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The Impact of Waiting Time on Patient Satisfaction with Laboratory Samples Collection in Sheikh Khalifa Medical City, United Arab Emirates

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Abstract

Purpose: The IOM has introduced the 6 fundamental aims, patient-centred and timely. Patients' satisfaction is their reactions to aspects that have a previous expectation, and the importance of patient satisfaction influences the clinical outcomes. The aim is to demonstrate the effects of waiting time on patients' satisfaction with laboratory sample collections.

Methodology: A quantitative cross-sectional design, implemented in SKMC, Abu Dhabi, UAE. Participants are from outpatient clinics, both genders and from the age of 18. Simple random sampling has been chosen to reduce bias errors and provide a chance to all individuals equally for participation. Using Microsoft Forms to initiate the survey with a total of 7 questions translated into Arabic and English languages.

Findings: The total number of participants was 228, 66% of them chose the Arabic language to answer the survey's question whereas 34% proceeded with the English language. The majority age group of our respondents was from 20 to 30 years old at 46.5%, and the lowest age group participated are from the age of 61 and above with 1.3%. Most of the participants were satisfied with lab registration members (85.1%), satisfied with waiting times (70%), satisfied with staff attitudes (84.2%), satisfied with cleanliness (89.5%), satisfied with instruction (94.7%), satisfied with overall experience (85.1%).

Unique Contribution to Theory, Practice and Policy: To end up, this research has successfully clarified the positive significance relationship between waiting time satisfaction and overall experience satisfaction. Current research highlights the impact of waiting time satisfaction on overall experience satisfaction. It focused on the priority of maintaining patient flow along with managing time. This finding suggests that improving patient waiting time enhances the overall experience. Future recommendations include precision of the measurements for waiting time, including demographic variables, and collecting qualitative data for more insights.

Keywords: *Patient Satisfaction, Waiting Time, Laboratory Service, Staff Attitude, Quality of Care*

JEL Codes: *M12, I11, I12, D12*

INTRODUCTION

Nowadays, the public and patients are aware of how important quality of care is, and it varies among the providers (Hannawa et al., 2022). To begin with, The Institute of Medicine (IOM) has demonstrated the 6 fundamental aims for healthcare which are: I) Safe, II) Efficient, III) Patient-Centred, IV) Equitable, V) Timely, and VI) Effective, timely manners has been mentioned as one of the aims (Al-Harajin et al., 2019). To elaborate more, safety aims to avoid any harm to patients with high-quality care, while efficiently is a link to prevent the waste of supplies or equipment, patient-centered refers to respectful and responsive to their needs, and equitable is mainly to not discriminate care depends to their gender or ethnicity, etc, the timely is typically on minimizing the waiting time or any harmful delays, and effective is to give the care based on the scientific knowledge (Hannawa et al., 2022). Therefore, customer satisfaction is considered a key enabler for an organization's success. Specifically, patient satisfaction is a tool that is used to help healthcare providers easily understand patients' perspectives that enhance quality (Sayani et al., 2023). Ferreira et al., (2023) defined patients' satisfaction as their reaction towards aspects of their experience. The satisfaction of patients measures how well the health professionals meet the expectations and needs of patients and their satisfaction can be tested via surveys or feedback forms (Abuzaid et al., 2023). The importance of patient satisfaction impacts clinical results, malpractice claims, and patient retention which results in quality of the (Al-Harajin et al., 2019). It's considered a concept that was cast aside for a long time however it becomes much more critical, described as a health service outcome and a key to evaluating the quality of care.

On the other hand, the time spent waiting to receive healthcare seemed to be a potential barrier, and patients tend to wait at several points during their health system interaction (McIntyre & Chow, 2020). Waiting time has been considered a crucial factor that influences the quality of care, which is a suitable tool to evaluate the satisfaction of the patient, and the more waiting time to access shows a significant issue suffered by many healthcare (Al-Harajin et al., 2019; Liddy et al., 2016).

In clinical laboratories, monitoring patient satisfaction is considered a useful tool for quality improvement, and is required for accreditation (Khatri & Sharma, 2021). In addition, there was a significant relationship seen between specimen collection and phlebotomy service satisfaction (Khatri & Sharma, 2021). In every healthcare setting, each department plays a role in improving the overall quality and achieving best practices for their patients. A published study done by Alkuwaiti et al., (2020) illustrates the results which showed patient satisfaction comprised of four factors, and laboratory service satisfaction was one of the factors.

Patient satisfaction is considered a critical factor that influences healthcare quality, yet the long waiting times persist as a challenge that impacts their experience. Previously published studies on the consequences of long waiting times showed the negative impacts on patient satisfaction (Holz et al., 2024; McIntyre & Chow, 2020; Sun et al., 2017). However, there were limited studies that focused on the phlebotomy service in the laboratory services specifically, and limited factors that influence patient satisfaction other than the waiting time. This current research aims to fill the gaps by providing real examples related to laboratory services and illustrating the evidence of waiting time satisfaction and overall experience. It offers several recommendations to improve healthcare delivery.

LITERATURE REVIEW

The healthcare service quality known as patient judgment worried about the overall service provided and illustrates the gaps between patients' expectations and their perceptions (Hidayat et al., 2020). The World Health Organization (WHO) classified patient waiting time as a key measurement of health system responsiveness while the IOM in the United States (US) report "Crossing the Quality Chasm" outlines the principles (Sun et al., 2017). Hidayat et al., (2020) have stated that the perceived service quality showed a correlation with waiting time as one of the factors such as educational attainment, gender, sociocultural, and the background of patients. In UAE, a study focused on the Emergency waiting time and it has shown that the more waiting time, the less patient satisfaction (Mosleh et al., 2023). Globally, the IOM has recommended a minimum of 90% of patients must be seen within thirty minutes of their schedule, however, the case is different in most developing countries as the patient is spending from 2 to 4 hours specifically in outpatient prior been seen by the doctor (Oche & Adamu, 2013). A published article has mentioned that response time which is the time needed for the health professionals to arrive at the patient area and waiting time which is the period that the patient will be waiting for the emergency service are considered the Key Performance Indicators (KPIs) in the ED or emergency department (Hidayat et al., 2020).

Importance of Patient Satisfaction

Patient satisfaction is a service evaluation of the healthcare that has been experienced by the patients based on their expectation of quality of life (Wang et al., 2023). Therefore, the context of patient satisfaction in quality improvement requested an investigation of their experience during delivering the service, in simple terms, A satisfied patient is contributing to the healthcare outcomes improvements (Akthar et al., 2023). Akthar et al., (2023) focused on patient satisfaction determinants in their research paper. Waiting time was also mentioned as a prominent problem that has been noticed during outpatient visits, and there was a negative relationship between satisfaction level and waiting time. Term satisfaction is a subjective evaluation of patients, it's affected by factors such as Actual Waiting Time (AWL) as objective time to be defined between time entering clinic and registration time (Zhang et al., 2023). Furthermore, Sun et al., (2017) have successfully stated that the length of waiting time has shown frustrating feelings to the patients that resulted in dissatisfaction means there is a relationship between patient satisfaction and waiting time with proof of previously published studies.

A Consequence of a Long Waiting Time

The long waiting time is negative remarks that lead to dissatisfied patients, but what else can happen? McIntyre & Chow, (2020) mentioned that delays in treatment access, poorer clinical results, increase in costs, anxiety among patients, inequality, and socioeconomic derivation refer to the association of increased burden of disorders that increase the health resource uses. Another paper published in 2019, has mentioned that the patient waiting report increases symptoms, a poor rate of health, and a reduction in health-related quality compared to others (Sæther et al., 2019).

As the clinical laboratory department is considered a critical element of overall quality management, it helps provide diagnostic data that outcomes in guidance for treatment (Hailu et al., 2020). Hailu et al., (2020), mentioned in their research that the low satisfied patients were due to the service on sample collection, clarity about when they would receive the result

report, and the long waiting time which leads to missed appointments and lift against advice or not follow the treatment plan.

Solutions for Long Waiting Times

A published paper titled "Enhancing outpatient clinics management software by reducing patients' waiting time" has demonstrated multiple solutions to reduce patient waiting time that affect the level of patients' satisfaction and result in poor quality provided. Below, Almomani & AlSarheed, (2016) mentioned those effective solutions: The overbooking appointment needs to be treated as a waiting list with a message sent to the patient as a reminder and confirmation. The Confirmation procedure ensures patients will be present in the clinic, or a cancellation if they are unable to attend. This has been solving the high percentage of no-show rates as well. Another solution to reduce waiting time is Almomani & AlSarheed, (2016) illustrated that serial number generation helps overbooked patients and walk-in patients' priority if they have an empty slot and that consequently reduces the long waiting time.

Moreover, Artificial Intelligence (AI) has made a comprehensive contribution these years in different aspects. As Bin et al., (2022) have spotted the light on AI in solving long waiting times, especially during post Covid-19 pandemic, an application has replaced the administrative team, it processes the data entry and automatically promotes the processes of the Electronic Health Records (EHR) without a human interaction. Skipping a whole step in the process resulted in 92% success in the medical auto registration and the patient had a shorter waiting time to be seen by the physician (Bin et al., 2022). Further, a suggestion has been stated by published papers which is to reduce the unnecessary waiting done to policy changes (Sæther et al., 2019). Moreover, the Health Authority of Abu Dhabi (HAAD) won the best national healthcare application award in 2016, as m-booking is a service ticking system to help reduce waiting time and, in a way, to improve time efficiency (Department of Health, n.d.).

Shedding the light on the laboratory, a demonstration of the timeline process in the laboratory testing process including non-value-steps such as patients waiting for phlebotomy, able to find the gaps and decrease the steps by increasing the number of sample collection rooms that resulted in improving patient-friendly space and reduction waiting time, especially in the peak hours (Alain et al., 2021). Another article suggested that barcoding was the best way to manage waiting time for patient sample collection (U et al., 2021).

AI Intervention

Nowadays, Artificial Intelligence (AI) is the transformation in healthcare by reducing the long waiting times and optimizing the patient flows. Such advanced technologies promote operational efficiency and modernization of care delivery. A published paper focused on improving patient care stated that before implementing a change for improvement and post-setting goals, there is a need to involve the stakeholders to identify the factors that might influence the implementation and to set targeted groups and hospital settings (Wensing & Grol, 2020). The introduction of the smart doctor, which is typically an intelligent system that focuses on the Natural Language Processing (NLP) model, The smart doctor recommended to examine before seeing the doctor as it acts such a real doctor process (Li et al., 2022). The advantage of this intervention is to proudly reduce patients' waiting time which is one of the proposal's aims. Moreover, it declines the nosocomial transmission of COVID-19 that the pandemic and AI technology help these days in repetitive tasks such as common cold procedures (Li et al., 2022). Another interesting study has shown an illustration of the use of the AI method to reduce patient waiting time. Trivedi & Patel, (2020) emphasized that the use of the AI-assist method showed

impact in terms of costs, resources, and quality of patient care. The specified use of AI in the ED helps to categorize patients depending on their risk which will outcomes in better health and plays an important role in the diagnosis by radiology which will speed up the treatment plan (Trivedi & Patel, 2020). A Chinese study has introduced the use of XIAO YI as an AI tool that will show promise in the future as it helps to ease the world and reduce patient waiting time in clinical laboratories and the research is suggesting the use of it to improve outpatients' services (Li et al., 2022).

To summarize, this literature review provides a comprehensive overview of the current research status which is about the "Impact of waiting time on laboratory samples collection on patient satisfaction in the UAE healthcare organization and AI innovations ". Key findings have shown that previous studies illustrated the relationship between the longer waiting time, especially in outpatient clinics during examination and laboratory sample collections and the highly dissatisfied patient rates. However, there were some gaps that have been noticed particularly the limited studies that identify the waiting times in the clinical laboratory services. Future research to measure the waiting times and conduct patient interviews would provide better understanding of the causes of waiting times and how to improve the care. How and where to address these gaps is crucial to educating ourselves on implementing solutions and measuring the outcomes. Although the challenges, A queuing system with its benefits has the ability of mathematically study the waiting lines and queue the waiting times and length calculated (Bello et al., 2022).

METHODOLOGY

The study design chosen was a quantitative cross-sectional design, as the data was gathered in a specific period to demonstrate the relationship between patient satisfaction and waiting time. The same study design has been successfully implemented in Tertiary care hospitals in Saudi Arabia (Al-Harajin et al., 2019). The chosen design helped target a tertiary hospital, the quantitative cross-sectional design captured specific periods with handling patient satisfaction rates, and the waiting times. This study was implemented in Abu Dhabi, United Arab Emirates (UAE), at Sheikh Khalifa Medical City (SKMC). This medical city involves both inpatients (patients who are admitted to the hospital) and outpatients (patients who attend an appointment). This tertiary hospital has been chosen due to the variety of specialties it has such as (Emergencies, surgeries, Family medicine, Gastroenterology, Rheumatology, Oncology, Nephrology, Neurology, Gynecology, and more). This research targeted outpatients for laboratory services across all SKMC departments, which includes both females and males from the age of 18 years old. The exclusion criteria were under the age of 18 years and whoever not interested to be part of the study. This study was taking place for one month which was from January 10, 2025, and closed on February 9, 2025. The sampling method chosen was simple random sampling as it minimized bias in this research and the population had an equal chance of being selected. Furthermore, after comparing it to previously published studies on the same topic and sample set, the sample size in our research was to target approximately 400 respondents from different departments. The targeted participants have been chosen based on the previously published study that has similarities with the current research (Shahzadi & Annayat, 2017). Moreover, a Microsoft Excel Sheet was used after downloading the data from Microsoft Forms which was conducted for survey and data collection. Multiple charts represented the data, and linear regression was used to show the relationship between overall patient satisfaction and waiting time satisfaction.

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RESULTS

A total of 228 respondents have participated in this study survey. The survey provides the choice of choosing language preference either Arabic or English before answering any questions. Out of 228 participants, there was 151 of them chose to continue with the Arabic language with a percentage of 66, while the rest of 77 proceeded with the English language by around 34% (Figure 1).

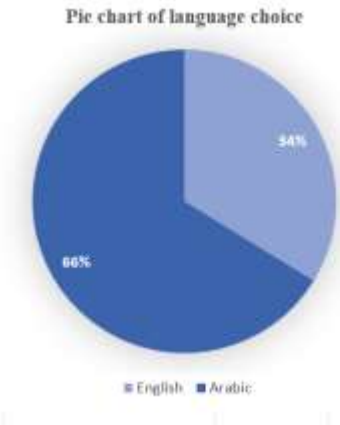

Figure 1: Pie Chart of Language Preferences

A demographic question about the age group showed that 106 of the participants were between the ages of 20 years old to 30 years, 66 of them between 31 years old to 40 years old, 36 of the total participants were from 41 years old to 50 years old, while 17 of them were within 51 years old to 60 years old, and only 3 participants aged 61 years old and above, with a percentage of 46.5%, 28.9%, 15.8%, 7.5%, 1.3% respectively (Figure 2).

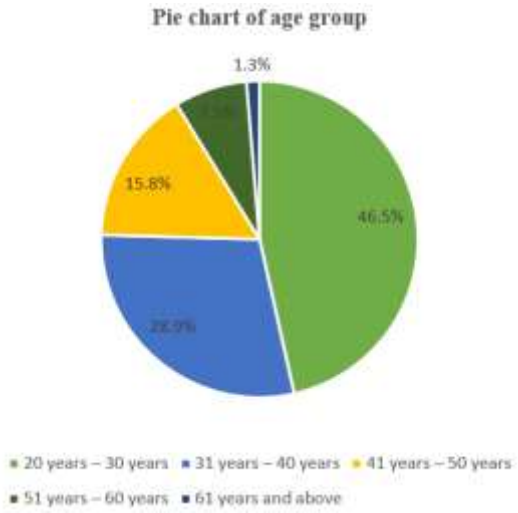

Figure 2: Pie Chart Divided by Age Group into 5 Categories

Addressing the next analysis of the result part which is about the satisfaction rates with laboratory registration members. Out of all participants, 194 of them were satisfied, 24 were neutral, and only 10 were dissatisfied with a percentage of 85.1%, 10.5%, 4.4% respectively. See Figure 3 below.

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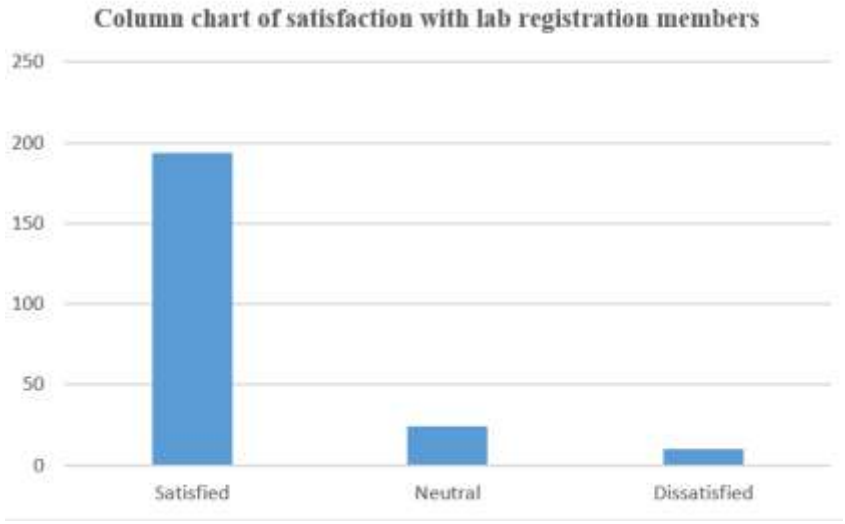

Figure 3: The Column Chart Represents Satisfaction with Lab Registration Members

Transitioning to the next section which focuses on satisfaction towards waiting time at the lab. Around 70% of participants were satisfied with the waiting time at the laboratory. Only 7% of them were dissatisfied with the period they waited time, and 23.2% of the participants were neutral as shown in Figure 4.

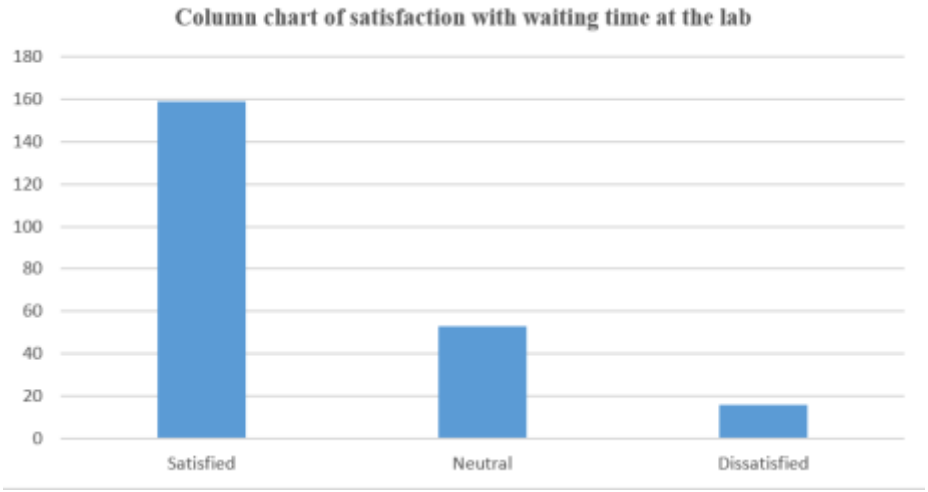

Figure 4: The Chart Represents Satisfaction with Waiting Time at the Laboratory

Proceeding with the staff attitude aspect, the majority (192) of the participants were satisfied with the staff attitudes, 28 of them were neutral, and only a small number of (8) individuals were dissatisfied. Moreover, shifting the focus to laboratory cleanliness, showed that 89.5% of the respondents were satisfied with the cleanliness of the laboratory, and the lowest response percentage was in the dissatisfied group with a rate of 1.8%. Furthermore, turning attention to the clarity of instruction and explanation, a notable proportion (94.7%) of participants found it clear, and 5.3% found it not clear. To add more, a question on the overall experience showed that 85.1% of the participants were satisfied, 11.8% of them found the experience neutral, and 3.1% of participants were dissatisfied with the overall experience.

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Table 1: Satisfaction with the Staff Attitude, Lab Cleanliness, Instruction and Explanation, and Overall Experience

Satisfaction with staff attitudes	**Frequency (f)**	**Percent (%)**
Satisfied	192	84.2%
Neutral	28	12.3%
Dissatisfied	8	3.5%
Satisfaction with lab cleanliness	**Frequency (f)**	**Percent (%)**
Satisfied	204	89.5%
Neutral	20	8.8%
Dissatisfied	4	1.8%
Satisfaction with instruction and explanation	**Frequency (f)**	**Percent (%)**
Yes, very clear	216	94.7%
Not clear	12	5.3%
Satisfaction with overall experience	**Frequency (f)**	**Percent (%)**
Satisfied	194	85.1%
Neutral	27	11.8%
Dissatisfied	7	3.1%

To shed light on the focus, which is the satisfaction with waiting time at the lab, 69.7% of our participants were satisfied with the waiting time at the Lab, 23.2% of them were neutral towards waiting time, and 7% were dissatisfied with the waiting time.

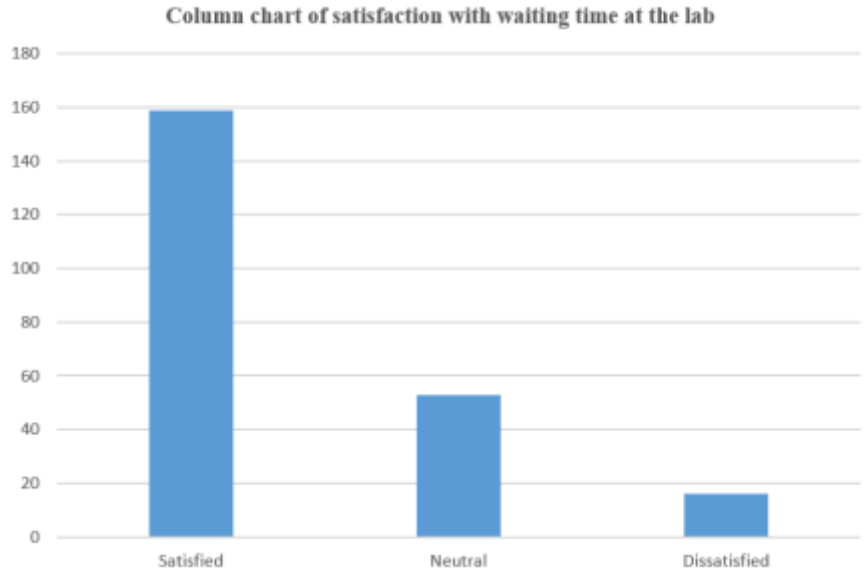

Figure 5: The Column Represents Satisfaction with Waiting Times at the Lab, Most of the Participants were Satisfied (159) and the Least Number of Participants were Dissatisfied (16).

The surveys ended with an open question asking about their suggestions and feedback, we received multiple responses in both languages (Arabic and English). The suggestions were such as to categorize the priority based on the patient's health condition (elderly, special needs, etc.), to provide an automatic registration machine in both waiting areas (females and males),

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increase the number of registration staff, and register through the application. On the other hand, feedback was mostly positive towards the service, for instance, the smooth process of laboratory procedures, quick registration services, and the kind attitude of the healthcare providers.

P-Value and Linear Regression Illustration

The scatter plot below represents the linear regression of the waiting time satisfaction and the patient's overall experience satisfaction. It shows a clear significant relationship between the two variables (Beta coefficient = 0.469, and P-value < 0.001) (Figure. 6).

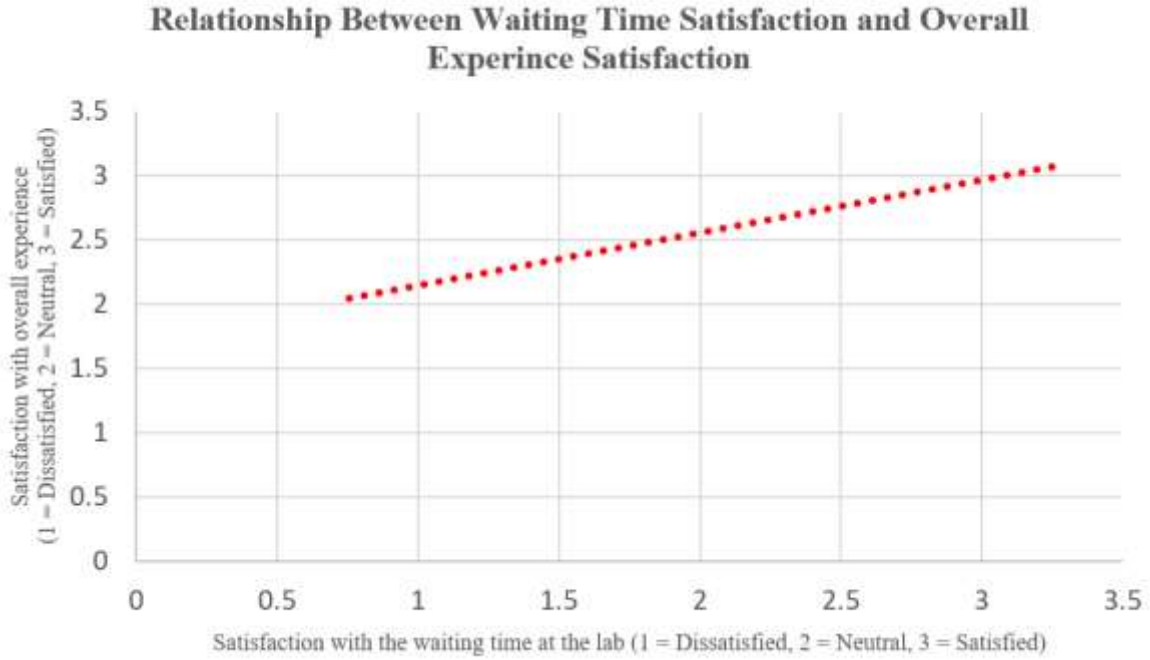

Figure 6: Linear Regression Shows the Relationship between Satisfaction with Waiting Time at the Lab and Overall Experience Satisfaction (β=0.469, p <0.001).

Discussion

Demographic Data

This study arranged the age group based on a ten-year range; the highest number of participants was aged from 20 to 30 years old with a percentage of 46.5. However, the lowest age group that participated with 1.3% is 61 years old and above. These results are consistent with previously published in Turkey that showed the highest participation age group is 26 to 30 years old with 20.1%, while the second highest participation age group is 31 to 35 years old with 18.5%, age 40 years old and above were the lowest participation age group with 12.7% (Coşkun et al., 2024).

Satisfaction with Lab Registration Members

It has been seen in our study that satisfaction with lab registration members is 85.1%, 10.5% were neutral with registration staff, and only 4.4% were dissatisfied with registration members. Compared with an article on lab registration satisfaction, 26% considered it excellent, 40% rated it as very good, and 0% considered it as poor (Raj et al., 2024).

Staff Attitude

Current research shows that 84.2% of the participants were satisfied with staff attitudes, while 12.3% of them were neutral, and only 3.5% were dissatisfied. Comparing our findings to Rawat et al., (2024) who illustrated that the participants were satisfied with staff attitude by 64.25%, neutral by 35.75%, and dissatisfied by 0.00%. It seems that both studies show the highest percentages of participants who are satisfied with the attitude of staff, taking into consideration the total number of participants in their study, which is 400 participants, and our research survey has 228 respondents. Another supported article shared the same low percentage of participants who rated poor staff behaviors by 2% (Raj et al., 2024).

Cleanliness of the Waiting Area

Another aspect of this study is the test of the satisfaction of the participants with the cleanliness of the waiting area. Our findings stated that 89.5% were satisfied, 8.8% were neutral, and 1.8% were dissatisfied. These findings match with A published article conducted in India which showed a 30% satisfaction rate, 44% very good, and 0% poor (Raj et al., 2024). Similarly, 76% were satisfied, 15.75% were neutral, and 8.25% of them were dissatisfied (Rawat et al., 2024). Another published research confirms the highly satisfactory rates of participants towards the cleanliness of the waiting area, which is about 95.9% satisfied, and 4.9% were dissatisfied (Khatri & Sharma, 2021).

Instructions and Explanations

It has been noticed that 94.7% of our participants were satisfied with the instructions and explanations and they found it clear, whereas 5.3% found the instructions not clear. In the paper published by Rawat et al., (2024), there were about 4.25% of participants who found the instruction not clear, which is lower than our current article, 68% were satisfied, and 27.7% was neutral.

Overall Experience

As mentioned in the result section, 85.1% of the participants were satisfied, 11.8% of them found the experience neutral, and 3.1% of participants were dissatisfied with the overall experience. Our findings were matched with Rawat et al., (2024) who shared the same question on the overall satisfaction with the lab service, the highest percentage (71.25%) of the total participants were satisfied, 13.25% were neutral, and 15.50% were dissatisfied. Furthermore, a study conducted in a tertiary governmental hospital among 1500 participants showed that 88% of them were satisfied with the overall experience (Raj et al., 2024). Similarities were found in a cross-sectional study on the laboratory service that showed 61% of the participants were very satisfied, 24% were satisfied, 11% were neutral, and 3.93% were dissatisfied with the overall experience in the laboratory (Aggarwal et al., 2022). In Chacha Nehru Bal Chikitsalaya Hospital (CNCH), the overall satisfaction was the same as in previously mentioned studies which showed vast majority of participants were satisfied with the overall experience 86% and only 14% were dissatisfied (Khatri & Sharma, 2021).

Waiting Time

In our result, 69.7% of the participants were satisfied with the waiting time, 23.2% were neutral, and 7% were dissatisfied with the waiting time at the laboratory. In contrast, only 0.5% considered that the waiting time was excellent, and 33.5%of participants found it poor in a Military hospital in Riyadh, Saudi Arabia (Albaqami & and Alshagrawi, 2025). In India as well, a small portion of participants were excellent with 17%, 36% of them mentioned that the

waiting time was very good, and 10% found it poor (Raj et al., 2024). This high rate of satisfactory waiting time in the current research compared to the rates in (Albaqami & and Alshagrawi, 2025; Raj et al., 2024) indicates the obligation to continuous improvements in the waiting time at the laboratory and increase patient satisfaction. To compare our current findings with Khatri & Sharma, (2021), there was a strong similarity between the results of respondents, as 90.6% of participants were satisfied with the waiting times and 6.79% were dissatisfied. Farid et al., (2024) illustrated in their findings that the waiting time for the laboratory is <10 minutes being strongly agreed by 73%, agreed by 20%, strongly disagreed by 2%, and disagreed by 5%.

CONCLUSION AND RECOMMENDATION

Conclusion

This research article examined the relationship between waiting time satisfaction and the overall experience. Our findings have shown that there is a positive significant association between waiting time satisfaction and overall experience, in which the increased waiting time satisfaction impacts the overall experience satisfaction. Such findings reinforce the importance of controlling the waiting times to help maintain the overall experience satisfaction. This gave an insight into the priority for implementing strategies for improving the reduction of long waiting times, as the integration of technology such as chatbots/virtual assistants helps to contribute to efficient communication and reducing waiting time (Omaghomi et al., 2024).

Recommendation

As the recommendation for future research, after conducting the current research, collecting and analyzing the data, and identifying some key challenges of data analysis, it noticed clear evidence that waiting time plays an important role in overall patient experience satisfaction. Based on the revealed areas to be explored, we recommended precise measurements for waiting time, expanded variables of demographics data, and introduced qualitative data via conducting patient-interview to collect comprehensive monitoring on satisfaction.

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