ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

ASSESSMENT OF PATIENTS WAITING TIME, CIRCULATION TIME AND SERVICE TIME AND THEIR DETERMINANTS AT ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE MEDICAL OUT PATIENT DEPARTMENT

BY: DR. MIHERTAB ERMIAS

ADVISORS:

DR. ISHMAEL SHEMSHEDIN (ASS. PROFESSOR OF INTERNAL MEDICINE)

MR. TEMESGEN GELETA (BSC, MPH)

A STUDENT RESEARCH TO BE SUBMITTED TO ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE PUBLIC HEALTH DEPARTMENT IN PARTIAL FULFUILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF MEDICINE

SEPTEMBER, 2017

ADDIS ABABA, ETHIOPIA

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ACRONYMS AND ABBREVIATIONS

AT- Arrival Time

CI- Confidence Interval

CT- Circulation Time

Hrs. - Hours

HSP- Health service provider

LT- Local Time

Min. – Minutes

MOPD- Medical Outpatient Department

OPD- Outpatient department

SPHMMC- St. Paul's Hospital Millennium Medical College

SP- Service point

SPSS- Statistical Packages for Social Studies

ST- Service time

WT- Waiting Time

ABSTRACT

Background: measurements are central in assessing the quality of health services. The time patients spent in the hospital affects patient satisfaction, hospital security and health professional work loads. Health facility should measure the time patients spent in receiving, waiting for and moving for services.

Objective: To measure the total waiting, service time and circulation time of patients and determine factors associated with them.

Method: A cross-sectional study using patient time flow sheet and on-exit interview questionnaire was used. A stratified random sampling method was used to select a total of 214 respondents. Total waiting time, total service time and total circulation time were measured and patients factors associated with them were determined using linear regression analysis method.

Result: Patients spent on average 195 min (3.2 hrs.) in waiting for services, 20 min in receiving services and 13 min. in moving between service delivery points. Waiting time makes 85% of patient's time in the hospital. Wednesday arrivals have a mean total waiting time 75 minutes less than Monday arrivals. The time of arrival also affects patients waiting time. Mean total waiting time for 6:00-8:00 LT, 8:00-10:00 LT and 10:00-12:00 LT is 126 min (2.1 hrs.), 188 min (3.1 hrs.) and 224 min (3.7 hrs.) less than 12:00-2:00 LT arrivals. Wednesday, Thursday and Friday arrivals also have a mean total circulation time 11 min, 7 min and 10 min less than Monday arrivals. Patients who have relatives working in the hospital have a mean total waiting time 57 minutes less than patients who do not have.

Conclusion: Most patients spent their time in waiting for services and the majority of patient overload occurs in week start days. Thus an efficient appointment and scheduling system is essential in improving waiting and circulation time. Such improvement improves health care delivery quality, patient satisfaction, hospital security and health professional work loads.

INTRODUCTION

BACKGROUND

Measurement is central to health care quality improvement; it provides a means to define what hospitals actually do, and to compare that with the original targets in order to identify opportunities for improvement.

Public satisfaction surveys are one of the principal methods of measuring hospital performance (1). Patient is the best judge since patient accurately assesses and provides inputs which can help in the overall improvement of quality health care provision through the rectification of the system weaknesses by the concerned authorities (2).

Patient satisfaction is considered as one of the most important quality dimension and key success indicators in health care. There is a growing consensus that assessment of the quality of hospital services should be based in part, on patients' perceptions of overall care and patients' satisfaction (3). According to Donabedian, patient satisfaction should be investigated since it is an objective of care, consequence of that care that can contribute to the effects of care and it's the patient's judgment on the care that has been provided (4).

Patient satisfaction is important because it has been observed to have significant influence on patients' attitude towards health care services. Patients who are satisfied are more likely to seek medical advices, adhere to treatment recommendation, keep appointments, cooperate with health professionals in service delivery and even refer other patients to their physicians (5).

Waiting time one of the factors that affect patients satisfaction. And also waiting time affects patients health, cost and health service utilization. (3) (6) (7)

STATEMENT OF THE PROBLEM

Patients spent most of their time in waiting for services. The mean waiting time in a study done Nigeria 5.7 hrs or 346 min. In Ethiopia, the measured mean total waiting time found were 153.7 min or 2.55 hrs, 149.2 minutes at Felege Hiwot hospital and 94.2 minutes at Debre Markos hospital. (3) (6) (8) (9)

Regarding the duration of stay with service provider, the mean (SD) time of consultation duration was 6.10 (4.12) minutes. A research conducted by Tayue Tateke and associates found a mean consultation time (SD) 7.82 (4.78) minutes in public hospitals with a range of 1-45 minutes. The mean consultation time (SD) in private hospitals was found to be 10.59 (6.01) minutes with a range of 2-45 minutes. Of the study participant 65% reported that the consultation duration was enough at private hospital, while 46% of the respondents at the public hospital responded the same way. (8)

Patients' waiting time is important determinant of patients' satisfaction with health service. Patients who waited less time are more likely to be satisfied than patients who waited more. (6)It also determines the health service utilization behavior. (10)

Prolonged waiting time is a risk factor for violence and threat to hospital safety and security. The American emergency nurse association, found that in 2009 more than 50% of emergency nurses had experienced violence by patients on the job and more than 25% had experienced 20 or more violent incidents in the past three years. The research also showed long waiting times, a shortage of nurses, drug and alcohol use by patients and treatment of psychiatric patients contributed to violence in the ED. (11)

A research done to analyze the effect health-related quality of life, pain and physical function during the waiting time showed that in addition to physical dimensions of health, patients suffered from restriction in psychological well-beings such as depression, distress and reduced vitality. (10)

Waiting time was found to be affected by visit day and arrival time. In a research done in Debre Markos and Felege Hiwot hospital to determine factors associated with patient waiting time, it was found large number of patients with few doctors, long searching of the cards and long registration time to have statistically significant association with waiting time.

Illogical queuing also has a large effect on an individual waiting time. Illogical queuing occurs when patients are attended to by staff in an illogical order, i.e. the patients are not attended to in the order that they arrive at the service point. This means that those who arrive first are not seen first, but are made to wait while others are seen before them. (3)

The physical environment greatly affects the quality, efficiency, and efficacy of healthcare delivery in outpatient settings. To appreciate this concept, it is important to understand the journeys that patients make through the department. Patient environment can best be studied from the ordinary experience (3)

SIGNIFICANCE OF THE STUDY

Even though quality in health care is vital and patient waiting time is one of the key measure, there is no research done to assess the waiting time and its determinant in Ethiopia. This study will evaluate the amount of time a patient spent in waiting for a service and determinants of the waiting time. It assess the patient waiting time, service time, patient movement and their determinants. The data that is generated from the study helps the college administration in informed decision making and baseline data for evaluation of future measures.

The unavailability of similar research in Ethiopia and the data generated from the research can be used to improve the health service delivery, this research is important. It also serves as guideline for future research in the field.

LITERATURE REVIEW

WAITING TIMES, SERVICE TIMES AND CIRCULATION TIMES

A research conducted in 2013 by Musinguzi Conrad to measure patient waiting time and associated factor. The research was a cross-sectional survey with a total sample size of 401. The objective of the study was to measure the total waiting time, identify section with long waiting time and determine factors associated with patient waiting time. The research found that, the overall median waiting time was 346 min. or 5.7 hrs. In this study, more than half of patients waited for about 5.9 hrs. and the shortest and longest waiting time were 4 hrs. and 7 hrs. respectively. This study also found that the median waiting time for medical evaluation was 325 (251-399) min. (3)

A research done 2012, to assess the determinants of patients satisfaction with outpatient health services at public and private hospitals in Addis Ababa, found a mean waiting time (SD) of 153.72 (128.22) minutes for public hospitals. The mean waiting time (SD) for private hospitals was 87.15 (88.89) minutes. This study also found, the mean waiting time (SD) before medical evaluation of 134.1 (121.58) and 80.1 (79.9) minutes at public and private hospitals. (8)

A research done to assess patient waiting time and its determinant in Debre Markos and Felege Hiywot Referral hospitals of Amhara Regional state in North West, Ethiopia found a mean waiting time (SD) of 149.2 (72.1) minutes at Felege Hiwyot hospital and 94.2 (58.3) minutes Debre Markos Hospital. (9)

A research done in Wolaita Sodo University Teaching Hospital to measure the patient satisfaction level and associated factors, found that 44.3% of the patient waited 30-60 minutes before visiting the service provider. In this research, the mean (SD) waiting time to see service provider preceding consultation in waiting area was 56.78 (65.95) minutes. This study also found that 24.3%, 45.4% and 17.3% of the patients perceived that the waiting time in the registration process, laboratory, X-ray and ultrasound result waiting time and waiting time for receiving medicine were long, respectively. (6)

Teshome Mulisa, Fasil Tessema and Hailu Merga conducted a research on patients' satisfaction towards radiological service and associated factors in Hawassa university teaching

hospital. In this research patients were asked to estimate the amount of time they spent to get radiological services to determine the total waiting time. Here 59.7% of the respondents waited for more than 12 hrs. to get radiological service. With respect to time taken to enter into radiological examination room, 35.85% waited between 30 minutes to one hour. With the time taken to get radiological result, it took two to five hours in 27.4% of patients to get radiological result. In this study, more than half of patients rated their stay in radiology department as long and one fifth of them rated it as very long. (12)

Regarding the duration of stay with service provider, the mean (SD) time of consultation duration was 6.10 (4.12) minutes.

A research conducted by Tayue Tateke and associates found a mean consultation time (SD) 7.82 (4.78) minutes in public hospitals with a range of 1-45 minutes. The mean consultation time (SD) in private hospitals was found to be 10.59 (6.01) minutes with a range of 2-45 minutes. Of the study participant 65% reported that the consultation duration was enough at private hospital, while 46% of the respondents at the public hospital responded the same way. (8)

THE IMPORTANCE OF WAITING TIME, SERVICE TIME AND CIRCULATION TIME

Waiting time are important determinant of patient satisfaction. Patients who waited less than or equal to 30 minutes were more satisfied than those who waited 60 minutes and above (AOR: 3.16, 95% CI: 1.37-7.25). Similarly, another research also found patients who stayed 30 min-1 hr. were four times more likely to be satisfied compared to those who stayed more than two hours (AOR: 4.12, 95% CI: 1.4-11.62). (6) (12)

Prolonged waiting time is a risk factor for violence and threat to hospital safety and security. The American emergency nurse association, found that in 2009 more than 50% of emergency nurses had experienced violence by patients on the job and more than 25% had experienced 20 or more violent incidents in the past three years. The research also showed long waiting times, a shortage of nurses, drug and alcohol use by patients and treatment of psychiatric patients contributed to violence in the ED. The American academy of emergency physician also consider reduction in waiting time as a means to decreases workplace violence. (11)

A research done to analyze the effect health-related quality of life, pain and physical function during the waiting time showed that in addition to physical dimensions of health, patients suffered from restriction in psychological well-beings such as depression, distress and reduced vitality. (10)

The time spent with the physician is a stronger predictor of patient satisfaction than is the time spent in the waiting room. These results suggest that shortening patient waiting times at the expense of time spent with the patient to improve patient satisfaction scores would be counter-productive.

FACTORS ASSOCIATED WITH WAITING TIME, SERVICE TIME AND CIRCULATION TIME

A research done in Nigeria, found that patient waiting time to have a statistically significant association with arrival time, day of arrival and number of patients in queue line. Patients who arrived between 8-9 AM spent on average 33.79 (95% CI: -55.65-11.84) minutes less than patients who arrived before 8 AM. Patients who arrived between 9-10 AM spent on average 22.7 (95% CI: -48.62,-0.92) minutes less than patients who arrived before 8 AM. Patients who arrived between 10-11 AM spent on average 45.1 (95% CI: -74.24, -16.10) minutes less than patients who arrived before 8 AM. Patients who arrived 11-12 PM spent on average 10.9 (95% CI: 27.88, 49.82) minutes more than patients who arrived before 8 AM. And patients who arrived after 12 PM, spent on average 3.9 (95% CI: 44.86, 36.88) minutes less than patients who arrived before 8 AM. (3)

The study mention above, also found a statistically significant association between day of visit and patient waiting time. Patients who reported on Tuesday spent on average 9.8 (95% CI: -55.56, -44.72) minutes less at the assessment center than patients who arrived on Monday. Patients who arrived on Wednesday spent on average 11.9 (95% CI: -63.59, -38.93) minutes less at the assessment center than patients who arrived on Monday. Patients who reported on Thursday spent on average 9.9 (95% CI: -84.8, -12) minutes less at the assessment center than patients who arrived on Monday. Patients who reported on Friday spent on average 33.9 (95% CI: -56.35, -4.20) minutes less than patients who reported on Monday. (3)

A study done in US found that 82% of patients arrived early or on time but overall waiting time was higher for patients who arrived earlier compared to patients who arrived later. (13)

Studies showed that most patients have the assumption that "if I come early, maybe I'll get out early". But this assumption paid off for 14.5% of patients who arrived early in Hospital A and for 24.8% in Hospital B. According to Thatcher, majority of patients arrived between 7:00-10:00. It was also found that patients were not seen until 9:00 AM. The study also noted most doctors take their break between 1-2 resulting in one hour interval of minimal services. (14)

In a research done in Debre Markos and Felege Hiwot hospital to determine factors associated with patient waiting time, it was found large number of patients with few doctors, long searching of the cards and long registration time to have statistically significant association with waiting time. Accordingly, they also concluded that there is a need for health care facilities and hospital administrators to address gaps in human resources, infrastructures and other internal procedures and institutional systems aimed at reducing waiting times and thus ensuring an effective health care. (9)

Illogical queuing occurs when patients are attended to by staff in an illogical order, i.e. the patients are not attended to in the order that they arrive at the service point. This means that those who arrive first are not seen first, but are made to wait while others are seen before them. Illogical queuing (jump queue) has a large effect on individual patient waiting times. But because of cultural, social and political reason certain groups of people, such as elders, religious leaders, pregnant women and under 5 children, may enjoy the privilege of jump queue. (3)

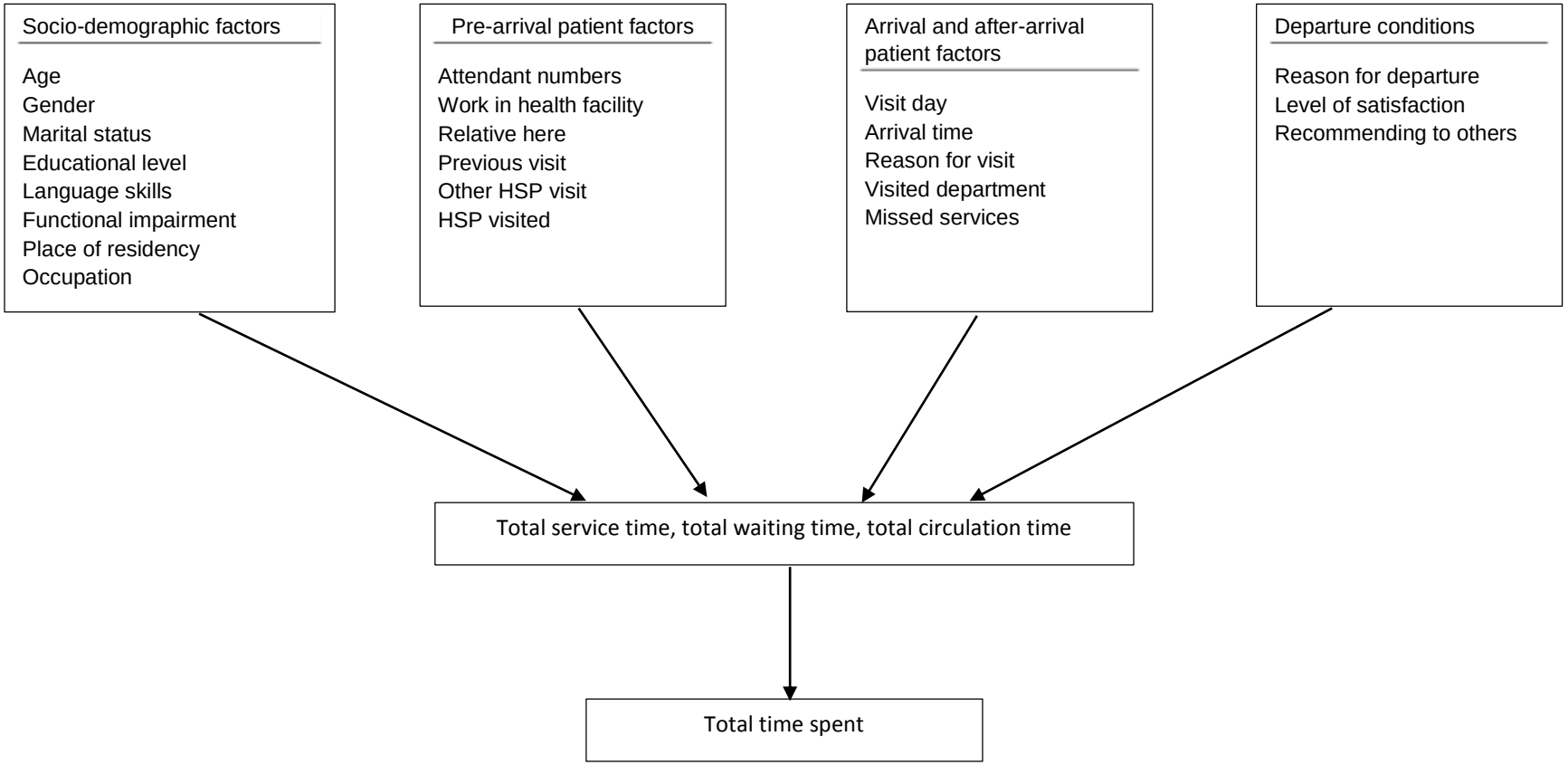
The physical environment greatly affects the quality, efficiency, and efficacy of healthcare delivery in outpatient settings. To appreciate this concept, it is important to understand the journeys that patients make through the department. Patient environment can best be studied from the ordinary experience (3). Physical experience can be affected by the way in which spaces are connected, the changes of direction imposed by the circulation system, the creation of room sequences, the distribution of branching points, the availability of alternative routes, and the relations of visibility between and across spaces (15). Studies show that hospital design coupled with walking distances and common journeys affects access to every department (16), with a direct impact on the movement of patients, staff, and supplies. Therefore controlling

movement in terms of; the number of changes in direction needed to access different service points from the main entrance, the distance and number pit stops (treatment rooms), would ensure less use of time on walking to locate service points (17). Therefore, physical accessibility is an important factor for optimizing patient flow; and to achieve operational efficiency (3).

CONCEPTUAL FRAMEWORK

The conceptual framework showed that socio-demographic factors, pre-arrival patient factors, arrival and post-arrival patient factors and departure conditions are considered to affect the total service time, total waiting time and total circulation time. The total time spent depends on total service time, total waiting time and total circulation time. The total time spent in hospital have different effects on patients' satisfaction, cost, hospital security and health seeking behavior of patients.

Figure 1: Conceptual framework



OBJECTIVES

GENERAL OBJECTIVES

To measure the total waiting time, total service time, total circulation time and to determine factors associated with them to help in improving the service provision of the hospital.

SPECIFIC OBJECTIVES

- To measure the total waiting time in medical OPD
- To measure the total service time in medical OPD
- To measure the total circulation time among patients in medical OPD
- To determine patient factors associated with total waiting time,
- To determine patient factors associated with total service time
- To measure patient factors associated with total circulation time.

METHODOLOGY

STUDY DESIGN

The study was cross-sectional study to measure total service time, total waiting time and total circulation time and factors associated with them.

STUDY AREA

The study was conducted in St. Paul's Hospital Millennium Medical College medical outpatient department. St. Paul's hospital millennium medical college is located in Addis Ababa Ethiopia. It is one of the national referral and teaching hospital in the country. It provides medical, diagnostic, surgical and training services. The hospital has more than 700 beds and over 1200 patients attend emergency and outpatient services daily. The outpatient department provides medical services. (18)

In analysis of the OPD attendance registry, it was found that the mean weekly attendance at the MOPD was 440 patients.

STUDY PERIOD

The study was conducted for five days from July 3, 2017 to July 7, 2017 GC.

POPULATION

SOURCE POPULATION

The source population included all patients who seek for medical services in MOPD.

STUDY POPULATION

The study population include all selected patients who visited the SPHMMC medical OPD during the study period.

SAMPLE SIZE

Sample size was calculated based on a research conducted to measure the level and determinants of patient satisfaction in private and public hospitals in Addis Ababa. In the study 50% of the patients waited for 153.7 minutes. (8)

Thus for the study, p-value of 0.5 and 95% CI were used. (z=1.96 and d=0.05)

$$n = \frac{z^2 p(1-p)}{d^2} = \frac{1.92^2 \times 0.5(1-0.5)}{0.05^2} = 385$$

The mean weekly patient volume at the medical OPD was 440 patients. The sample size determination for finite population was used

$$n = \frac{n_0 N}{n_0 + (N-1)} = \frac{385 \times 440}{385 + (440-1)} = 205$$

Considering a 10% non-response rate, the total sample size used was 225.

SAMPLING PROCEDURE

Samples were selected based on proportionate stratified random sampling method among source population. Samples were proportionally stratified based on the day of visit.

Table 1: Sample size proportion for days of the week

	Monday	Tuesday	Wednesday	Thursday	Friday
Percentage of the week visit	22.4	22.4	19.5	20.1	14.4
Sample size	51	51	43	46	33

A sampling frame which includes the number of mean daily visit was prepared. And SPSS was used to generate random numbers from a sampling frame which includes the mean daily visit for the 5 days of the week.

STUDY VARIABLES

DEPENDENT VARIABLES

The dependent variables are:

- Total waiting time
- Total service time and
- Total circulation time.

These variables are measured in a continuous scale. They are obtained by summing the service point specific waiting time, service time and circulation time. They indicate the time patients spend in waiting for services, receiving in services and moving among different service points.

INDEPENDENT VARIABLES

The independent variables used in the study includes socio-demographic factors, pre-arrival patient factors, arrival and after-arrival patient factors and departure conditions. Information about this independent variables were collected and their influence on the dependent variables were analyzed.

Socio-demographic factors: age, gender, marital status, occupation, educational level, functional impairment, language skills and place of residence.

Pre-arrival patient factors studied in the research includes: number of attendants, work in HSP, relative working here, visit to other HSP and the type of HSP visited.

Arrival and after arrival patient factors includes: visit day, arrival time, reason for current visit, visited departments, missed services

Departure patient conditions includes: reason for departure, level of satisfaction and recommendation to others.

INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria

- All patients who seek care at the medical OPD.

Exclusion criteria

- We did not have exclusion criteria.

DATA COLLECTION

DATA COLLECTION TOOLS

Primary data were collected thru the use of patient time flow sheet which tracks and documents the patient movement in selected service points in the hospital and a questionnaire that documents the independent variables.

DATA COLLECTION PROCEDURE

Patient time flow sheet was filled at three different service points: at the medical OPD, at the laboratory, and radiology department. Three students were assigned at the three service points and fill the patient time flow sheet. A single student facilitated and notified the assigned data collectors the selected respondents.

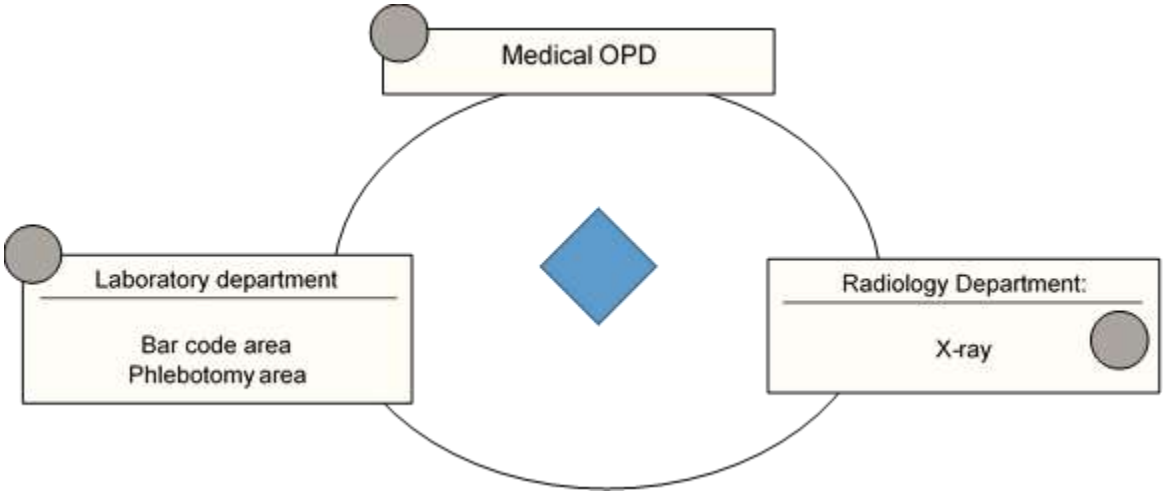


Figure 2: The data collection process. The circles indicated data collectors and the rectangle shows the facilitator.

DATA PROCESSING

Data was checked for completeness and was fed into SPSS statistics 20. After completion of the feeding process, SPSS listed data was cross checked with the hard copy for consistency.

DATA ANALYSIS

The data analysis process was conducted in three steps. First to visualize the general features of the respondent's descriptive statistics was obtained.

Linear regression was computed to identify association between dependent variables and independent variables. Furthermore, bivariate and multivariate linear regression was used to identify statistically significant associations. Statistically significant association was issued at a p-value less than 0.05. Variables found to have significant association in bivariate analysis were included in multivariate linear regression.

DATA QUALITY CONTROL

Data collectors were oriented about the research objectives, methodology and data collection process.

Data collectors calibrated and synchronized their watches.

Data collectors were told to contact and ask the researcher for any troubles. The researcher assisted the data collector to troubleshoot.

Data collection tools were examined for completeness and any error and errors found were fixed.

OPERATIONAL DEFINITIONS

Arrival time: this is the time a patient reports to the medical OPD seeking health service.

Departure time: this is the time a patient leaves the hospital after receiving health services or without receiving the service or having been admitted to the hospital inpatient or transferred to other department.

Outpatient: this refers to a patient that visits the hospital and leaves the same day immediately after treatment.

Patient flow: this describes the patients' movement in the hospital through different service points.

Waiting time: this is the time a patient spends waiting to receive a service.

Service point waiting time: this is the time a patient spends waiting to receive a specific service at specific service point.

Total waiting time- this is the sum of all service point waiting time.

Service time: this is the time a patient spends receiving a service.

Service point service time: this is the time a patient spend receiving a service from a service provider at any service point.

Total service time: this is the sum of all service point service time

Circulation time: this is the time patients spent in moving from one service point to another SP.

Pre-arrival patient factors: patients factors unrelated to health service utilization in this hospital.

ETHICAL CONSIDERATION

Permission and ethical clearance were obtained from SPHMMC Public Health Department. Participation was voluntary and respondents' responses were kept anonymously. Consent was taken from all participants and research ID number was used instead of patient names. For children below age of 18 years, Consent was sort from their guardians.

DISSEMINATION PLAN

The result of the study was disseminated to the department of public health, SPHMMC. It will also be submitted to the hospital administration for help in making informed decision in improving service provision.

RESULTS

SOCIO DEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS

A total of 214 respondents participated in the study making a response rate of 95.1%. The age of respondents ranged from 15-83 years, with mean (SD) age of 45 (17.8) years. 112 (52.3%) of the respondents were male. 140 (65.4%) of the study participants are currently married. 56(26.2%) of the respondents attended grade 9-12 as their maximum educational achievements. 3 (1.4%) of them have educational level above degree. 53(24.8%) of the respondents were farmers. 99 (46.3%) of the study participants lives in Addis Ababa and 6(2.8%) of them lives in prisons.

Table 2: Socio-demographic characteristics of patients at the medical OPD, SPHMMC, Addis Ababa, Ethiopia, 2017.

Characteristics (n=214)	Frequency	Percentage
Five years age groups		
15-19	20	9.3
20-24	12	5.6
25-29	19	8.9
30-34	22	10.3
35-39	15	7.0
40-44	16	7.5
45-49	17	7.9
50-54	24	11.2
55-59	15	7.0
60 and above	54	25.2
Sex of respondents		
Male	112	52.3
Female	102	47.7
Marital status		
Single	51	23.8
Married	140	65.4
Divorced	12	5.6
Widowed	11	5.1
Educational achievements		
No school attendance	52	24.3
Traditional schools only	34	15.9

Grade 1-8	26	12.1
Grade 9-12	56	26.2
Diploma	17	7.9
Degree	26	12.1
Above degree	3	1.4
Occupation		
Unemployed	42	19.6
Farmer	53	24.8
Students	24	11.2
Merchant	10	4.7
Teacher	8	3.7
Religious leader	6	2.8
Health worker	6	2.8
Gov. officials	3	1.4
Others	62	29.0
Region of residence		
Addis Ababa	99	46.3
Oromia	76	35.5
Amhara	15	7.0
SNNPR	12	5.6
Afar	6	2.8
Prisoner	6	2.8

Regarding the language skill of respondents, 183(85.5%) of the respondents can listen and speak Amharic. 137(64.0%) of the study participant can read Amharic. 14(6.5%) of them can listen, speak and read other languages.

163(76.2%) of the respondents do not have any functional impairment. It is also found that 22(10.3%) of them have locomotion impairment.

Table 3: Language skills and functional impairment of patients at the medical OPD, SPHMMC, Addis Ababa, Ethiopia, 2017.

Characteristics (n=214)	Frequency	Percentage
Can listen		
Amharic	183	85.5
Oromiffa	61	28.5
English	42	19.6
Others	14	6.5
Can speak		
Amharic	182	85.5
Oromiffa	61	47.7
English	42	19.6

Other	14	6.5
Can read		
Amharic	137	64.0
Oromiffa	61	28.5
English	42	19.6
Other	14	6.5
Functional impairment		
No impairment	163	76.2
Visual impairment	18	8.4
Hearing impairment	6	2.8
Locomotion impairment	22	10.3
Visual and locomotion impairment	5	2.3

PRE HOSPITAL ARRIVAL PATIENT FACTORS

208 (97.2%) of the respondents have never worked in health facility. 189 (88.9%) of the respondents do not have relatives working in the hospital. 117 (54.7%) of the study participants had previous visit to this hospital. 170 (79.4%) of the participants have visit to other health services provider for the current illness. Of those who visited other health service provider, 80 (44.2%) of them had visit to government hospitals. 95 (44.4%) of the study participants visited the hospital with only one attendant. The maximum number of attendants accompanying the respondents was 3.

Table 4: Pre-arrival factors of patients at the medical OPD, SPHMMC, Addis Ababa, Ethiopia, 2017.

Variables (n=214)	Frequency	Percentage
Number of attendants		
0	75	35.0
1	95	44.4
2	36	16.8
3	8	3.7
Ever worked in health facility		
Yes	6	2.8
No	208	97.2
Have relatives working here		
Yes	25	11.7
No	189	88.3
Ever had previous visit		
Yes	117	54.7

No	97	45.3
Other HSP visit to current illness		
Yes	170	79.4
No	42	19.6
HSP visited (n=170)		
Health center	55	30.4
Private clinics	9	5.2
Gov. hospitals	80	44.2
Private hospitals	31	18.2
Others	6	3.5

ARRIVAL AND AFTER ARRIVAL PATIENT FACTORS

50 (23.4%) of the respondents visited the hospital on Monday. 117 (54.7%) of the respondents arrived at the hospital between 2:00-4:00 LT. The earliest and latest arrival time found in the study were 12:00 LT and 10:15 LT. In regards to reason of current visit, appointment for follow up is the reason in 142(66.4%) of the respondents. 4 (1.9%) of the respondents visited by walk-ins. 143 (66.8%) of the respondents visited the laboratory department together with medical services. 155 (72.4%) of the respondents did not missed any services. Of those who missed any of the services, 51 (94.4%) missed laboratory services.

Table 5: Arrival and after arrival factors of patients at the medical OPD, SPHMMC, Addis Ababa, Ethiopia, 2017.

Variables (n=214)	Frequency	Percentage
Visit day		
Monday	50	23.4
Tuesday	48	22.4
Wednesday	40	18.7
Thursday	45	21.0
Friday	31	14.5
Arrival time in 2-hrs category		
12:00-2:00	58	27.1
2:00-4:00	117	54.7
4:00-6:00	11	5.1
6:00-8:00	9	4.2
8:00-10:00	15	7.0
10:00-12:00	4	1.9
Reasons for current visits		
Appointment	142	66.4

Referrals	68	31.8
Walk-ins	4	1.9
Other visited service points		
No other service point	57	26.6
Laboratory	143	66.8
Radiology	49	22.8
Other service points	44	20.6
Missed any services		
Yes	54	27.6
No	155	72.4
Missed services (n=54)		
Medical evaluation	1	1.8
Laboratory services	51	94.4
Radiology services	20	37.0

WAITING TIME, SERVICE TIME, CIRCULATION TIME AND TOTAL TIME SPENT

Median (SD) time spent in the hospital by the respondents in the survey was found to be 195.50 (141.9) min. The minimum time spent is 35 minutes and maximum time spent is 595 minutes. 48(22.4%) of respondents spent 3-4 hrs. The median (SD) total time spent before receiving medical evaluation was 113.50 (124.0) minutes. The minimum and maximum time spent before medical evaluation was 2 and 560 minutes respectively. 57 (26.6%) of the patient spent 1-2 hrs. before receiving medical evaluation. The median (SD) time spent after medical evaluation was 20.00 (75.99) minutes. The minimum and maximum time spent after medical evaluation was found to be 0 and 382 minutes respectively. 176 (82.2%) of the patients spent 0-1 hr. after medical evaluation.

Table 6: Total time spent in the hospital by patients at the medical OPD, SPHMMC, Addis Ababa, Ethiopia, 2017.

Variables (n=214)	Frequency	Percentage
Total time spent in 1 hr. time groups		
0-1 hr.	25	11.7
1-2 hrs.	26	12.1
2-3 hrs.	42	19.6
3-4 hrs.	48	22.4
4-5 hrs.	19	8.9
5-6 hrs.	9	4.2

6-7 hrs.	18	8.4
7-8 hrs.	11	5.1
8-9 hrs.	11	5.1
9-10 hrs.	5	2.3
Total time spent before medical evaluation in 1 hr. time groups		
0-1 hr.	42	19.6
1-2 hrs.	57	26.6
2-3 hrs.	50	23.4
3-4 hrs.	20	9.3
4-5 hrs.	12	5.6
5-6 hrs.	13	6.1
6-7 hrs.	7	3.3
7-8 hrs.	4	1.9
8-9 hrs.	6	2.8
9-10 hrs.	1	0.5
Total time spent after medical evaluation in 1 hr. time groups		
0-1 hr.	176	82.2
1-2 hrs.	17	7.9
2-3 hrs.	5	2.3
3-4 hrs.	3	1.4
4-5 hrs.	2	0.9
5-6 hrs.	2	0.9
6-7 hrs.	5	2.3

TOTAL WAITING TIME AND TOTAL WAITING TIME FOR MEDICAL EVALUATION

Median (SD) time spent in waiting for services was found to be 150.0 (137.02) min. The minimum waiting time is 2 min and the maximum 575 min. 57 (26.6%) of the patients have a total waiting time of 2-3 hrs. The median (SD) time respondents spend waiting for medical evaluation was 113.5 (124.66) min. The minimum and maximum waiting time for medical evaluation were found to be 2 and 580 minutes respectively. 63 (29.7%) of the patients have a total waiting time of 1-2 hrs. after medical evaluation.

Table 7: Total waiting time of patients at the medical OPD, SPHMMC, Addis Ababa, Ethiopia, 2017.

Variables (n=214)	Frequency	Percentage
Total waiting in 1 hr. time groups		
0-1 hr.	32	15.0
1-2 hrs.	34	15.9

2-3 hrs.	57	26.6
3-4 hrs.	34	15.9
4-5 hrs.	10	4.7
5-6 hrs.	12	5.6
6-7 hrs.	13	6.1
7-8 hrs.	10	4.7
8-9 hrs.	10	4.7
9-10 hrs.	2	0.9
Total waiting times for medical evaluation in 1 hr. time groups		
0-1 hr.	50	23.6
1-2 hrs.	63	29.7
2-3 hrs.	41	19.3
3-4 hrs.	26	12.1
4-5 hrs.	4	1.9
5-6 hrs.	8	3.8
6-7 hrs.	6	2.8
7-8 hrs.	7	3.3
8-9 hrs.	6	2.8
9-10 hrs.	1	0.5

TOTAL SERVICE TIME AND TOTAL MEDICAL EVALUATION SERVICE TIME

The median (SD) time spent in receiving a service as found to be 16.0 (12.19) minutes. The minimum and maximum total service time found were 3 min and 62 minutes. 69 (32.2%) of the patient spent a total service time of 0-10 min. The median (SD) time spent in receiving medical evaluation only as found to be 15.0 (10.45) min. The maximum and minimum medical evaluation service time were 50 and 3 minutes. 84(39.6%) of the patients have a total medical evaluation time of 0-10 min.

Table 8: Total service time of patients at the medical OPD, SPHMMC, Addis Ababa, Ethiopia, 2017.

Variables (n=214)	Frequency	Percentage
Total service time in 10 min. time groups		
0-10 min	69	32.2
10-20 min.	68	31.8
20-30 min.	46	21.5
30-40 min.	19	8.9
40-50 min.	9	4.2
50-60 min.	3	1.4
60-70 min.	2	0.9

Total medical evaluation service time in 10 min. time groups		
0-10 min.	84	39.6
10-20 min.	72	34.0
20-30 min.	35	16.5
30-40 min.	12	5.7
40-50 min.	9	4.2

TOTAL CIRCULATION TIME

The median (SD) time spent in circulating between service points was 10.0 (12.7) minutes. The maximum circulation time was 105 minutes and the minimum was 0 minutes. 183 (87.1%) of the patients have a total circulation time of 0-20 min.

Table 9: Total circulation time of patients at the medical OPD, SPHMMC, Addis Ababa, Ethiopia, 2017.

Variables (n=214)	Frequency	Percentage
Total circulation time in 20 min. time groups		
0-20 min.	183	87.1
20-40 min.	19	9.0
40-60 min.	3	1.4
60-80 min.	3	1.4
80-100 min.	1	0.5
100-120 min.	1	0.5

DEPARTURE PATIENT FACTORS

153(71.5%) of the respondents departed with appointment for regular follow-ups. 5(2.3%) of the respondent departed self-discharge. 92 (43.0%) of them are satisfied with the overall services of the hospital. 154(72.0%) of the respondents recommend others to visit this hospital.

Table 10: Departure condition of patients at the medical OPD, SPHMMC, 2017, Addis Ababa, Ethiopia, 2017.

Variables (n=214)	Frequency	Percentage
Mode of departures		
Appointments for follow-ups	153	71.5
Admission	6	2.8
Discharge	3	1.4
Transfer to other departments.	6	2.8
Appointment for incomplete investigations	41	19.2
Walk-outs	5	2.3
Level of satisfaction		
Very dissatisfied	14	6.5
Not satisfied	58	27.1
Satisfied	92	43.0
Quite satisfied	15	7.0
Very satisfied	35	16.4
Do you recommend others		
Yes	154	72.0
No	60	28.0

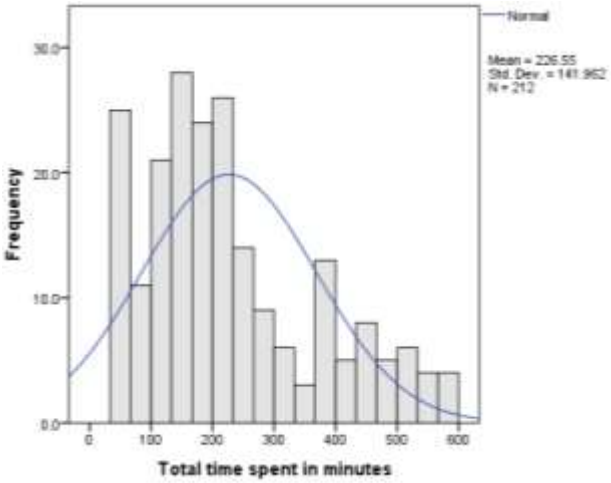


Figure 4: Distribution of total time spent in min.

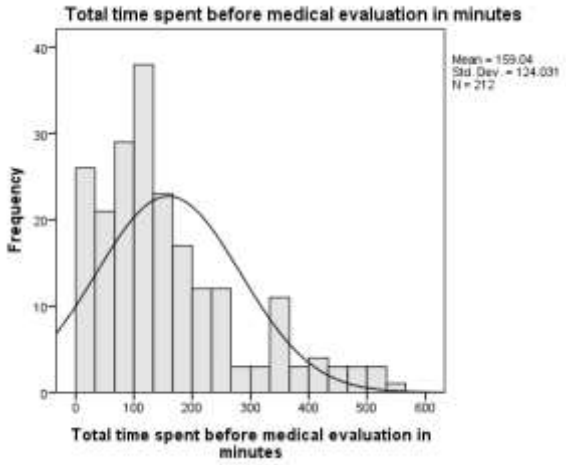


Figure 3: Distribution of time spent before medical evaluation in min.

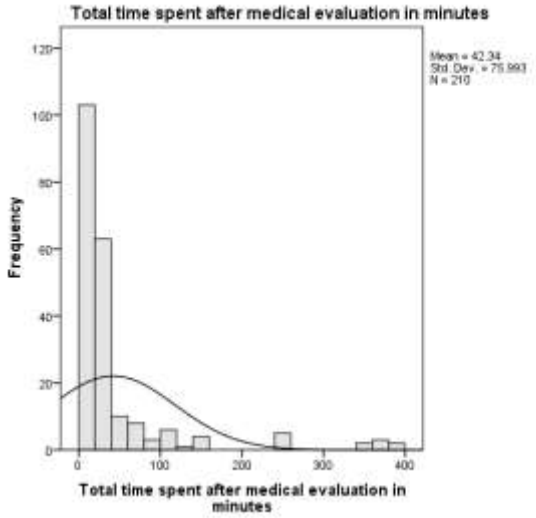


Figure 5: Distribution of total time spent after medical evaluation in min.

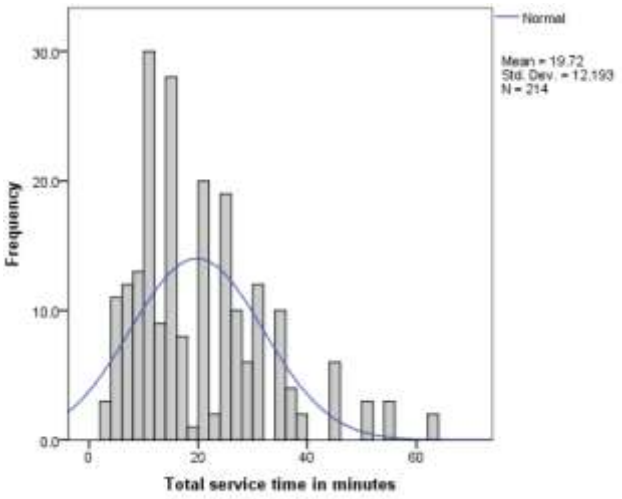


Figure 6: Distribution of total service time in min.

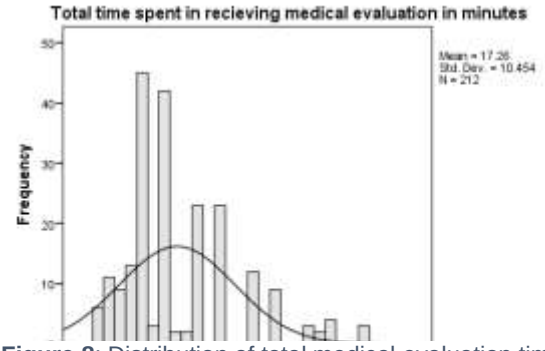


Figure 8: Distribution of total medical evaluation time in min.

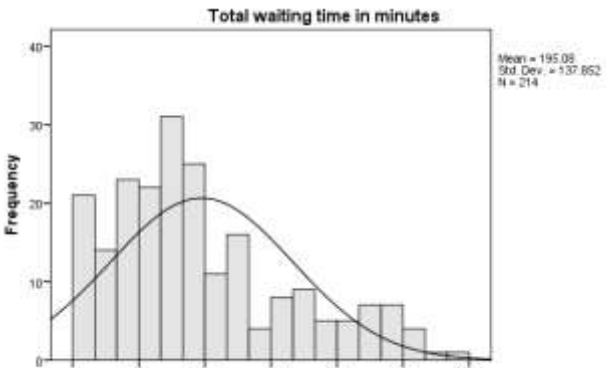


Figure 7: Distribution of total waiting time in min.

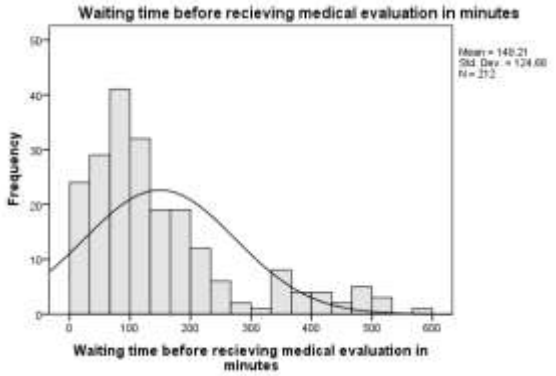


Figure 10: Distribution of waiting time before medical evaluation.

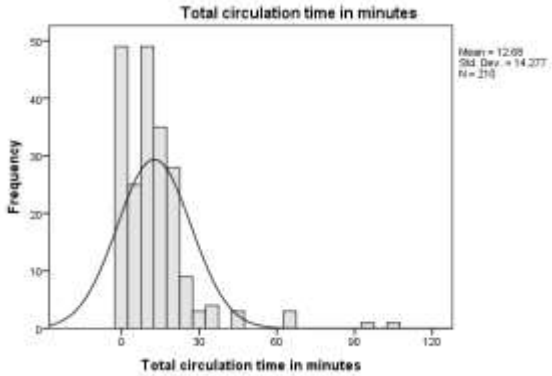


Figure 9: Distribution of total circulation time in min.

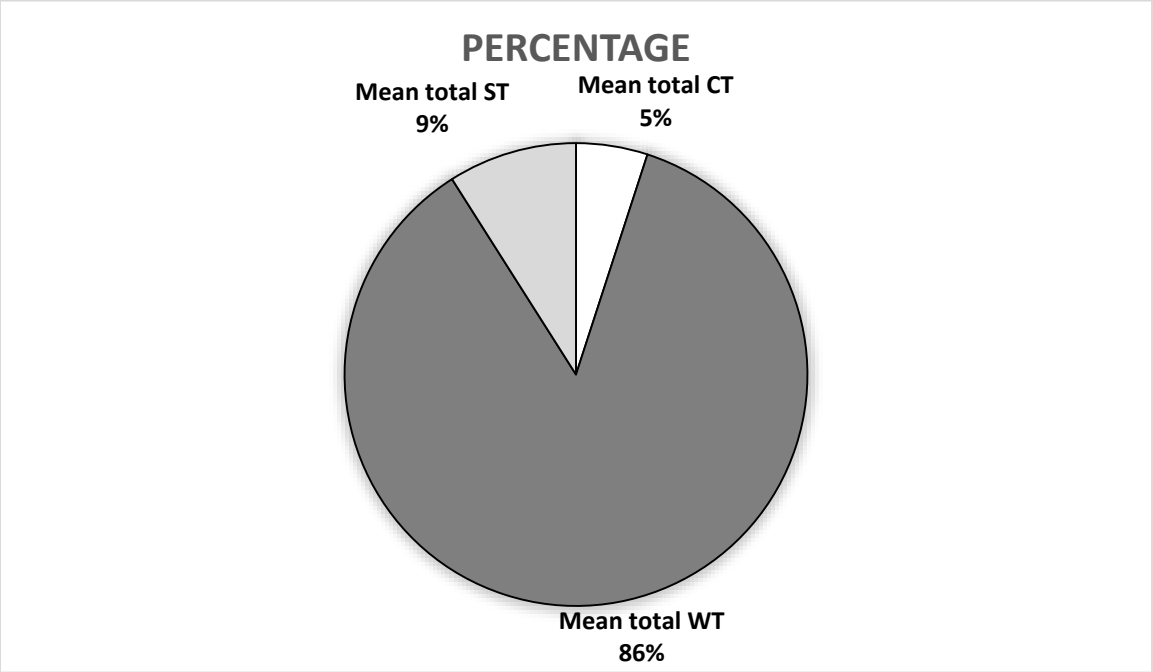


Figure 11: Percentage of mean total waiting time, mean total circulation time and mean total service time. Total waiting time makes up 86% of the total time spent and total service time and total circulation time make 9% and 5% of the patients' total time spent respectively.

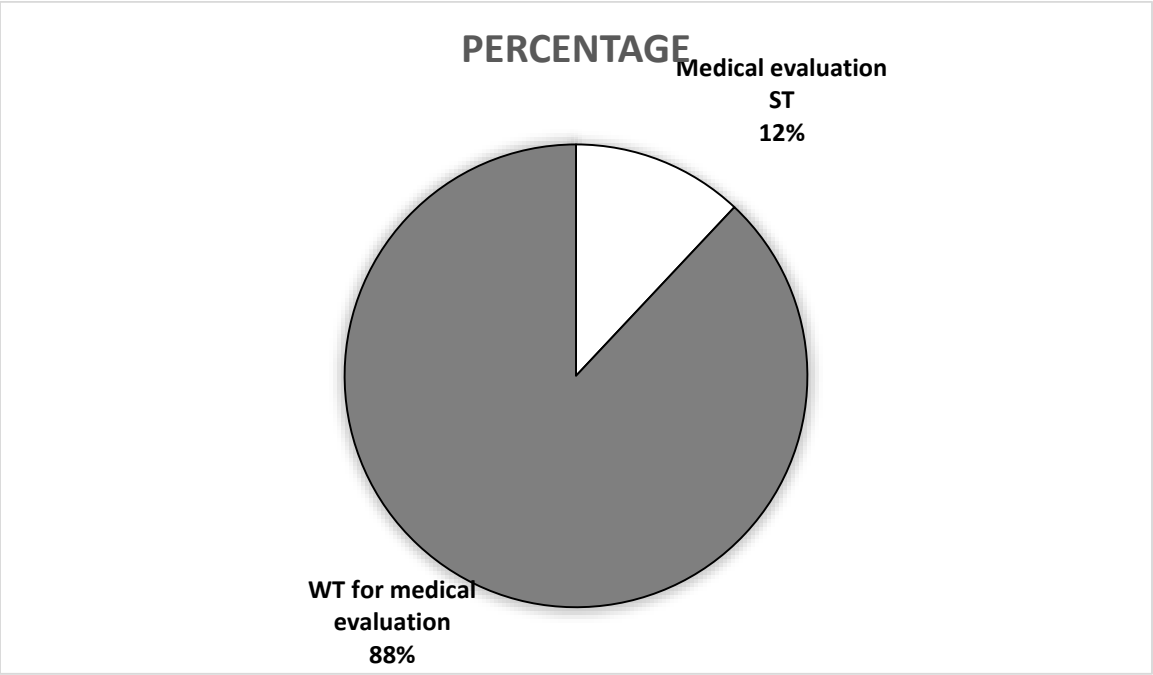


Figure 12: Percentage of the median total medical evaluation ST and WT for medical evaluation. Patients spent 88% of their time before completing medical evaluation in waiting for the medical evaluation. While only they spent on 12% of the time in receiving the medical evaluation.

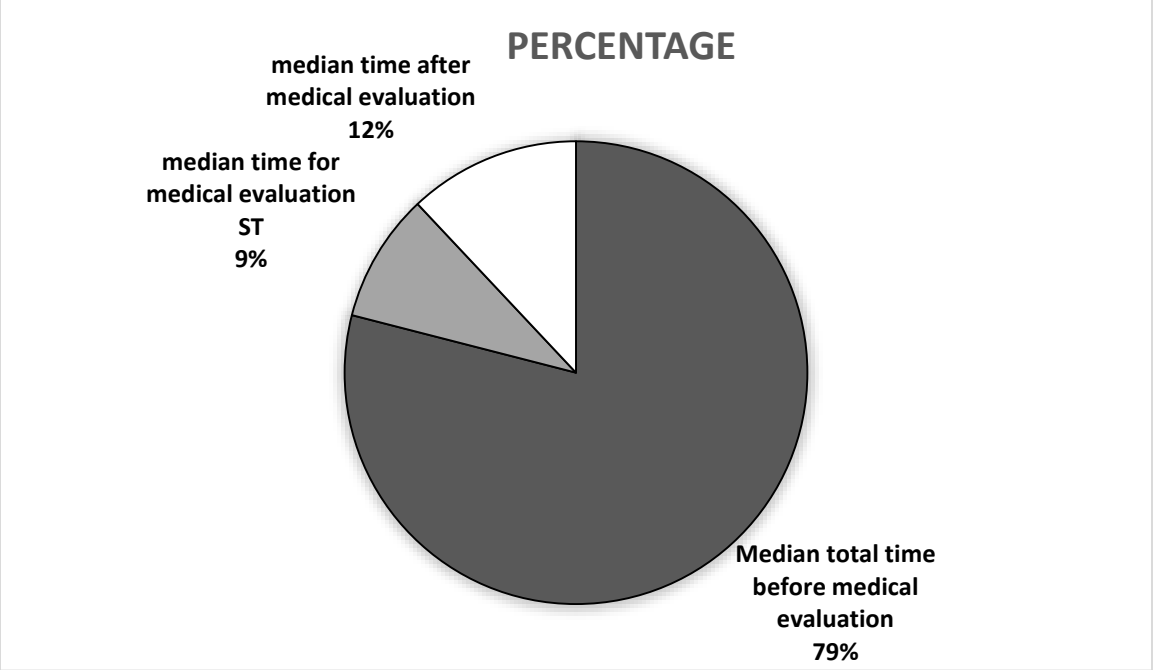


Figure 13: Percentage of the median total time before medical evaluation, median time after medical evaluation and medical evaluation service time. Patients spent 79% of their total time before getting medical evaluation. Only 12% and 9% of their total time is spent in receiving medical evaluation and after receiving medical evaluation respectively.

FACTORS ASSOCIATED WITH TOTAL WAITING TIME

BIVARIATE ANALYSIS OF FACTORS ASSOCIATED WITH TOTAL WAITING TIME

Socio-demographic factors associated with total waiting time

In bivataite analysis statistically significant association was found between place of residence, English, Afan Oromiffa, and other language skills and functional impairment. But we found no association between age, sex, marital status, educational level, occupation and Amharic language skill with total waiting time.

The mean total waiting time of respondents who lives in Afar regional state was 180 minutes less than those who lives in Addis Ababa.

In regarding the language skill, the mean total waiting time of Oromiffa listeners and speakers was found to be 39 minutes less than those who cannot speak or listen. Respondents who can speak, listen and read English language have a mean total waiting time 61 minutes less than those who cannot speak, listen or read. Those who speak and listen other languages have a mean total waiting time 165 minutes longer than those who cannot speak and listen other languages. The mean total waiting time of respondents who can read other languages is 146 minutes longer than those who cannot read other languages.

Considering the functional impairment of respondents, the mean total waiting time for respondents with visual and locomotion impairment was found to be 238 minutes lesser than those who do not have any form of functional impairment.

Table 11: Bivariate analysis of socio-demographic characteristic and total waiting time.

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Region of residence				
Addis Ababa (Ref.)				
Oromia	-16.819	0.984	-85.11	51.47
Amhara	57.408	0.789	-66.66	181.48
SNNPR	-37.942	0.972	-174.82	98.94
Afar	**-180.025**	**0.041**	**-368.29**	**8.24**
Prisoner	113.64	0.535	-74.63	301.91
Listen Amharic				

Yes				
No	-27.744	0.156	-10.863	66.350
Speak Amharic				
Yes				
No	-27.744	0.156	-10.863	66.350
Read Amharic				
Yes				
No	0.413	0.984	-40.506	41.332
Listen Oromiffa				
Yes	**-40.985**	**0.032**	**-80.588**	**-1.382**
No				
Speak Oromiffa				
Yes	**-40.985**	**0.032**	**-80.588**	**-1.382**
No				
Read Oromiffa				
Yes	-34.321	0.182	-84.447	15.804
No				
Listen English				
Yes	**-62.131**	**0.002**	**-101.226**	**23.036**
No				
Speak English				
Yes	**-62.131**	**0.002**	**-101.226**	**23.036**
No				
Read English				
Yes	**-62.131**	**0.002**	**-101.226**	**23.036**
No				
Listen other languages				
Yes	**165.154**	**0.000**	**93.249**	**237.058**
No				
Speak other languages				
Yes	**165.154**	**0.000**	**93.249**	**237.058**
No				
Read other languages				
Yes	**136.204**	**0.003**	**45.292**	**227.117**
No				
Functional impairment				
No impairment				
Visual impairment	-41.539	0.807	-143.33	60.25
Hearing impairment	33.850	0.984	-136.51	204.21
Locomotion impairment	46.895	0.649	-46.19	139.98
Visual and locomotion impairment	**-257.050**	**0.007**	**-443.12**	**-70.98**

Pre-hospital arrival patient factors associated with total waiting time

Number of attendants accompanying the respondent, previous visit to the hospital, other health service provider visit for the current complaint and the health service provider visited were not found to be associated with total waiting time.

The mean total waiting time of respondents who have ever worked in health facility was found to be 80 minutes less than those who have never worked in health facility. Respondents with relatives working in the hospital have a mean total time 68 minutes less than those who do not have relatives.

Table 12: Bivariate analysis of pre-arrival patient factors and total waiting time

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Ever worked in health facility				
Yes	-80.675	0.001	-119.234	-42.116
No				
Have relatives working here				
Yes	-68.072	0.020	-125.301	-10.843
No				

After arrival patient factors associated with total waiting time

Visit day and arrival time were found to have statistically significant association with total waiting time. Patients who arrive on Wednesday have a mean waiting time 75 minutes less than the mean total waiting time of Monday arrivals. patients who arrive between 6:00-8:00 LT, 8:00-10:00 LT and 10:00-12:00 LT have mean total waiting time 146 min, 197 min and 241 min less than those who arrived 12:00-2:00 LT.

Table 13: Bivariate analysis of arrival and after arrival factors and total waiting time.

Variable	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Visit day				
Monday				
Tuesday	5.78	0.999	-79.24	89.20
Wednesday	-74.83	0.014	-163.24	-13.58

Thursday	-66.68	0.214	-182.96	52.32
Friday	-66.40	0.324	-103.65-	61.65
Arrival time in 2hrs. group				
12:00-2:00 LT				
2:00-4:00 LT	59.41	0.330	-19.50	118.32
4:00-6:00 LT	38.94	0.979	-104.27	177.95
6:00-8:00 LT	-146.26	0.018	-279.99	-27.46
8:00-10:00 LT	-197.99	0.000	-312.29	-63.71
10:00-12:00 LT	-241.86	0.045	-446.50	-2.86

Departure patient factors associated with total waiting time

Reason for departure, satisfaction level and recommendation to others were found to have no statistically significant association with total waiting time.

MULTIVARIATE ANALYSIS OF FACTORS ASSOCIATED WITH TOTAL WAITING TIME

In multivariate analysis visit day, arrival time and having relative working here were found to have statistically significant association with the total waiting time.

Patients who have relatives working in the hospital were found to have a mean total waiting time 57 minutes less than patients who do not have relatives.

Patients who arrive on Wednesday were found to have a mean waiting time 75 minutes less than those who arrive on Monday. This difference is statistically significant at P-value of 0.035.

In regards to time of arrival, patients who arrive between 6:00-8:00 LT, 8:00-10:00 LT and 10:00-12:00 LT were found to have a mean waiting time 126 minutes, 188 minutes and 224 minutes less than those who arrived between 12:00-2:00 LT respectively.

Table 14: Multivariate analysis of patient factors associated with total waiting time.

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Have relatives working here				
Yes	--56.78	0.031	--99.672	-11.843
No				
Visit day				
Monday				
Tuesday	4.98	0.999	-63.08	73.04

Wednesday	**-74.83**	**0.035**	**-146.28**	**-3.38**
Thursday	-66.68	0.065	-2.53	135.89
Friday	-66.40	0.126	-10.59	143.40
Arrival time in 2 hrs. groups				
12:00-2:00				
2:00-4:00	49.41	0.124	-7.14	105.96
4:00-6:00	36.84	0.941	-78.96	152.64
6:00-8:00	-126.26	0.050	-252.42	-0.11
8:00-10:00	-188.00	0.000	-290.00	-86.00
10:00-12:00	-224.68	0.006	-406.72	-42.65

FACTORS ASSOCIATED WITH TOTAL SERVICE TIME

BIVARIATE ANALYSIS OF FACTORS ASSOCIATED WITH TOTAL SERVICE TIME

Socio-demographic factors associated with total service time

There was found no association between total service time and respondent's age, occupation, Amharic language skills, Oromiffa language skills, other language speaking and listening skill and functional impairment.

The mean total service time of male respondents were found to be 4 minutes longer than females. In regards to marital status, divorced respondents have a mean total service time 12 minutes longer than unmarried respondents. Respondents with English language skills were found to have a mean total service time 5.8 minutes longer than those without English language skills.

Table 15: Bivariate analysis of socio-demographic factors and total service time.

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Respondent Gender				
Male	4.156	0.012	0.907	7.405
Female				
Marital status				
Unmarried				
Married	-0.372	0.998	-5.83	5.08
Divorced	11.966	0.021	1.26	22.67
Widowed	8.103	0.280	-3.36	18.82
Speak English				
Yes	5.814	0.001	2.366	9.263
No				

Listen English				
Yes	5.814	0.001	2.366	9.263
No				
Read English				
Yes	5.814	0.001	2.366	9.263
No				
Read other language				
Yes	11.655	0.005	3.603	19.705
No				

Pre-arrival patient factors associated with total service time

The mean total service time of respondents in regards to the number of respondents showed statically significant difference. Respondents with 2 and 3 attendants were found to have a mean total service time 4 and 21 minutes less than those who do not have any attendant. The mean total service time of respondents who have visited other health service provider was 6 minutes longer than those who do not have visit to other health service provider for the current complaint.

Table 16: Bivariate analysis of pre-arrival patient factors and total service time.

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Number of attendants				
0				
1	-0.589	0.990	-5.55	4.38
2	-7.297	0.021	-13.81	-0.78
3	-20.922	0.000	-32.88	-8.97
Other HSP visit				
Yes	6.268	0.004	3.535	9.002
No				

Arrival and after arrival patient factors associated with total service time

In bivariate analysis, a statistically significant association was found between visit day, reason for current visit, radiology visit and missing any services with the total service time.

Table 17: Bivariate analysis of arrival and after arrival factors associated with total service time.

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Visit day				
Monday				
Tuesday	1.548	0.974	-5.33	8.44
Wednesday	-13.160	0.000	-20.38	-5.94
Thursday	-7.227	0.039	-14.22	-0.23
Friday	-8.644	0.020	-16.42	-0.86
Reason for current visit				
Referrals				
Appointments	-5.581	0.008	-9.23	-1.93
Walk-in	-0.257	0.999	-15.21	14.70
Radiology visit				
Yes	5.016	0.049	0.032	10.00
No				
Missed any service				
Yes	-12.128	0.000	-15.42	-8.84
No				
Missed laboratory service				
Yes	10.070	0.000	5.528	14.612
No				
Missed radiology services				
Yes	11.390	0.000	5.947	16.834
No				

Departure patient factors associated with total service time

The mean total service time showed no statistically significant difference in regards to reason for departure, level of satisfaction and tendency to recommend others to visit the hospital.

MULTIVARIATE ANALYSIS OF FACTORS ASSOCIATED WITH TOTAL SERVICE TIME

None of the socio-demographic factors, pre-arrival patient's factors, arrival and after arrival patient factors and departure factors showed statistically significant association with the total service time.

FACTORS ASSOCIATED WITH TOTAL CIRCULATION TIME

BIVARIATE ANALYSIS OF FACTORS ASSOCIATED WITH TOTAL CIRCULATION TIME

Socio-demographic factors associated with total circulation time

The mean total circulation time showed no statistically significant difference in regards to age, sex, marital status, occupation, functional impairment, and place of residence. Language skill other than Amharic, Oromiffa and English also showed no statistically significant difference in the mean total circulation time.

Table 18: Bivariate analysis of socio-demographic factors associated with total circulation time.

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Educational level				
No school				
Traditional schools	2.370	0.996	-8.44	13.18
Grade 1-8	-2.093	0.999	-14.56	10.37
Grade 9-12	-3.990	0.889	-13.43	5.45
Diploma	-15.512	0.014	-29.20	-1.82
Degree	-4.288	0.944	-16.06	7.48
Above degree	10.135	0.955	-18.89	39.23
Listen Amharic				
Yes	5.597	0.031	0.551	11.406
No				
Speak Amharic				
Yes	5.597	0.031	0.551	11.406
No				
Listen English				
Yes	-1.715	0.042	-5.903	-2.472
No				
Speak English				
Yes	-1.715	0.042	-5.903	-2.472
No				
Read English				
Yes	-1.715	0.042	-5.903	-2.472
No				
Listen Oromiffa				

Yes	-4.675	0.026	-8.787	-0.564
No				
Speak Oromiffa				
Yes	-4.675	0.026	-8.787	-0.564
No				

Pre-arrival patient factors associated with total circulation time

The number of attendants, relatives working in the hospital and the type of HSP visited for current complaint showed statistically significant association with total circulation time in bivariate analysis.

Patients with two attendants are have a mean total circulation time which is 10 minutes longer than those patients who came alone. Patients with relatives working in this hospital have a mean total circulation time 6 minutes less than respondents without relatives. In regards to the type of HSP visited, respondents who visited other health facility have a mean total circulation time 22 minutes less than those who visited health center.

Table 19: Bivariate analysis of pre-arrival patient factors associated with total circulation time.

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Number of attendants				
0				
1	0.489	0.997	-5.62	6.59
2	9.828	0.008	1.89	17.76
3	-2.783	0.962	-17.34	11.77
Relative working here				
Yes	-6.398	0.035	-12.346	-0.450
No				
Other HSP visited				
Health center				
Gov. Hospital	1.996	0.939	-5.00	8.99
Private hospital	1.423	0.993	-7.50	10.35
Private clinic	-3.753	0.954	-17.99	10.48
Others	-22.642	0.002	-39.65	-5.63

Arrival and after-arrival patient factors associated with total circulation time

Visit day, laboratory visit and missing any services were found to have statistically significant association with total circulation time.

In regards to day of visit, patients who arrived on Wednesday, Thursday and Friday were found to have a mean total circulation time 13 minutes, 10 minutes and 15 minutes less than those who arrived on Monday.

Respondents who visited the laboratory have a mean total circulation time 9 minutes longer than who do not have a visit to the laboratory. Missing any of the services decreases the circulation time.

Table 20: Bivariate analysis of arrival and after-arrival patient factors associated with total circulation time

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Visit day				
Monday				
Tuesday	7.620	0.101	-0.83	16.07
Wednesday	-13.199	0.000	-22.12	-4.27
Thursday	-10.580	0.007	-19.17	-1.99
Friday	-15.121	0.000	-24.87	-5.38
Laboratory visit				
Yes	9.382	0.000	5.440	13.324
No				
Missed any service				
Yes	-3.793	0.025	-7.104	-0.482
No				

Departure factors associated with total circulation time

Reason for departure showed statistically significant association with total circulation time. Patients who are discharged have a mean total circulation time 54 minutes less than those who were discharged with appointments.

Table 21: Bivariate analysis of departure conditions associated with total service time.

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Reason for departure				
Appointments				
Admission	10.809	0.516	-6.82	28.44
Discharge	-53.691	0.000	-78.38	-29.00
Transfer to other departments	-11.025	0.493	-28.65	6.60
Appointment for incomplete investigations	2.040	0.974	-5.43	9.51
Walk-out	0.309	1.000	-18.94	19.56

MULTIVARIATE ANALYSIS OF FACTORS ASSOCIATED WITH TOTAL CIRCULATION TIME

On multivariate analysis of factors associated with total circulation time, only visit day was found to have statistically significant association. Patients who arrive on Wednesday were found to have a mean circulation time that is 11 minutes less than those who arrived on Monday.

Table 22: Multivariate analysis of factors associated with total circulation time.

Variables	Mean Difference	p-value	95% CI	
			Lower Bound	Upper Bound
Visit day				
Monday				
Tuesday	6.21	0.071	-0.32	12.73
Wednesday	-10.89	0.000	-18.37	-4.14
Thursday	-7.15	0.032	-13.91	-0.39
Friday	**-9.74**	**0.006**	**-17.53**	**-1.94**

DISCUSSION

The study was conducted to measure the total time patients spend in waiting for service, receiving services, and moving between service points in SPHMMC medical OPD. It also determined factors associated with them. The results generated from the study can be used to improve service provision of the hospital.

The study found patients spent most of their time in waiting for services. having relative working in the hospital, visit day and arrival time were found to have statistically significant association with total waiting time but only visit day was found to have association with total circulation time. No patient factor was found to have statistically significant association with total service time.

In this study the mean total waiting time was found to be 195 minutes or 3.25 hrs. A research conducted to determine factors associated with patient satisfaction found a comparable mean total waiting time. In this survey, the mean total waiting time was 153 minutes or 2.55 hrs. (8) This study included both private and public hospitals. The inclusion of private hospitals can decrease the overall waiting time. But a research similar with our research done in Nigeria found a mean total waiting time was 346 minutes or 5.7 hrs. which is longer than our finding. (3)

A similar research done in Debre Markos and Felege Hiwot Hospitals found a mean total waiting time 94.2 min and 149.2 min respectively. (9) Our finding is longer than this one. Because SPHMMC is a national referral hospital it has larger patient volume than both of this hospitals, which are regional hospitals.

The mean total service time found in this study was 19.7 minutes. This finding is comparable with the result found in a research done in Nigeria, where they found a mean total service time of 17 minutes.

The mean total circulation time in this research was found to be 12.8 minutes. We did not find similar research to compare the mean total circulation time.

FACTORS ASSOCIATED WITH TOTAL WAITING TIME, TOTAL SERVICE TIME AND CIRCULATION TIME

In multivariate analysis, relative working here, visit day and arrival time were found to have statistically significant association with total waiting time.

Patients who have relatives working here have a mean total waiting time 57 minutes less than those patients who do not have relatives. Similar researches did not included relatives working here in their analysis.

In regards to visit day, patients who arrived on Wednesday were found to have a mean total waiting time 75 minutes or 1.25 hrs. less than those who arrived on Monday. But a similar research done in Nigeria also found a statistically significant association between visit day and total waiting time. But the mean total waiting time for Wednesday arrival showed no statistically significant association, rather patients who arrived on Friday have a mean total waiting time 34 minutes less than those who arrived on Monday. The proportion of attendance in Wednesday and Friday were comparable in both our and the Nigerian study. The reason for this difference may be related to country difference.

In multivariate analysis, it was also found there is statistically significant association between arrival time and total waiting time. The mean total waiting time of patients who arrived between 6:00-8:00 LT, 8:00-10:00 LT and 10:00-12:00 was found to be 126 min. (2.1 hrs.), 188 min (3.1 hrs.), 224 min (3.7 hrs.) less than those who arrived between 12:00-2:00 LT. But a similar research in Nigeria found, the mean total waiting time is 33 minutes, 24 min and 45 min less for those who arrived 2:00-3:00 LT, 3:00-4:00 LT and 4:00-5:00 LT, respectively than those who arrived before 2:00 LT. In this research, patients who arrived after 5:00 LT do not have statistically significant association with the total waiting time. (3) As a teaching college, most of the teaching activities are completed after 3:00 LT and physician start seeing patients after 3:00 LT. Therefore, patients who arrived early are obliged to wait longer.

This result is similar to the finding of a research done by Thatcher. According to Thatcher, most patients arrived 7:00-10:00 AM and noted that patients are not seen until 9:00 AM. (14)

None of the patient factors showed no statistically significant association with total service time.

In regards to circulation time, total circulation time and visit day were found to have statistically significant association. Patients who arrived on Wednesday, on Thursday and on Friday have mean total circulation time 11 min, 7 min and 9 min less than those who arrived on Monday.

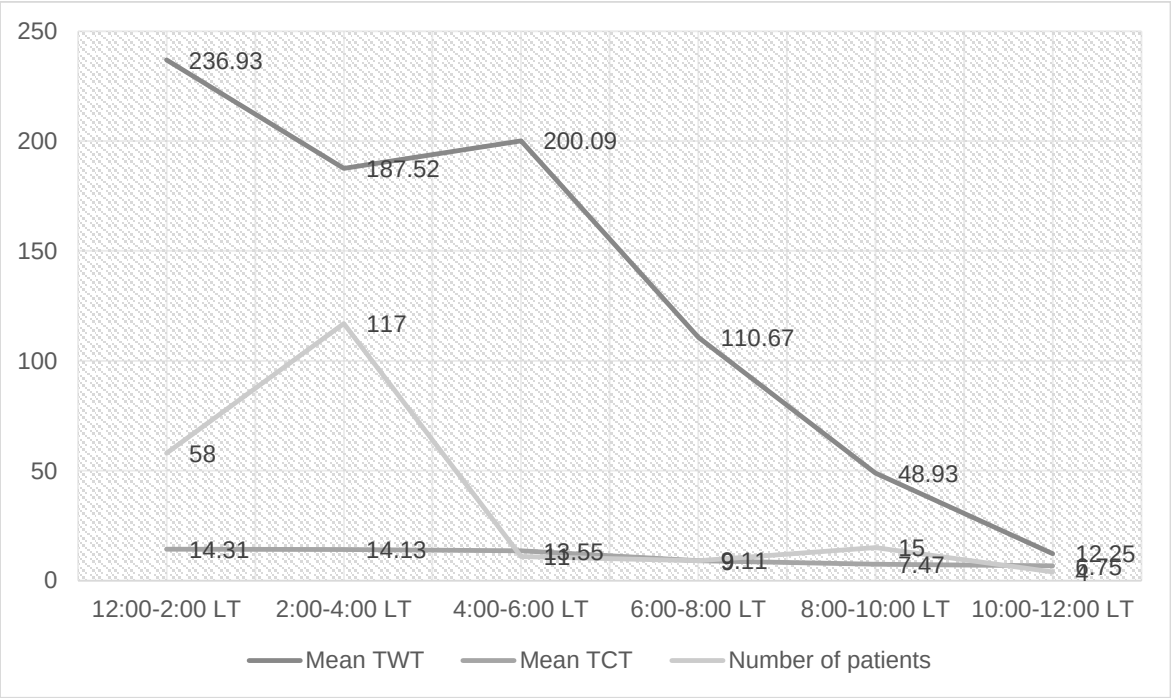


Figure 14: The effect of arrival time in 2 hrs. group on mean total waiting time and mean total circulation time. Patients' arrival decreases as time goes on. With the decrease in patient volume both mean total circulation time and mean total waiting time decreases with arrival time.

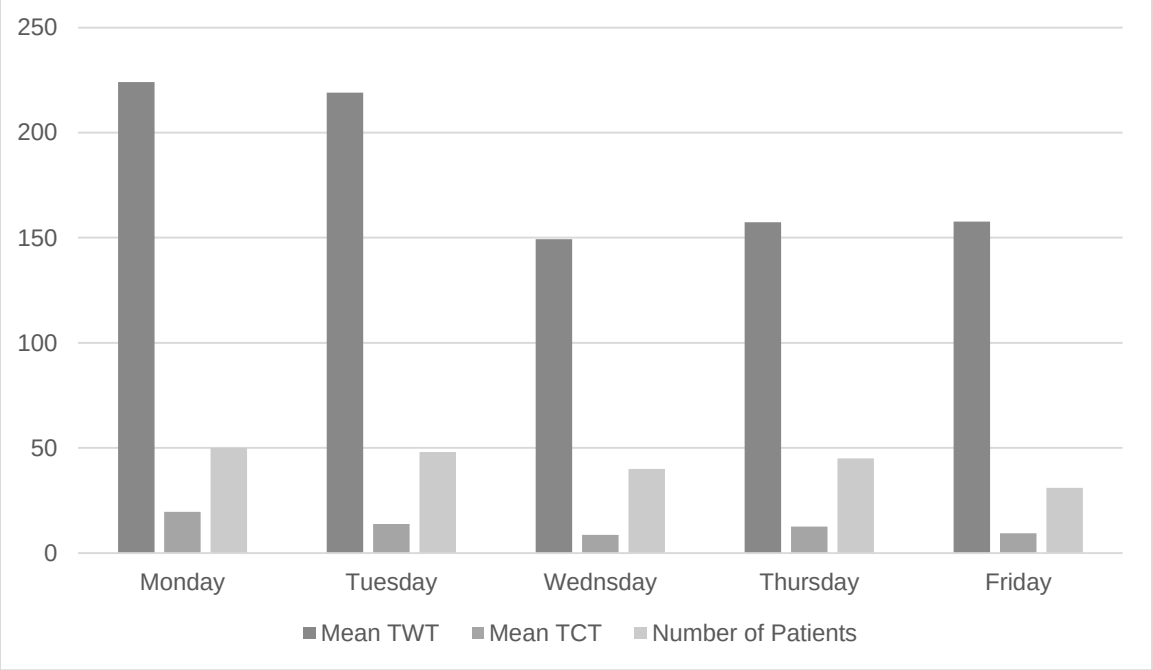


Figure 15: The effect of Visit day on the mean total waiting time and mean total circulation time. The mean total waiting time is shortest in for Wednesday.

LIMITATION OF THE STUDY

Total time spent was calculated from the time patients reach the waiting area at the medical OPD until he or she finishes services from medical OPD, laboratory or radiology departments.

The study included patients who seek for services at the medical OPD only.

Only patients factors were studied in the survey and the survey did not include their disease conditions.

CONCLUSION

The study showed that majority of patients spent a long time in the hospital. Mainly they spent in waiting for services. The major causes of this long waiting time is their arrival time and day. Most of the patients arrive on Monday and Tuesday. More than ¾ of the patients arrive before 4:00 LT while physician start service provision after 3:00 LT.

The total circulation time, the sum of times it takes to move from one service point to other service points, depends on the visit day which may be related to the increased patient volume in the start of the week. This increased patient volume results in overcrowding in the hospital that can decrease speed of movement in the hospital.

The study also found that patients having relatives who works in hospital to have a mean total waiting time 57 min. less than those who do not have but 11.7% of the patients have relatives working here.

RECOMMENDATION

TO THE PATIENTS

Majority of the visits occur in Monday and Tuesday and most patients arrive before 4:00 LT. Patients are primary victims of prolonged waiting time. Patients also have an assumption that "if I arrive early, maybe I'll get out early." (19) Patients should be told that this assumption is a foolish assumption.

TO PHYSICIAN

As total time spent in hospital has effect on patients' satisfaction, health service utilization, workplace safety and patients' health, physicians should start service provision earlier.

TO THE HOSPITAL

To improve the waiting time and circulation time, the hospital should try to use appointment methods that evenly distribute caseloads evenly in regards to visit day and time.

To improves the total circulation time, the patient volume in the hospital should be improved with a general method that evenly distribute cases loads evenly in regards to visit day and arrival time. It is found that 66.4% of the patients have visit for regular appointments and the hospital has direct control over their visit. Thus, This patient groups can be assigned their day of visit and time of visit to evenly distribute the patient volume and decrease their waiting time and circulation time.

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ANNEXE

ANNEX I: RANDOMLY SELECTED SAMPLES

Mon			Tue			Wed			Thu			Fri	
1	41	81	1	41	81	1	41	81	1	41	81	1	41
2	42	82	2	42	82	2	42	82	2	42	82	2	42
3	43	83	3	43	83	3	43	83	3	43	83	3	43
4	44	84	4	44	84	4	44	84	4	44	84	4	44
5	45	85	5	45	85	5	45	85	5	45	85	5	45
6	46	86	6	46	86	6	46	86	6	46	86	6	46
7	47	87	7	47	87	7	47	87	7	47	87	7	47
8	48	88	8	48	88	8	48	88	8	48	88	8	48
9	49	89	9	49	89	9	49	89	9	49	89	9	49
10	50	90	10	50	90	10	50	90	10	50	90	10	50
11	51	91	11	51	91	11	51	91	11	51	91	11	51
12	52	92	12	52	92	12	52	92	12	52	92	12	52
13	53	93	13	53	93	13	53	93	13	53	93	13	53
14	54	94	14	54	94	14	54	94	14	54	94	14	54
15	55	95	15	55	95	15	55	95	15	55	95	15	55
16	56	96	16	56	96	16	56		16	56	96	16	56
17	57	97	17	57	97	17	57		17	57	97	17	57
18	58	98	18	58	98	18	58		18	58	98	18	58
19	59	99	19	59	99	19	59		19	59		19	59
20	60	100	20	60	100	20	60		20	60		20	60
21	61	101	21	61	101	21	61		21	61		21	61
22	62	102	22	62	102	22	62		22	62		22	62
23	63	103	23	63	103	23	63		23	63		23	63
24	64	104	24	64	104	24	64		24	64		24	64
25	65	105	25	65	105	25	65		25	65		25	65
26	66	106	26	66	106	26	66		26	66		26	66
27	67	107	27	67	107	27	67		27	67		27	67
28	68	108	28	68	108	28	68		28	68		28	68
29	69	109	29	69		29	69		29	69		29	69
30	70		30	70		30	70		30	70		30	70
31	71		31	71		31	71		31	71		31	71
32	72		32	72		32	72		32	72		32	72
33	73		33	73		33	73		33	73		33	73
34	74		34	74		34	74		34	74		34	74
35	75		35	75		35	75		35	75		35	75
36	76		36	76		36	76		36	76		36	
37	77		37	77		37	77		37	77		37	
38	78		38	78		38	78		38	78		38	
39	79		39	79		39	79		39	79		39	
40	80		40	80		40	80		40	80		40	

ANNEX II: PATIENT CONSENT FORM

ጤና ይስጥልኝ.

ስሜ ዶ/ር ምህረትአብ ኤርምያስ ይባላል። የቅዱስ ጳውሎስ ሆስፒታል ሚሊኒየም የህክምና ኮሌጅ የመጨረሻ ዓመት የህክምና ተማሪ ስሆን፤ ወደ ሆስፒታሉ የሚመጡ ታካሚዎች በሆስፒታሉ ውስጥ የሚያሳልፉትን ጊዜና ተያያዥ ጉዳዮችን በተመለከተ በማጥናት ላይ እገኛለሁ። እርሶ ደግሞ በዚህ ጥናት ላይ መረጃ በመስጠት ተሳታፊ እንዲሆኑ ተመርጠዋል።

በጥናቱ ወቅት የሚሰበሰቡ መረጃዎች ሙሉ በሙሉ በሚስጢር የሚያዙና ለጥናቱ አገልግሎት ብቻ የሚውሉ ናቸው። በመረጃ አሰባሰብ ወቅት የመረጃው ባለቤት እንዳይታወቅና መረጃውን በጥናቱ ውስጥ ከተሳተፉ ግለሰቦች በቀር ማንም እንዳይጠቀማቸው ይደረጋል። ከጥናቱ መርጃ የሚገኘው ውጤት የሆስፒታሉን አገልግሎት አሰጣጥ ለማሻሻል በእጅጉ ይጠቅማል።

መረጃው በሁለት መልኩ ከእርሶ ይሰበሰባል። በሆስፒታሉ ያሳለፉትን ሰዓት የጥናቱ መረጃ ሰብሳቢ በተወሰነ ርቀት በመከተል የሚመዘግብ ሲሆን፤ የሆስፒታሉን አገልግሎት ጨርሰው ሊወጡ ሲሉ መረጃ ሰብሳቢው ከሁለት ደቂቃ ላልበለጠ ጊዜ ቃለ መጠይቅ ያደርግሎታል።

በጥናቱ ውስጥ የሚኖሮት ተሳትፎ ሙሉ በሙሉ በእርሶ ፈቃደኝነት ላይ የተመሰረተ በመሆኑ፤ ጥያቄ ካልዎት በማንኛውም ሰዓት የመጠየቅ ወይም ከጥናቱ ተሳታፊነት የማቋረጥ መብት አለዎት። በጥናቱ በመሳተፎም ይሁን ባለመሳተፎ ምንም ዓይነት ጉዳት እንደማይደርስቦት ለማረጋገጥ እወዳለሁ።

ከላይ ያለውን ጽሁፍ አንብቤ ወይም ተነቦልኝ ተረድቼ፣ በጥናቱ ለመሳተፍ ሙሉ በሙሉ ፈቃደኛ መሆኔን በፊርማዬ አረጋግጣለሁ።

የጥናቱ ተሳታፊ ፊርማ_____ ቀን_____

የመረጃ ሰብሳቢው ፊርማ_____ ቀን_____

ANNEX III: PATIENT TIME FLOW SHEET

RESPONDENT ID MRN DATE

ARRIVAL TIME _____DEPARTURE TIME _____

Main Dept. Visited for Medical Evaluation _____Main Diagnosis_____

PATIENT'S TIME FLOW SHEET

S. No.	Service Point (SP)	Arrival Time	Service In Time	Service Out Time	Queue Length	SP Service Time	SP Waiting Time	Remarks

DEPARTURE TIME:_____

REASON FOR DEPARTURE:

A. Admission B. Appointment C. Discharge
D. Walk-out E. Appointment with investigation F. Leave without medical evaluation

TIME SUMMERY

S .No.	Time pattern	Min	S. No.	Time pattern	Min
1	Total Time Spent In Hospital		5	Total time spent before medical evaluation	
2	Total Service Time		6	Total time spent after medical evaluation	
3	Total Waiting Time		7	Total service time for medical evaluation	
4	Total Circulation Time		8	Total waiting time for medical evaluation	

ANNEX IV: ON-EXIT INTERVIEW QUESTIONNAIRE

1. Age:_____
2. Gender
   A. Female
   B. Male
3. Marital Status
   A. Unmarried
   B. Married
   C. Separated
   D. Widowed
4. Highest level of educational attainment
   A. Didn't attend any form of school
   B. Attended traditional school only
   C. Up to Grade 8 completed
   D. Grade 9-10
   E. Grade 11-12
   F. Diploma
   G. Degree
   H. Above degree
5. Language skills
   A. Amharic A. Speak B. Listen C. Read
   B. Oromic A. Speak B. Listen C. Read
   C. English A. Speak B. Listen C. Read
   D. _____ A. Speak B. Listen C. Read
   E. _____ A. Speak B. Listen C. Read
6. Disability or impairment
   A. None
   B. Visual impairment
   C. Hearing impairment
   D. Locomotion impairment
   E. _____
7. Place of residency (region/city)
   A. Addis Ababa
   B. _____
8. Occupation or employment status
   A. Unemployed
   B. Religious leaders
   C. Farmer
   D. Teacher
   E. Student
   F. Merchant
   G. _____
9. Total number of attendants_____
10. Do you work in health facility?
    A. Yes
    B. No
11. Do you have relative working in this hospital?
    A. Yes
    B. No
12. Do you have any previous visit to this hospital?
    A. Yes
    B. No
13. Do you have any visit to other health service provider for your current illness?
    A. Yes
    B. No
14. If Yes to Q. 12, which health service provider did you visit?
    A. Health center
    B. Government Hospital
    C. Private hospital
    D. Private clinic
    E. Traditional healers
    F. _____
15. What is the reason for your current visit?
    A. Referral from other health facility
    B. Appointment for regular follow-up or treatment
    C. Walk-in
    D. _____
16. Did you miss any service?
    A. Yes B. No
17. Mention the service point
    _____
18. Are you satisfied with the overall services provided to you by the hospital?
    A. Very satisfied
    B. Quite satisfied
    C. Satisfied
    D. Not satisfied
    E. Very dissatisfied
19. What is the reason for your departure
    A. Admission
    B. Appointment
    C. Walk-outs
20. Do you recommend others to attend for health service to this hospital?
    A. Yes
    B. No

THANK YOU VERY MUCH!