Association of Comfortable Waiting Times of Patients in Queue with Diverse Demographics at Large Hospital's Out Patient Department (OPD)

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Abstract-Patients wait at the outpatient department (OPD) for a long time to see the doctor and different patients react differently in response to being awaited for a long time. In this regard, this empirical research was conducted to analyze the association of comfortable waiting time (CWT) of patients with the various patients demographics. A questionnaire was used to collect the data. Two hundred twenty (220) questionnaires were distributed among patients, two hundred ten (210) of them were returned, and above 10 were uncompleted. The statistical software for social sciences (SPSS) version 22 was used to examine the data. To reveal the association between the comfortable waiting time of patients and various demographics, the Pearson chi-square test was used and phi was used to find the magnitude of the revealed relationship. As per the interpretation of the results, the association of age groups (0.422), OPD visiting experience (0.387), geographical region (0.789), OPD visiting/accompanying status (0.442), and income class (0.325) was found to be significant with comfortable waiting times.

Keywords- Comfortable Waiting Time, Queuing System, Hospital, Outpatient Department

I. INTRODUCTION

The world health organization (WHO) defined health care in 2000 as "all organizations, institutions, and resources that are dedicated to producing health actions" [1]. The effective provision of medical care to the population is always expected. One of the primary goals of health care is to improve the health of the population [1], [2]. Hospital patient flow has long captivated the attention of researchers and health care professionals, who believe that by doing so patient satisfaction can be improving [3]. The patient satisfaction perspective has become more important in health care in recent years [4]. Patient happiness and service quality are directly related; high service standards encourage patient participation, which builds a positive relationship with the hospital [5]. Service quality is described by Kotler (2009) as the discrepancy between the actual and anticipated level of service [5]. Patients now have a variety of options when choosing a health care service [6]. The most crucial elements influencing and keeping clients are patient happiness and brand perception [7]. Lack of process and ignorance of healthcare service quality are not thought to be the main issues with healthcare facilities in Pakistani hospitals [8]. Since Pakistan is ranked as the sixth most populous country with a population of 191.70 million and a growth rate of 1.71%, it is evident that patient visits to hospitals are rising because of the link between health and development [2]. Poor healthcare services are functioning as a barrier to Pakistan's overall growth [9]. Therefore, it is crucial to improve and enhance their service to give the citizens better healthcare. Hospitals are regarded as the fundamental and important link in the healthcare system, and the caliber of health care services has a direct impact on people's lives [10], [11]. They are crucial in the early discovery, treatment, and recovery of the individual from the disease [12]. The primary goal emphasizes by the hospitals for the calculation of their executive capacity is the occupancy and discharge rate of patients. Managers can plan and manage resources by using applications from the management sciences and industrial engineering [10]. It is necessary to create an explicit framework for performance, that can be measured [13]. Demand for service can make it more difficult for departments to manage their capacity due to irregularities in the monitoring of customer services [14].

One of the main issues with hospitals is the overcrowding of patients in waiting areas, emergency rooms, outpatient departments, and intensive care units (ICUs) [15]–[17]. In the past ten years, EDs have placed a strong emphasis on the issue of congestion, the hospital's capacity to handle emergencies, and how these factors affect service times [12]. This is the outcome of the hospital's numerous departments using an ineffective queue system. When there are fewer doctors available than there are patients, a line must be formed. The emergency department (ED) and outpatient department (OPD) are the most frequently visited hospital departments and the places where patients and staff members first interact [18]. The most prominent issue patients have at the hospital is a long line when they want to see a doctor [15]–[17]. Delay is calculated by dividing service demand by the capacity that is available to

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meet that demand [19]. Patients become dissatisfied with patients as a result of the lengthy wait periods in line [20]. Patients get dissatisfied again as a result of long lines and crowding, which causes doctors to rush through examinations and not thoroughly evaluate each patient [19]–[29]. The main cause of patients' concerns about their experiences in evaluating care is frequently the length of time they must wait for treatment in hospitals. As a result, the level of overall service satisfaction is greatly influenced by patient care with waiting times [30]. In health care systems, delivering the intended level of treatment has been measured against patient satisfaction. The duration of time patients with at a medical facility before seeing a doctor is related to patient satisfaction [26]. The decreased waiting times of patients have an impact on patient satisfaction [31]. The hospital needs to figure out a solution to cut down on the long waiting times there [30].

II. LITERATURE REVIEW

Waiting is s typical occurrence in the waiting area at the doctor's office [32]. If the problem of WT is not fully tackled, health care delivery centers will face server issues [33]. A cross-sectional study was conducted in 2016 by Ekpe EE and Peter AL to examine how patients felt about the department of surgery's service and how satisfied they were with them. In general, patients were reported to be pleased with how simple it was to evaluate their care in hospitals. While waiting periods of more than 60 minutes were experienced by 41.7 %, 22.72%, 31.03%, 21.05%, 16.67%, and 14.29% respectively, in the surgical outpatient department (SOPD), accident and emergency (A&E), blood bank, pharmacy, laboratories and medical records [30]. The comfortable waiting time of patients across diverse demographics was measured by Kalwar et al., (2018). 200 patients completed the questionnaire, which was utilized to gather the data. The pleasant waiting time was shown to be the same for both sexes, although it varied depending on the age group. Additionally, patients with diverse OPD visiting experiences (their first, second, and third) were also found to have the same comfortable waiting time [15]. A cross-sectional descriptive study was investigated in 2011 by Umar I., Oche M.O., and Umar A.S. at the Usamnu Danfodiyo University Sokoto's outpatient departments. 384 patients were chosen at random for the trial. Data collection involved the use of a pretested questionnaire. Results showed that 371 (96.6%) patients waited less than 30 minutes with the doctors, whereas 118 (31%) patients spent more time than 60 minutes in the waiting area. Only 63 (16%) of the patients reported health talks while they waited to see a doctor, but 211 (55%) reported being satisfied with the hospital's service delivery [26]. The waiting for management in the emergency department (ED) was studied by Burstorm et al., in 2013. Minimizing the unacceptable waiting time was the research's main goal. The definition of unacceptable waiting signs includes contact seeking, life-threatening circumstances, and physical densification. When the ED staff was unable to reduce unacceptable waiting time, they eventually decided to quit their jobs out of frustration and embarrassment. In order to change the waiting experience and increase patients flow, either structures were used to push and shove pateints around of people were calmed down and covered up with deflections

[34]. In 2012, Sanober B.Shaikh, MD, et al., conducted study on how long patients can tolerate waiting in the emergency room. 340 out of 375 patients that were contacted to participate in the data collection did so (91%) when asked how long they would be willing to wait, 171 (51%) said they would wait up to two hours, 58 (17%) said they would wait between two and eight hours, and 110 (32%) said they would wait indefinitely. There is no connection between perceived symptom severity, race, gender, or insurance status. The majority of patients who could wait more than two hours were older than 25 [35]. Kalwar et al. (2021) identified the problems of healthcare delivery system in Pakistan are highlighted in the Health Care Units of Pakistan and the applications of Queuing Theory and Discrete Event Simulation were discussed to improve it [36]. Khakheli et al. (2021) & Khan et al. (2021) discussed the OPD scenario of large Hospital in Pakistan and its perfromance during COVID-19 Pandemic [37]-[38]. The Multi-Server Queuing Model was used to analyze the Queue of OPD and solutions were proposed to improve the service level and reduce the waiting time in queue of OPD [37]-[38]. Rahoo et al. (2021) identified and analyzed many issues during the pandemic Covid-19 vaccination at various hospitals and health centers in Pakistan [39]. To reduce waiting times, healthcare delivery centers in Dubai undertook an analysis by Aburayya et al., (2022). The WT of patients was tracked for a month using an electronic medical record audit, and data was collected using a universal sample approach. Total records obtained and questions collected were calculated to be 938 and 76,780, respectively. The findings showed that 45.2% of the patients self-registered in <7 minutes and that their average visit and WT took place 11.7 minutes after entry. Additionally, the WT for 75.3% of patients was a half-hour, and the average length of their consultations was estimated to be 34.2 minutes. The patient's average wait time for an appointment was 365 days. Higher workload, poor work procedures, the availability of facilities, and the interaction between employees and supervisors were the causes of that long WT [33]. According to Constanzo et al., 2022, 56,614 people were waiting for their first adult visit with a neurologist as a result of the shortage of doctors in Chile [40], [41]. The Teleneurology program was introduced at the hospital Las Higueras de Talcahuano (HHT) in Chile in 2015 to reduce the wait time (WT) for patients to see a neurologist for the first time. A total of 8269 patients were sent to the HHT neurology clinic between 2103 and 2018, according to the data collected from the primary, secondary, and territory care facilities. The cos regression technique was used in the data analysis to examine the factors that affected the outcome. Results showed that although 6526 patients accessed the tele-neurology program's channel. In 2018, a decline in patients (from 3084 to 298) was noted [42]. To develop an effective measure for improvement, Azarii AB et al., 2017 investigated the doctor's consultation time and WT at basic healthcare clinics. This study took place over four weeks and employed the universal sampling method. The patients who have seen a doctor within that time were included in the criteria. A queue management system (QMS) was used to keep track of patient arrival times. Patients were given a piece o paper, and staff members were required to manually record the time on it at each clinic stage (registration, before consultation, payment, consultation, and appointment, and pharmacy and

consultation time). Data were examined using Social Sciences Statistical Software (SPSS). The average wait time for patients from registration to seeing a doctor was estimated to be 41 minutes, with 53% of patients being registered within the first 15 minutes. The mean consultation time was found to be 18.21 minutes, with 99% of patients needing less than 30 minutes to acquire their medications. The number of workers at the registration desk has been increased, a staggered appointment schedule for follow-up patients has been implemented, and the queuing system for walk-in patients has been enhanced [32]. The goal of the current study was to determine how long it was comfortable for patients from various groups to wait in the gastrology OPD at ABC hospital in Karachi, Sindh, Pakistan. By doing this, the hospital was given the information it needed to improve its services for the benefit of both its patients and customers.

III. RESEARCH METHODOLOGY

A. Data Collection

This empirical study was carried out in the gastrology outpatient department of ABC Hospital in Karachi. A closed-ended questionnaire that was designed after reviewing literature was used to collect the data. It consisted of two sections namely the demographics and other variables portions. Five factors, including gender, age, income, OPD visiting time, and geography were included in section 1. Six questions were made up in section 2. The two hundred twenty (220) questionnaires were distributed to the patients, and two hundred ten (210) questionnaires were returned and 10 responses were determined to be incomplete, therefor they were dismissed.

B. Data Analysis

For the data analysis, 200 questionnaires were put into MS Excel and the statistical program, e for social science (SPSS) version 22. To reveal the association between the comfortable waiting time of patients and various demographics, the Pearson chi-square test was used and chi was used to find the magnitude of the revealed relationship.

IV. RESULTS

Under the present heading, only the relationship between various demographic characteristics and the comfortable waiting time of patients has been calculated with the help of the chi-square test as given in below given tables. The detailed frequency distribution of each demographic characteristic was presented in previously published research i.e. [15], [43].

A. Association of Gender and Comfortable Waiting time of Patients

Results of the chi-square test indicated that the expected responses of female respondents are greater than their observed responses against comfortable waiting times i.e. 15, 20, 30, and 45 minutes (see table 1); whereas the expected responses of male respondents are greater than their observed responses against comfortable waiting times i.e. 15, 20, 30, 45, 60, and 90 minutes as given in table 1. The greater the variation in observed counts and expected the greater will be the value of chi-square [44]. The value of chi-square was calculated to be 6.671 with an asymptotic significance of $0.246 > 0.05$ (see table 2) which indicated that gender and comfortable waiting time of patients are independent of each other. Moreover, the value of phi was also found to be not significant because its asymptotic significance was greater than the alpha value (0.05).

TABLE I. OBSERVED COUNTS AND EXPECTED COUNTS OF COMFORTABLE WAITING TIME OF PATIENTS ACROSS GENDER

			How long can you wait comfortably at the OPD? (Minutes)						Total
			15	20	30	45	60	90	
Gender	Female	Count	0	0	7	13	79	21	120
		Expected Count	0.6	0.6	8.4	16.2	76.2	18.0	120.0
	Male	Count	1	1	7	14	48	9	80
		Expected Count	0.4	0.4	5.6	10.8	50.8	12.0	80.0
Total		Count	1	1	14	27	127	30	200
		Expected Count	1.0	1.0	14.0	27.0	127.0	30.0	200.0

TABLE II. CHI-SQUARE TEST RESULTS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.671[a]	5	0.246
Likelihood Ratio	7.336	5	0.197
N of Valid Cases	200		

TABLE III. SYMMETRIC MEASURES AS OBTAINED FROM THE CHI-SQUARE TEST

		Value	Approx. Sig.
Nominal by Nominal	Phi	0.183	0.246
	Cramer's V	0.183	0.246

B. Association of Age and Comfortable Waiting time of Patients

Results of the chi-square test indicated that the expected responses of participants from middle-aged and young age groups varied largely against two comfortable waiting times i.e. 60 and 90 minutes as given in table 4. The value of chi-square was calculated to be 35.648 with an asymptotic significance of $0.002 < 0.05$ (see table 5) which indicated that age groups and comfortable waiting times of patients are not independent of each other but are associated. Moreover, the value of phi (0.422) was also found to be significant with an asymptotic significance of $0.002 < 0.05$ as given in table 6. The value of phi indicated that there was a weak positive relationship between participants` age groups and their comfortable waiting times.

TABLE IV. OBSERVED COUNTS AND EXPECTED COUNTS OF COMFORTABLE WAITING TIME OF PATIENTS ACROSS THE AGE

			How long can you wait comfortably at the OPD? (Minutes)						Total
			15	20	30	45	60	90	
Age	Middle Aged	Count	0	0	5	10	43	3	61
		Expected Count	0.3	0.3	4.3	8.2	38.7	9.2	61.0
	Old Aged	Count	0	1	7	12	69	12	101
		Expected Count	0.5	0.5	7.1	13.6	64.1	15.2	101.0
	Teenager	Count	0	0	0	0	6	3	9
		Expected Count	0.0	0.0	0.6	1.2	5.7	1.4	9.0
	Young	Count	1	0	2	5	9	12	29
		Expected Count	0.1	0.1	2.0	3.9	18.4	4.4	29.0
Total		Count	1	1	14	27	127	30	200
		Expected Count	1.0	1.0	14.0	27.0	127.0	30.0	200.0

TABLE V. CHI-SQUARE TEST RESULTS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.648[a]	15	0.002
Likelihood Ratio	33.502	15	0.004

TABLE VI. SYMMETRIC MEASURES AS OBTAINED FROM THE CHI-SQUARE TEST

		Value	Approx. Sig.
Nominal by Nominal	Phi	0.422	0.002
	Cramer's V	0.244	0.002

C. Association of Income Class and Comfortable Waiting time of Patients

Expected and observed counts are presented in table 7; a look at the table indicates the small difference in the observed and expected counts across the income class of participants. The value of chi-square was calculated to be 21.162 with an asymptotic significance of 0.020 < 0.05 (see table 8) which indicated that participants` income class and comfortable waiting times of patients are not independent of each other but are associated. Moreover, the value of phi (0.325) was also found to be significant with an asymptotic significance of 0.020 < 0.05 as given in table 9. The value of phi indicated that there was a weak positive relationship between participants` income class and comfortable waiting times.

TABLE VII. OBSERVED COUNTS AND EXPECTED COUNTS OF COMFORTABLE WAITING TIME OF PATIENTS ACROSS INCOME CLASS

			How long can you wait comfortably at the OPD? (Minutes)						Total
			15	20	30	45	60	90	
Class	lower Class	Count	1	0	2	14	49	13	79
		Expected Count	0.4	0.4	5.5	10.7	50.2	11.9	79.0
	Lower Middle Class	Count	0	1	5	7	20	1	34
		Expected Count	0.2	0.2	2.4	4.6	21.6	5.1	34.0
	Upper Middle Class	Count	0	0	7	6	58	16	87
		Expected Count	0.4	0.4	6.1	11.7	55.2	13.1	87.0
Total		Count	1	1	14	27	127	30	200
		Expected Count	1.0	1.0	14.0	27.0	127.0	30.0	200.0

TABLE VIII. CHI-SQUARE TEST RESULTS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.162[a]	10	0.020
Likelihood Ratio	22.127	10	0.014

TABLE IX. SYMMETRIC MEASURES AS OBTAINED FROM THE CHI-SQUARE TEST

		Value	Approx. Sig.
Nominal by Nominal	Phi	0.325	0.020
	Cramer's V	0.230	0.020

D. Association of Region and Comfortable Waiting time of Patients

Table 10 presents the expected and observed counts; a look at the table indicates the small difference in the observed and expected counts across the region of participants. The value of chi-square was calculated to be 125.468 with an asymptotic significance of 0.000 < 0.05 (see table 11) which indicated that region and comfortable waiting times of patients are not independent of each other but are associated. Moreover, the value of phi (0.789) was also found to be significant with an asymptotic significance of 0.000 < 0.05 as given in table 12. The value of phi indicated that there was a strong positive relationship between participants` region and comfortable waiting times.

TABLE X.   OBSERVED COUNTS AND EXPECTED COUNTS OF COMFORTABLE WAITING TIME OF PATIENTS ACROSS REGIONS

			How long can you wait comfortably at the OPD? (Minutes)						Total
			15	*20*	*30*	*45*	*60*	*90*	
Region	Afghanistan	Count	0	0	5	0	39	16	60
		Expected Count	0.3	0.3	4.2	8.1	38.1	9.0	60.0
	Balochistan	Count	0	0	0	4	69	14	87
		Expected Count	0.4	0.4	6.1	11.7	55.2	13.1	87.0
	Interior Sindh	Count	0	0	1	12	17	0	30
		Expected Count	0.2	0.2	2.1	4.1	19.1	4.5	30.0
	Local	Count	1	1	8	11	2	0	23
		Expected Count	0.1	0.1	1.6	3.1	14.6	3.5	23.0
Total		Count	1	1	14	27	127	30	200
		Expected Count	1.0	1.0	14.0	27.0	127.0	30.0	200.0

TABLE XI.   CHI-SQUARE TEST RESULTS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	124.468[a]	15	0.000
Likelihood Ratio	120.899	15	0.000

TABLE XII.   SYMMETRIC MEASURES AS OBTAINED FROM THE CHI-SQUARE TEST

		Value	Approx. Sig.
Nominal by Nominal	Phi	0.789	0.000
	Cramer's V	0.455	0.000

E. Association of OPD Visiting Experience of Patients and Comfortable Waiting time of Patients

Expected and observed counts are presented in table 13; a look at the table indicates the small difference in the observed and expected counts across the OPD visiting time of participants. The value of chi-square was calculated to be 29.978 with an asymptotic significance of 0.012<0.05 (table 14) which indicated that participants` OPD visiting experience and comfortable waiting times are not independent of each other but are associated. Moreover, the value of phi (0.387) was also found to be significant with an asymptotic significance of 0.012<0.05 as given in table 15. The value of phi indicated that there was a weak positive relationship between participants` OPD visiting experience and comfortable waiting times.

TABLE XIII.   OBSERVED COUNTS AND EXPECTED COUNTS OF COMFORTABLE WAITING TIME OF PATIENTS ACROSS OPD VISITING EXPERIENCE OF PATIENTS

			How long can you wait comfortably at the OPD? (Minutes)						Total
			15	*20*	*30*	*45*	*60*	*90*	
Visiting Experience of Patients	1st Time	Count	0	0	12	19	81	21	133
		Expected Count	0.7	0.7	9.3	18.0	84.5	20.0	133.0
	2nd Time	Count	0	1	1	2	25	3	32
		Expected Count	0.2	0.2	2.2	4.3	20.3	4.8	32.0
	3rd Time	Count	0	0	0	4	16	4	24
		Expected Count	0.1	0.1	1.7	3.2	15.2	3.6	24.0
	4th Time	Count	1	0	1	2	5	2	11
		Expected Count	0.1	0.1	0.8	1.5	7.0	1.7	11.0
Total		Count	1	1	14	27	127	30	200
		Expected Count	1.0	1.0	14.0	27.0	127.0	30.0	200.0

TABLE XIV.   CHI-SQUARE TEST RESULTS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.978[a]	15	0.012
Likelihood Ratio	19.171	15	0.206

TABLE XV.   SYMMETRIC MEASURES AS OBTAINED FROM THE CHI-SQUARE TEST

		Value	Approx. Sig.
Nominal by Nominal	Phi	0.387	0.012
	Cramer's V	0.224	0.012

F. Association of OPD Visiting Status and Comfortable Waiting time of Patients

Table 16 presents the expected and observed counts; a look at the table indicates the small difference in the observed and expected counts across the accompanying status of participants. The value of chi-square was calculated to be 39.128 with an asymptotic significance of 0.000 < 0.05 (see table 17) which indicated that the accompanying status of participants and comfortable waiting times are not independent of each other but are associated. Moreover, the value of phi (0.442) was also found to be significant with an asymptotic significance of 0.000 < 0.05 as given in table 18. The value of phi indicated that there was a weak positive relationship between participants` accompanying status and comfortable waiting times.

TABLE XVI. OBSERVED COUNTS AND EXPECTED COUNTS OF COMFORTABLE WAITING TIME OF PATIENTS ACROSS OPD VISITING STATUS

			How long can you wait comfortably at the OPD? (Minutes)						Total
			15	*20*	*30*	*45*	*60*	*90*	
When you visit the hospital, you are accompanied or unaccompanied?	Accompanied	Count	0	1	11	25	125	30	192
		Expected Count	1.0	1.0	13.4	25.9	121.9	28.8	192.0
	Unaccompanied	Count	1	0	3	2	2	0	8
		Expected Count	0.0	0.0	0.6	1.1	5.1	1.2	8.0
Total		Count	1	1	14	27	127	30	200
		Expected Count	1.0	1.0	14.0	27.0	127.0	30.0	200.0

TABLE XVII. CHI-SQUARE TEST RESULTS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	39.128[a]	5	0.000
Likelihood Ratio	17.798	5	0.003

TABLE XVIII. SYMMETRIC MEASURES AS OBTAINED FROM THE CHI-SQUARE TEST

		Value	Approx. Sig.
Nominal by Nominal	Phi	0.442	0.000
	Cramer's V	0.442	0.000

V. DISCUSSION

Public and private healthcare services are distributed unfairly in Pakistan, making them unavailable to those with little income, particularly in rural areas [21], [45]. Healthcare delivery systems (HCDS) are groups of people, organizations, and other resources that work together to deliver healthcare to individuals, commonalities, and populations [46], [1]. Pakistan is regarded as a low-income nation[47] and ranks 65th out of 102 nations in terms of poverty according to the human poverty index [48]. The change in healthcare service structures, roles, and responsibilities is ongoing [49]. According to a systematic assessment of the literature by Basu et al., (2012), the public sector is not more effective at providing medical services, but public healthcare falls short in terms of its friendliness and responsiveness [50]. Gender is one demographic feature that has been shown to affect patient expectations [51].

Demographic characteristics (gender) have been reported to influence the expectations of patients [51]. In the present research, no significant association between gender and the comfortable waiting time of patients was found. MO, Oche, and H, Adamu (2013) conducted a study that revealed that the waiting times for 6/36 males and 30/60 females were each 3 hours long at the clinic [52]. Males are reportedly in a rush, according to a report [53]. Another study that was done in an eye clinic found that female patients had to wait longer to get their eye cataracts removed than did male patients [54]. The expectation of patients has been linked to age [51], [22]. In the literature, it has been discussed how age and waiting time are related. When compared to elderly patients, patients under the age of 25 were said to wait voluntarily for more than two hours, while younger patients were said to visit less frequently [35]. In comparison to younger persons, senior people were said to experience longer waiting times without complaining [53]. In the present research, the association of age groups

(0.422), OPD visiting experience (0.387), geographical region (0.789), OPD visiting/accompanying status (0.442), and income class (0.325) was found to be significant with comfortable waiting times (see figure 1).
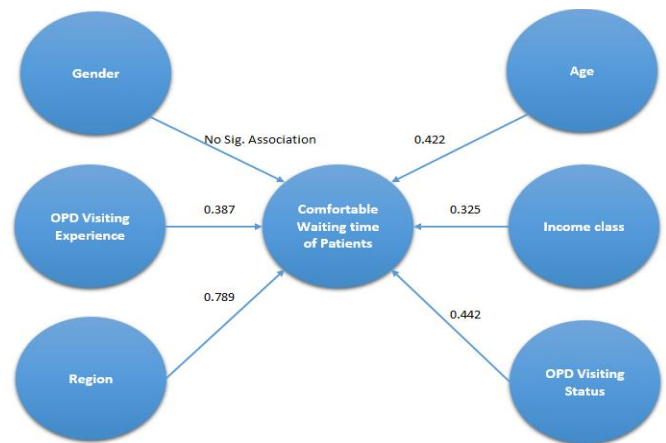

Figure 1. Association (values of phi as taken from tables 3, 6, 9, 12, 15, and 18) of comfortable waiting time of patients and various demographics

VI. CONCLUSION

The association of demographic characteristics (age groups, OPD visiting experience, OPD Accompanying status, geographical region, and income class) and comfortable waiting time was found to be significant. Moreover, the relationship between the geographical region and the comfortable waiting time of patients was found to be stronger among all the considered demographic characteristics. In this regard, at the very first, the same study should be conducted with a larger sample size to confirm the revealed associations. Moreover, keeping in view the strong positive relationship between geographical regions, the hospital should consider separate times for the OPD of local patients to avoid their dissatisfaction in case of longer waiting times.

VII. MANAGERIAL IMPLICATIONS

The reduce patient waiting times, the hospital in question needs to take corrective action. Since this is a problem with queues and waiting lines, queuing theory and modeling of queuing systems can be used to tackle it more effectively.

VIII. LIMITATIONS

Only 200 patients were contacted for data collection because Karachi is Pakistan's largest city and the targeted hospital is one of Karachi's largest private hospitals, according to the analysis of this research. The same OPD should be the authors' main emphasis to acquire more responses, but they can also target other departments to get to better and more accurate conclusions.

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CONFLICT OF INTEREST

There was no conflict of interest among the authors of this research paper.

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