients having less expectations would have higher satisfaction rate [12].

Due to lacking in the management of customer services, capacity planning of the particular department can be complicated by the provided service demands [13]. Due to long waiting times, the satisfaction of patients about the particular hospital is affected. [14]. On the same time, due to long waiting lines of patients, the doctors are also put to stress and due to which they may not check the patients properly [14]. In the overall development of Pakistan, poor healthcare services are highlighted as the obstacles [15].

This research aimed to differentiate in the waiting times of patients, they can wait comfortably in the OPD having different demographics i.e. gender, age and OPD visiting experience e.g. (1^{st}, 2^{nd}, etc.).

II. RESEARCH METHODOLOGY

ABC private hospital of Karachi was selected for this research. The data collection site was OPD of Gastrology of the case hospital. 220 questionnaires were distributed among the patients; 210 questionnaires were collected back from them and 10 responses were found to be invalid; therefore, those responses were discarded from the study. Data was analyzed in the statistical package for social sciences (SPSS) version 22. Firstly, demographic characteristics were presented in pie charts. For normality, skewness and kurtosis of the data was calculated and it was indicated by the results that the data was not normal because the values of skewness and kurtosis were not in the range of +1 and -1. Since, the data was not normal; therefore, the t-test and ANOVA could not be applied in order to test the hypothesis. Non-parametric tests i.e. Mann Witney U test and Kruskal Wallice tests were applied to test the hypothesis.

A. Developed Hypothesis

In order to reveal the differences in the comfortable waiting times of the patients among the patients with varying demographics, four hypothesis were developed which are discussed below:

1. There is no significant difference in the comfortable waiting times of males and female at the OPD.
2. There is no significant difference in the comfortable waiting times of patients belong to different age groups.
3. There is no significant difference in the comfortable waiting times of patients having different OPD visiting time.
4. There is no significant difference in the comfortable waiting times of patients belong to different regions
5. There is no significant difference in the comfortable waiting time of patients belong to different income groups

III. results

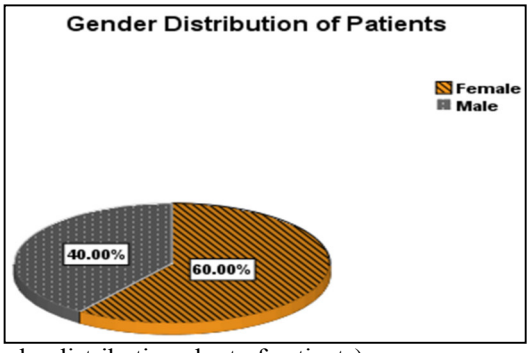
Results were presented in three steps: in the first step, frequency distribution of the demographics were presented by the help of pie charts. After the presentation of frequency distribution, normality of the data was checked by calculating skewness and kurtosis. In third step, hypothesis were tested and their results were discussed.

B. Demographic Presentation

Four demographic characteristics were included in the questionnaire i.e. gender, age, monthly income and the visiting time of patient at the OPD i.e. 1^{st}, 2^{nd}, 3^{rd} etc. These demographic characteristics are presented individually in the separate headings as under;

1) Gender distribution of patients

As mentioned earlier that 200 valid responses were collected from the research location.

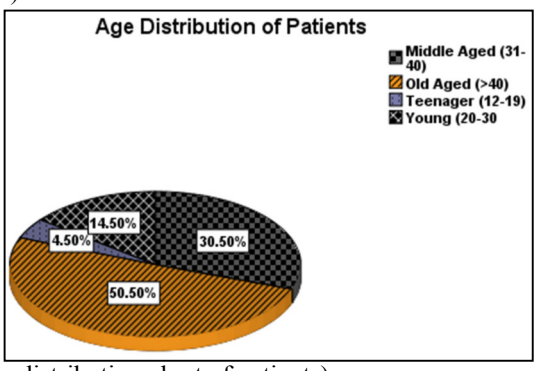


(Gender distribution chart of patients)

Out of 200 respondents, 120 (60%) were females and 80 (40%) were males.

2) Age distribution of patients

Four groups were formed i.e. teenager (12-19 years), young (20-30 years); middle aged (31-40) and old age (>41).



(Age distribution chart of patients)

9 (4.5%) respondents were teenagers; 29 (14.5%) respondents came in the category of young people; 61 (30.5%) respondents were middle aged people and 101 (50.5%) patients fell in the
category of old aged people. Mean age of the respondents was calculated to be 42.24±14.

3) Income distribution of patients

Due to the large number patients and due to having different salaries it was difficult to present the information in organized manner. The respondents were organized in four income groups.

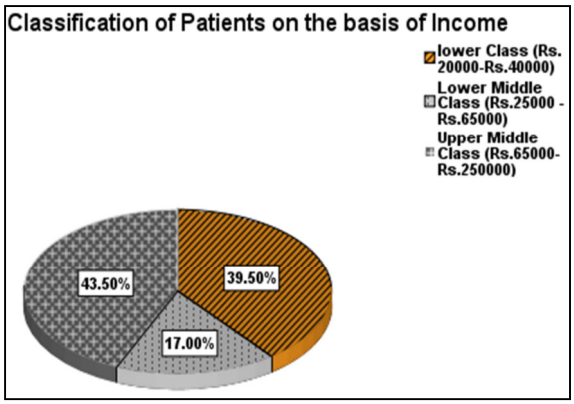


Fig. 1. (Income distribution chart of patients)

Lower Class: People whose income was greater than Rs.20,000 and up-to Rs.40,000
Lower Middle Class: People whose income was between Rs.40,000 and Rs. 65,000
Upper Middle Class: People whose income was between Rs.65,000 and Rs.250,000

79 (39.5%) respondents belonged to lower class, 34 (17%) were of lower middle class and 87 (43.5%) of them belonged to upper middle class.

C. Visiting Time (1st, 2nd, 3rd, 4th) Of Patients At OPD

Most of arriving patient at the OPD were new. 133 (66.5%) patients were new; 32 (16%) were those patients, who came for the second time; those patients, who visited the OPD for 3rd time were counted to be 24 (12%) and 11 (5.5%) patients were those patients, who came for the 4th time. From this frequency distribution, it was

concluded that 66.5% of the patients were new and the percentage of follow up patients was 33.5%.

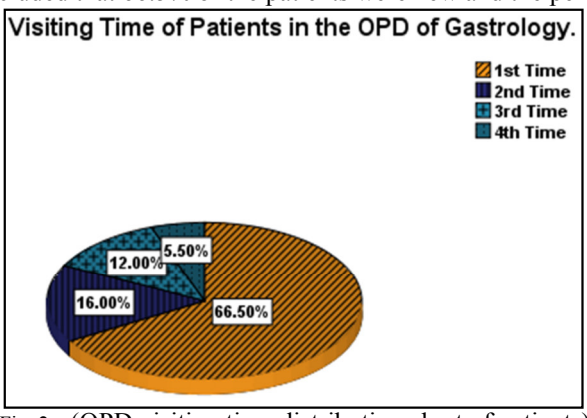


Fig. 2. (OPD visiting time distribution chart of patients)

D. Region Distribution of Patients

Patients from the different regions arrived at the OPD to see the doctor who could prescribe them for their medical issue. 11.50% (23) patients were local; 15% (30) patients were from interior Sindh; 43.5 (87) patients were from Balochistan and remaining 30% (60) were from Afghanistan.

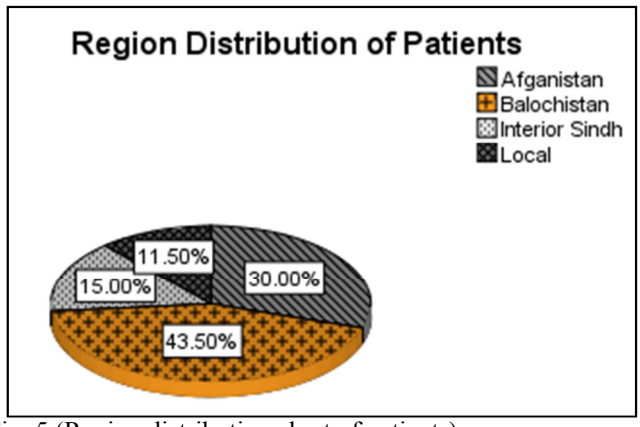


Fig. 5 (Region distribution chart of patients)

Conclusively, 30% (60) patients were foreigners (from Afghanistan) and 70% () of patients belonged to Pakistan.

E. Normality Test

Normality of the data was calculated before testing hypothesis: it was necessary in order to know, which test should be applied to test the hypothesis?

The normal range of values of skewness and kurtosis is in between +1 and -1. The values of skewness and kurtosis for the given variables are not in the normal range (see table I). Hence the data was interpreted to be not normal.

TABLE I. NORMALITY TEST

Question	*Skewness*	*Kurtosis*	*Interpretation*
Age	3.86	1.025	Right-skewed and not normal
Monthly Income	2.69	-1.43	Right-skewed and not normal
How long can you wait comfortably in the OPD?	1.23	1.610	Right-skewed and not normal
Visiting time of patients at the OPD	1.448	1.922	Right-skewed and not normal

F. Hypothesis Testing

Since it was revealed that the data was not normally distributed, therefore, T-test and Analysis of Variance (ANOVA) could not be applied to test the hypothesis; therefore, non-parametric tests were required to be applied in this case.

Two tests were applied to test the hypothesis, Independent samples Mann-Whitney U test was used to test the hypothesis (H_0). This test is supposed to be applied, when the independent variable is consisted of two groups. When the groups are two or more than two; then, the independent samples Kruskar Wallice test is applied for testing hypothesis.

TABLE II. HYPOTHESIS TEST RESULTS

Type	*Table column subhead*	*Sig.(two-tailed)*	*Remarks*
H_0	Comfortable waiting time of males and females in the OPD is same	0.383	Accepted
H_0	Comfortable waiting time of patients belong to different age groups is same	0.026	Rejected
H_0	Comfortable waiting time of patients with the different OPD visiting time is same	0.865	Accepted
H_0	There is no significant difference in the comfortable waiting time of patients belong to different regions	0.314	Accepted
H_0	There is no significant difference in the comfortable waiting time of patients belong to different income groups	0.006	Rejected

1. There is no significant difference between the comfortable waiting time of males and females at the OPD

This hypothesis was tested by using independent Mann-Whitney U test; the value of the test came out to be 0.383 (see table II). Since, 0.383 > 0.05, therefore, first hypothesis failed to reject. Interpretation of the test revealed that the comfortable waiting time of patients was same. The result of the hypothesis came out in contrast with the evidence of literature.

2. There is no significant difference in the comfortable waiting times of patients belong to different age groups.

Independent sample Kruskal Wallice test was used for testing H_2. The value of the mentioned test was calculated to be 0.026; which is certainly less than 0.05 (see table II). Hence, second hypothesis was rejected. The interpretation of the value indicated that the comfortable waiting time of patients belonging to different age groups was not same.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Middle Aged-Old Aged	-8.903	8.063	-1.104	.269	1.000
Middle Aged-Young	-25.579	11.215	-2.281	.023	.135
Middle Aged-Teenager	-42.798	17.754	-2.411	.016	.096
Old Aged-Young	-16.676	10.475	-1.592	.111	.668
Old Aged-Teenager	-33.894	17.296	-1.960	.050	.300
Young-Teenager	17.218	18.972	.908	.364	1.000

Fig. 3. The pariwise comparison as computed by the SPSS (Kruskal Wallice test

In fig 1, it can be seen that pairwise comparison of age groups i.e. middle aged-old aged, old aged-teenager and young-teenager bear significant p-values i.e. >0.05; which revealed that the these age groups have the same comfortable waiting times.

On the other hand pairwise comparison of the groups i.e. middle aged-young, middle aged-teenager, old aged-teenager bear the non-significant p-values i.e. <0.05; which indicates that comfortable waiting time for these mentioned groups was not same. Therefore, the second hypothesis was rejected.

It was reported in the study that the patients having age above 25 years could willingly wait for more than two hours; higher incomplete visiting rate was also reported for younger patients as compared to the old aged patients [16]. Older age patients can wait more as compared to the youngster [17].

3. There is no significant difference in the comfortable waiting times of patients having different OPD visiting time.

Independent sample Kruskal Wallice test was applied in order to test H_3. The p-value was computed to be 0.865 (see table II); since, 0.865>0.05, hence, above hypothesis failed to reject. The interpretation of the value indicated that comfortable waiting time of patients who were new was same as of those patients who have already been there.

4. There is no significant difference in the comfortable waiting times of patients belong to different regions

This hypothesis was also tested by using independent sample Kruskal Wallice test. P-value of the test came out to be 0.314; hence this null hypothesis failed to reject. Therefore, it was interpreted that the comfortable waiting

time of patients belonging to different regions were same.

5. There is no significant difference in the comfortable waiting times of patients belong to different income groups

Fifth hypothesis was tested by using the Independent sample Kruskal Wallice test. P-value for the hypothesis was computed to be 0.006; which is less than the level of significant (0.05), which was interpreted as; there was significant difference in the comfortable waiting time of patients belonging to different age groups. Hence the fifth hypothesis was rejected.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Lower Middle Class-lower Class	-26.357	10.198	-2.584	.010	.029
Lower Middle Class-Upper Middle Class	-31.915	10.056	-3.174	.002	.005
lower Class-Upper Middle Class	5.557	7.727	.719	.472	1.000

Fig 6. (Pairwise comparison table as obtained from the SPSS)

After the pairwise comparison of the lower middle class and lower class patients, p-value came out to be 0.029 (<0.05) which meant that there was significant difference in the comfortable waiting time of patients of these two income groups.

From the pairwise comparison of lower middle class and upper middle class; p-value came out to be 0.005 (<0.05), which was interpreted as, there was significant difference between the comfortable waiting time of lower middle class and upper middle class patients.

From the last pairwise comparison of income groups i.e. lower class and upper middle class; p-value was computed to be 1.0 (>0.05), which was interpreted that there was no significant difference between lower class and upper middle class patients.

I. Discussion

It was required to investigate the comfortable waiting time of patients; because, when they wait in any system they have to suffer certain opportunity cost [18]. Some demographics characteristics are found to have an influence on the waiting time of patients. Gender has an impact on the expectations of patients [12] and it was found to be associated with the quantity of waiting time of patients; in this regard, one of the study was conducted considering the gender differences: results indicated that from total number of 60 (62.5%) females, 30 (31.6%) of them waited higher than three hours: On the other hand, 6 (6.3%) of the male patients from the total number of 36 (37.5%) waited equally as females did in order to service at the clinic [19]. Males are evidently reported to be in hurry. Another study was concluded with the relevant results that male patients waited less than the females did at eye clinic for extraction of cataract [20]. Keeping in view these evidences, it can be concluded that the male patients are observed to be in hurry as compared to the female patients. But the results of present came opposite with the literature evidence. The comfortable waiting time of patients were found to be the same at the OPD of Gastro-logy of ABC hospital of Karachi, Pakistan. This was because of the already developed perception of supposed waiting time at the OPD.

Age has been also found to be in influential association with the expectations of the patients [12] [21]. It was reported in the research [16] that those patients with the age higher than 25 years can willingly wait for greater than 120 minutes. Greater incomplete visiting rate is also found in the previously conducted research especially for younger patients. The relationship of age and waiting time of patients is also discussed: old aged patients are reported for their higher waiting times without any complaints [17]. In the present study, these literature evidences are supported in terms of the difference of in comfortable waiting of patients with increasing age.

Income is also the factor which have an association with the waiting time of people coming to the hospital due to the opportunity cost [21]. It is quite expensive for them to wait at the hospital because, they have option of spending that time to earn money if they do not come to the hospital. This is why, in fifth hypothesis, the significant difference of comfortable waiting time among the various income groups was investigated. Furthermore, the significant difference was also analyzed among the patients having different OPD visiting time; because, when the people have already been there, their expectation and perception about the hospital will not be same as those who have come newly at the hospital.

II. Research Gap

Literature is available on this topic though but not specifically on the demographics; no such study is published which can discuss results statistically by focusing the demographics of patients arriving at the OPDs of private hospital. This research highlights the difference in the comfortable waiting time of patients specifically in the perspective of demographics. This research can help the managers while designing the basic policies regarding

the management of queuing system of the OPD.

III. conclusion

In this research, five hypothesis were developed in order to reveal the behavior of patients arriving the ABC private hospital of Karachi. From the analysis, it was concluded that the comfortable waiting time of male and female patients was same: the comfortable waiting time of patients belonging to different age groups was found to be different: the comfortable waiting time of patients having OPD visiting time (i.e. 1st, 2nd, 3rd) was same: The comfortable waiting time of patients belonging to different regions (Interior Sindh, Karachi, Baluchistan, Afghanistan) was also found to be same. From the result of fifth hypothesis, it was concluded that there was significant difference in the comfortable waiting time of patients belonged to different income groups.

If the patients are served in accordance with their comfortable waiting times, then the patients` satisfaction is likely to be sustained; because the waiting time of patients is quite critical parameter of customer satisfaction.

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