Research Article

Improving Adult ART Clinic Patient Waiting Time by Implementing an Appointment System at Gondar University Teaching Hospital, Northwest Ethiopia

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Received 12 July 2015; Revised 13 September 2015; Accepted 14 September 2015

Academic Editor: Julio Diaz

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Background. Long waiting time has been among the major factors that affect patient satisfaction and health service delivery. The aim of this study was to determine the median waiting time at the Anti-Retroviral Therapy (ART) Clinic before and after introduction of an intervention of the systematic appointment system. **Methods.** Patient waiting time was measured before and after the introduction of an intervention; target population of the study was all adult HIV patients/clients who have visited the outpatient ART Clinic in the study period. 173 patients were included before and after the intervention. Systematic patient appointment system and health education to patients on appointment system were provided as an intervention. The study period was from October 2011 to the end of January 2012. Data were analyzed using SPSS software version 17.0. Independent sample *t*-test at 95% confidence interval and 5% significance level was used to determine the significance of median waiting time difference between pre- and postintervention periods. **Results and Conclusion.** The total median waiting time was reduced from 274.8 minutes (IQR 180.6 minutes and 453.6 minutes) before intervention to 165 minutes (IQR 120 minutes and 377.4 minutes) after intervention (40% decrease, $p = 0.02$). Overall, the study showed that the introduction of the new appointment system significantly reduces patient waiting time.

1. Introduction

Long waiting time has been among the major factors that affect patient satisfaction and health service delivery, efficiency, quality, transparency, and accountability [1–4]. In many health care facilities in Ethiopia as well as in other countries, waiting time could exceed two hours [5–7]. In 2001, a study conducted by the Health Care Financing Secretariat of the Federal Ministry of Health showed the average outpatient clinic waiting time in health facilities in Ethiopia as being 6.4 hours [8]. Another study at Jimma Hospital in 1998 has indicated an average of 4.5 hours' waiting time [5].

Long waiting time is among the several factors that can negatively impact the outcome of ART treatment [6, 8]. It

was regarded as a barrier for accessing ART services and the cause of high dropout rate [7]. In Ethiopia, as well as in many sub-Saharan African countries, Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) remains the greatest challenge to the health care system [9]. In response, the ART coverage of Ethiopia has increased from 46% to 55% from 2008 to 2010 [9, 10]. And the number of people receiving ART has continued to increase since 2005.

Shortage of medical staff and medical and laboratory supplies and lack of systematic appointment system are among the factors that contribute to long waiting time [6]. In a poor setting with heavy workload, a doctor may examine 40–60 patients per day compared to the very low number of patients a day by American physicians; therefore,

it leads to lack of time specific appointment and causes long waiting time [11]. Moreover, the majority of cases are rooted in the inefficiency of the ART Clinic management system, which can be manifested in lack of scheduling, inefficient registration and triage procedures, misfiling of cards, delay in consultations, and simultaneous break times [6, 12]. Various interventions targeting these root causes have shown successes in reducing waiting time, including addition or reallocation of human resources, changing work processes, and scheduling follow-up visits for less busy times [6, 13]. However, there are no intervention studies conducted in Ethiopia to observe the various factors that affect waiting time at facilities providing ART services.

Therefore, this project was undertaken in an effort to apply quality improvement technique to address the long waiting service time at the ART Clinic of the Gondar University Hospital. Hence, the aim of this project was to improve patient waiting time by strengthening scheduling system and providing continuing health education. The hospital senior management team, the head of the ART Clinic, the nursing director, and some front line health professionals, including nurses, health officers, and nursing assistants working at the ART Clinic, were engaged in planning, implementing, and evaluating stages of the new patient schedule management system for the ART Clinic.

2. Methods

2.1. Setting and Preintervention. Gondar University Hospital, teaching referral hospital in northwest Ethiopia, has 400 beds and 14 outpatient clinics. It serves approximately 110,000 outpatients every year. The ART Clinic provides ART care and HIV counseling and testing. During the study period, the clinic had 4 physicians, 1 health officer, 6 nurses, 4 medical laboratory technologists, 3 pharmacists, 2 case managers, 2 data clerks, and 3 medical record workers. Over 9,565 adults and pediatric cases have been enrolled in HIV care, with 6,022 newly initiated and 3,899 already in the course of ART (3,543 adults and 356 children). Patients usually visited the clinic every three months.

During the preintervention period, all ART patients used to be informed to return on a specific day for follow-up. Neither an upper limit on the number of patients to be scheduled nor proper documentation of appointment existed. Due to lack of a coordinated appointment system, the number of patients scheduled on any given appointment day frequently exceeds the capacity of the ART Clinic which, as a result, causes long waiting time. Additionally, in the absence of calendar or appointment book, patients frequently were told to return during holiday and weekends by mistake, resulting in an unnecessary long waiting time and confusion.

2.2. Study Design and Data Collection. This study utilized pre- and postintervention design to measure the impact of the appointment system on patient waiting time for services at the ART Clinic.

Time motion collection formats were designed by the team, to collect basic demographic information: arriving and

departing time for each service point and the reason for the visit. Five data collectors and one supervisor were recruited to conduct the time collection. To ensure quality, one-day training on the data collection procedure, the objectives of the assessment, ethical issues, techniques, supervision, and the use of the time motion form were given by the principal investigator. The time motion collection forms were checked for completeness and accuracy by data collectors and supervisors. Waiting time for all segmented services, total waiting from arrival at ART Clinic to finish all services, and the percentages of preintervention and postintervention patients wrongly scheduled on weekends and holidays were also collected.

Data entry errors were minimized by performing double checking entry into the computer by two separate data clerks. Ethical clearance was obtained from Addis Ababa University, College of Health Sciences, and School of Public Health as the study was conducted as part of master's thesis for the first author. Respondents were briefed about the confidentiality of their responses and the importance of providing true and accurate information. Verbal consent was obtained from all study participants prior to data collection.

2.3. Sample Size Determination. Both pre- and postintervention samples were collected using a systematic sampling method. By using mean difference formula, 173 patients before and after intervention were included. Every 6th patient at the adult ART outpatient clinic was selected over a period of 2 weeks. The preintervention sample was collected in October 1–15, 2011; the intervention period was from November 2011 to January 20, 2012, and patients with appointment date starting from January 21, 2012, comprised the postintervention sample. Only HIV positive patients who were 18 years old or older were included in this study, with the exclusion of seriously ill patients who had compromised mental capacity and pediatric patients.

2.4. Intervention. In October 2011, a project team was formed with members from senior management team and ART Clinic managers and supervisors. Focus interviews were conducted with five health professionals to identify the root causes. The team developed the implementation strategy and decided to establish a centralized appointment system for ART follow-up patients and agreed that a daily quota should be set to limit and regulate the ART Clinic patient volume.

The new patient appointment system included setting a daily patient limit for each clinical day, centralizing the appointment process, using an appointment book, and educating patient on adherence to appointment. There were 3,543 adult patients actively on ART. The maximum number of patients per day was calculated by dividing the total number of patients by the number of working days in a 3-month cycle ($3543/66 = 54$) and adding the estimated number of new patients per day (16) giving a total of 70 patients per day.

A centralized appointment system was created in which patients, after completing their clinical visit, go to the central appointment room to make an appointment. Health

care providers were no longer allowed to give appointments individually. Appointments were given by a scheduler and were recorded in an appointment calendar. Weekends and holidays were crossed off from the calendar and no appointment would be given on those days. Patients were given appointment cards and reminded to adhere to their scheduled appointments. The importance of adhering to the appointment schedule was also incorporated into the health education sessions given by nursing staff and case managers.

2.5. Data Analysis and Statistical Consideration. The preintervention and postintervention median waiting service times were analyzed using independent sample *t*-tests and the preintervention and postintervention percentages of patients wrongly scheduled on weekends and holidays were compared using chi-square test. Both tests used confidence level at <0.05 to determine the statistical significance. All data analyses were performed using SPSS version 17.0 (SPSS, Inc., Chicago) and log transformation was used because the data were skewed.

2.6. Operational Definitions. Operational definitions are as follows:

Total waiting time: the time spent to get all the services and the time spent with the service provider.

OPD (Out Patient Department) services waiting time: the time spent for those services which are only examinations at OPD (not including other services like laboratory and pharmacy and the time spent in OPD).

Pharmacy waiting time: the time spent for pharmacy services.

Laboratory waiting time: the time spent for the laboratory services.

3. Results

Both preintervention and postintervention samples had 173 patients each. The preintervention and postintervention samples did not differ significantly by sex, age, visit type, and type of services received (Table 1).

There was a significant decrease in waiting time. The median waiting time was reduced from 274.8 minutes (IQR 180.6 minutes and 453.6 minutes) before intervention to 2.75 hours (IQR 120 minutes and 377.4 minutes) after intervention (40% decrease, $p = 0.02$).

Two services showed significant decrease in waiting time; the card retrieval time decreased from 60 minutes before intervention to 40 minutes after intervention (33% decrease, $p = 0.001$). The medication refill time was reduced from 60 minutes before intervention to 20 minutes after intervention (67% decrease, $p = 0.04$).

Two other services also showed decrease in waiting time, although these were not statistically significant. Waiting time for pharmacy services decreased from 55 minutes before intervention to 38 minutes after intervention (30% decrease, $p = 0.942$), while that for laboratory services decreased

TABLE 1: Patient sample characteristics (preintervention and postintervention).

Sample size ($N = 173$)	Preintervention	Postintervention
	N (%)	N (%)
Age (mean $\pm$ SD)	36.2 $\pm$ 10.3	37.6 $\pm$ 9.4
Sex		
Male	62 (35.8%)	70 (40%)
Female	111 (64.2%)	103 (60%)
Visit types		
New	19 (11%)	26 (15%)
Repeat	154 (89%)	147 (85%)
Coming for specific services		
OPD	22 (12.7%)	15 (8.7%)
Pharmacy	88 (50.9%)	92 (53.2%)
Laboratory	19 (11%)	31 (19.7%)
Pharmacy and laboratory	27 (15.6)	27 (15.6%)
OPD, laboratory, and pharmacy	11 (6.4%)	6 (3.5%)

Key: OPD: Out Patient Department; N = total sample size of the study.

from 315 minutes before intervention to 285 minutes after intervention (10% decrease, $p = 0.534$).

The median waiting time for health education increased from 15 minutes before intervention to 20 minutes after intervention (32% increase, $p < 0.001$, Table 2).

There was a significant decrease in the percentage of patients wrongly scheduled on weekends and holidays. Wrong scheduling decreased from 4.4% before intervention to 0.1% after intervention ($p < 0.000$, Table 2).

4. Discussion

The result of the study showed that our intervention has reduced the overall patient waiting time at the ART Clinic by 40% from 274.8 minutes to 165 minutes ($p = 0.02$). It has also significantly reduced the wrong scheduling error by 4.3%. Two services at the ART Clinic (card retrieval and medical refill) particularly contributed to the overall reduced waiting time: The median time for card retrieval decreased from 60 to 40 minutes ($p = 0.001$) and that for medication refill decreased from 60 minutes to 20 minutes ($p = 0.04$). In line with this, different studies have shown reduction of waiting time after introduction of simple intervention, community health center in East Bronx, NY (91.9 minutes to 78.3 minutes), and at the Specialist Hospital, Bauchi, Nigeria (6.48 h–4.35 h). On the other hand, the median total waiting time found in this study was lower than the study done in Ethiopia in 2001 (6 hrs). This difference might be due to the fact that the focus of the present study was only on one special clinic of the hospital. The increase in time for patient health education might be due to additional contents of the health education and the health educator may be aware of the study.

Despite the significant reduction in waiting time for services, this study has its own limitations: the appointment system was limited to only giving appointment dates to

TABLE 2: Preintervention and postintervention waiting time and schedule error comparison.

Waiting service time (minutes)	Preintervention		Postintervention		Change	p value
	Median	IQR (25th and 75th)	Median	IQR (25th and 75th)		
Card retrieval	60	45 and 84.6	40	25 and 60	−33%	0.001*
Pharmacy	55.2	30 and 60	38	30 and 50	−30%	0.942
Refilling	60	30 and 60	20	15 and 30	−67%	0.04*
Laboratory	315	212 and 570	285	240 and 480	−10%	0.534
Health education	15	15 and 15	20	15 and 25	+32%	0.000*
Overall waiting service time	274.8	180.6 and 453.6	165	120 and 377	−40%	0.02*
Schedule error	Preintervention		Postintervention		Change	p value
	N	%	N	%		
Correct appointment	1634	95.6%	1714	99.9%	—	
Wrong appointment	76	4.4%	2	0.1%	−4.3%	<0.000*

*Significant at $p = 0.05$.

*IQR: interquartile range at the 25th and 75th percentile.

patients without specific time. It was only the first phase of the new appointment system. Although reduction in waiting time was observed, its full impact has not been achieved as it only addressed a small portion of a complex issue. Long waiting time could be due to a combination of factors and this study was only focused on the appointment system. In addition to the above limitation as time is a variable which is not normal, we used log transformation to make it normal. However, nonparametric alternatives should have been used. Finally, the authors believed that the new appointment system reduced the patient waiting time. However, we recommended that it would be better to conduct further studies by using control groups.

5. Conclusion

Our study has shown that the introduction of the new appointment system significantly reduces patient waiting time at the ART Clinic. The intervention was inexpensive and effective. Long term follow-up is needed to assess the sustainability of the intervention. Quality improvement projects of this approach should be encouraged to be applied in other areas of hospital management in Ethiopia to enhance the quality of health care services.

Conflict of Interests

All authors declare that they have no competing financial or any other interest in relation to the work.

Authors' Contribution

Asmamaw Atnafe conceived the study, undertook statistical analysis, and drafted the paper. Damen Haile Mariam, Rex Wong, Taddese Awoke, and Yitayih Wondimeneh initiated the study and made major contributions to the study design, data collection, and statistical analysis. All authors contributed to the writing of the paper and approved its submitted version.

Acknowledgments

The authors appreciate the management of Gondar University Hospital and the health workers and patients in the ART Clinic that were involved in the survey. They would also like to extend their thanks to Dr. Jeph Herin, Professor Elizabeth Bradley, Zahirah McNatt, and Ato Dawit Tatek, for their inspiration and technical support in many ways.

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