Strengthening Health Systems through training of Health Care Providers in the conduct of Routine Waiting Time and System Efficiency Surveys

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Abstract

The effective functioning of Health Systems is reliant on good quality information being available for decision-making. Routine surveys exemplify an under-utilised source of such information that could enable Health Departments to gain insights into the performance of health service provision, from both the stand-point of the providers and users. Amongst these, Waiting Time and System Efficiency Surveys (WTSES) directly responds to the commonest complaint of users of healthcare services. There is, however, little information on approaches to routinely implement robust and sustainable facility-based WTSES especially in resource-constrained settings. This paper describes the conceptual and methodological basis for implementing WTSES in health care facilities, using a method that places the conduct of the survey within the purview of the normal service activities of health care providers, and thus makes the routine assessment of Waiting Times possible at low cost and with high benefit. The authors aver that the universal implementation of the WTSES presents the potential for enriching patient and health facility information systems, particularly in resource-constrained settings, where efficient use of limited resources is critical.

Keywords:

Patient waiting times, Routine surveys, Health facility surveys

Introduction

The collection, processing, reporting and use of routine health information is ineluctable for the effective and efficient functioning of health delivery systems [1]. Routine health information systems (RHIS) are important to guide and improve decision making including *inter alia*, strategic planning and policy development, daily operational activities, and controlling resources such as finances and personnel [2]. It is for this reason that they are aptly described as *health management information systems*. Effective RHIS will also directly increase the staff and community's understanding of the functioning and outputs of the health delivery system; will help to identify problem areas and areas where health services need to be improved; will improve the motivation of staff by highlighting improvements where appropriate and advocate for changes to facilitate further improvements in the health service [2]. A

number of health facility-based information systems such as public health surveillance, health system monitoring and mortality information systems exist, and to varying degrees have been successful in meeting some of the aforementioned potentials.

Routine large-scale surveys however, exemplify an under-utilized source of information that could enable Health Departments to gain insights into the performance of health service provision from both the stand-point of providers and users. Amongst these, the Waiting Time and System Efficiency Survey (WTSES) directly responds to the commonest complaint of users of health care services [3]. The WTSES primarily measures how long people wait for a service and the amount of service time they receive at health facilities. Importantly, in addition to identifying long waiting times, the survey identifies the reasons why these arose and suggests ways to reduce them. The survey also measures the workload of the staff, the efficiency of service provision and the percentage of time staff spend attending to patients. There is, however, little information on approaches to routinely implement robust and sustainable facility-based WTSESs especially in resource-constrained settings. This paper describes the conceptual and methodological basis for implementing WTSESs in health care facilities using a method which places the conduct of the survey within the purview of the normal service activities of health care providers and thus making routine assessment of Waiting Times possible at low cost and with high benefit.

Methods

The focus of the survey is to measure the time patients' spend at the health care facility for any service. This includes the amount of time that patients spend waiting for a service, and the time taken to provide the service. This requires that patients are tracked from their time of arrival at the health facility till the time they depart the health facility. The sample size required for a valid survey is typically quite large, so all patients seen at the facility in a time period (e.g. a session, a day, a week, or a month) are included in the sample. The more heterogeneous the services provided at the facility the longer the time period required and conversely the more homogenous the service the shorter the time period required. The starting point for the survey is therefore a decision on this time period. For

primary level care facilities where services rendered do not significantly change from day to day, an average day within an average week of the year should suffice. For secondary and tertiary level care facilities a longer time period is usually required in order to assess all services.

Data collection is done via a timesheet. As patients enter the health facility, they are handed a timesheet on which their arrival time is recorded. The patients are then asked some basic questions, such as their age, whether they have an appointment and how they travelled to the health facility. The timesheet has a list of every point or station in the facility at which the patient may receive a service (hereafter referred to as a "service point"). Each of the health workers (such as receptionist, doctor, pharmacist, nurse, etc) who attend to the patient on that day, then fill in the time they start seeing the patient and the time they finish seeing the patient, against their service point on the timesheets. When the patients leave the health facility, the departure time is recorded and they are asked questions about how long they are willing to wait at the health facility for the services which they had just received. See Figure 1.

The health workers also complete a personal timesheet. On their personal timesheet, they record the time that they commenced duty at the service points at which they worked and the time that they completed their duty at that service point. They may work in more than one service point through the day and are expected to document all of these on their timesheets. The health workers also fill in a short questionnaire on the amount of time that they think it is appropriate for patients to wait and on whether they have sufficient equipment and space to properly attend to the patients.

Both patient and staff timesheets are then captured using a customised database. Using a combination of data from the patients' timesheets, the patients' questionnaire, the health workers' timesheets and the health workers' questionnaire, the waiting times, service times and patient workload for every service point is then calculated.

Data Analysis

A database application has been developed to facilitate the capturing, cleaning, analysis and storing of data as well as the production of standardized reports. The simple individual patient calculation of waiting and service times is shown in Figure 1 and 2. These are then aggregated for all patients surveyed to develop composite tables and graphs on key indicators for the health facility.

The first primary table is a detailed service point table which reports descriptive statistics on the numbers of patients who attend the facility, the number of staff who work in the facility, the number of patients who visit individual service points, the daily full-time equivalent staff present at the facility, workload of staff per service point (calculated as the number of patients seen per full time equivalent staff per day), workload efficiency index (calculated as the percentage of available staff time spent providing services to the patients), percentiles (5th, 25th, 50th and 95th) of service and waiting times per service point and then overall for all service points.
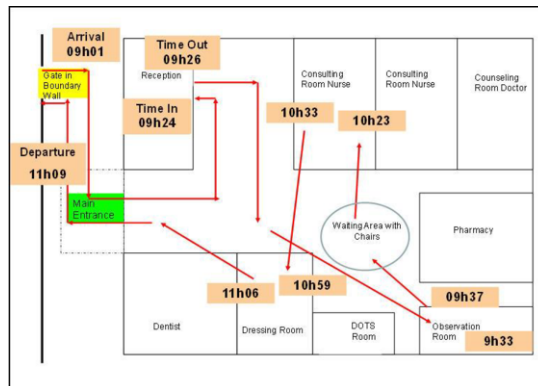

Figure 1 - Measuring Waiting and Service Time at a health centre by following a patient with a timesheet. The patient arrives at 9:00, waits 23 minutes before being attended to by the staff at reception at 9:24. Receives a service for 2 minutes until 9:26 and is then sent to the observation room. Similarly the patient waits at and is attended to at the other points.

Calculating Waiting and Service Times

Arrival Time 9:01

Service Point	Time In	Time Out	Service Time	Waiting Time
Reception	9:24	9:26	2 min	23 min
Observation Room	9:33	9:37	4 min	7 min
Consulting Room Nurse	10:23	10:33	10 min	46 min
Dressing Room	10:59	11:06	7 min	26 min
Complete ST			23 min	
Complete WT				102 min

Departure Time 11:09

Figure 2- Calculating the Waiting and Service Time of a patient

In addition, "arrival time graphs" are used to display the arrival times of patients and the median waiting and service times according to hour of arrival. This is done for every service point and then for the entire facility (i.e. all service points combined). Another set of graphs, the "snapshot graph" shows the waiting and service patterns for every service point in the facility in relation to the staff available to provide the service.

Results

To date, surveys have been implemented in over 200 primary level care facilities, 11 secondary level (regional hospitals) and 3 tertiary hospitals within 2 provinces of South Africa and three districts in the United Republic of Tanzania. Waiting and Service time calculations have been done for over 110 000 patient visits to health facilities.

For all of these health facilities, customised patient and staff timesheets have been developed together with customized database applications. From these, standardized reports for health facilities have been generated showing *inter alia*, the "detailed service point table", "arrival time graphs" and "snapshot graphs" (See Figures 3, 4 and 5).

Importantly, in all the surveys health workers themselves collected and interpreted the information as described earlier and this has translated into very enlightening information about their service points. Findings indicate that facilities and service points show a wide variation of waiting and service times. Overall, staff time usage efficiency ranged from low to modest, while waiting times ranged from minimal to excessive. Eight immediate causes of long waiting times have been identified. These are:

1. *High Workload*: if staff are overworked, then patients have to wait longer as staff have too many patients to attend to.
2. *Batching and inappropriate arrival patterns*: if many patients arrive at the same time then most of these patients would have to wait a long time to be seen, as the staff member would be busy seeing the patients who were first in the batch and the rest would be waiting.
3. *A lack of efficiency in attending to patients*: patients are waiting and yet staff members are present at the service point but they are busy doing something else instead of attending to the patients who are waiting.
4. *A mismatch*: a mismatch occurs when patients arrive to be seen but staff are not yet at that service point.
5. *A logistical problem*: patients are waiting to be seen and staff are available to see the patients but due to a lack of equipment, rooms or other logistical needs, staff are unable to attend to the patients.
6. *Flow problems:* Staff are available to see patients and patients are at the facility but they are being delayed at some other service point.
7. *Queuing problems:* This 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.
8. *High Service time:* An inappropriately high service time for a particular service point would result in higher waiting times for the other patients waiting in the queue.

Prior to the surveys, it was anecdotally believed that high waiting times were mainly due to high workloads. However, in all settings surveyed so far, high waiting times were rarely linked to high workloads but were consistently linked to lack of appointments and the resultant flood of patients arriving at facilities in large batches, especially in the early hours of the day [4].

Service Point	% Staff Time Spent Attending to patient	Median Service Time	Median Waiting Time	Logistics Problem
Surgical Intern	90%	20	50	N
Medical Doctor	52%	30	42	Y
Emergency Room Doctor	14%	28	9	N
Doctor Resuscitation Unit	63%	105	1	N

Figure 3- Detailed Service Point Table
The surgical intern is overworked with a resultant high waiting time. The high waiting time for the medical doctor is due to the logistical problem of awaiting laboratory results. The resuscitation doctor has an appropriately low waiting time.

Health Care Systems uptake of the Survey

Having successfully developed and piloted the WTSES in primary level clinics and health centres in Cape Town (South Africa), we were able to develop simple and efficient methods to analyze waiting times and identify the major causes of long waiting times using a robust methodology supported by a customised database. Based on the experiences of this first survey, we extended the methodology to allow for the identification of all the causes of excessive waiting times, and we standardized the methodology to enable the widespread roll-out of the survey. The methodological procedures were then tested by doing surveys of all clinics and health centres in Cape Town in 2007. It proved to be highly successful in measuring waiting times and identifying the causes of those that were excessively long. Solutions for these problems were then developed. Our success spurred replication of the survey in KwaZulu Natal Province, South Africa and further on to East Africa where we surveyed health facilities in 2 regions of the United Republic of Tanzania
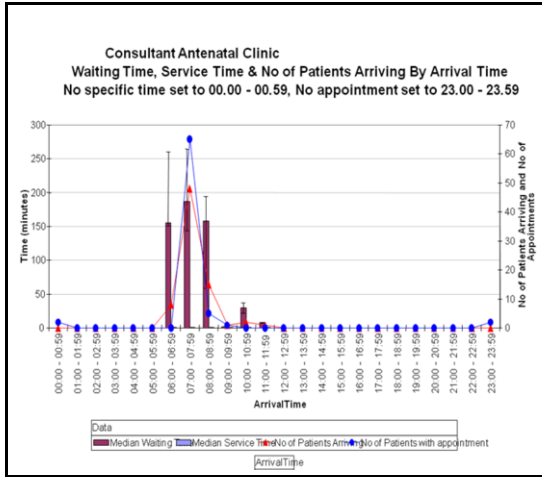
Figure 4- Arrival time graph of a service point in a health facility showing batching between (0700hrs-0800hrs) caused by inappropriate appointment times. Ninety-nine percent of the patients have arrived by 08.00 even though the clinic operates from 08.00 to 13.00.
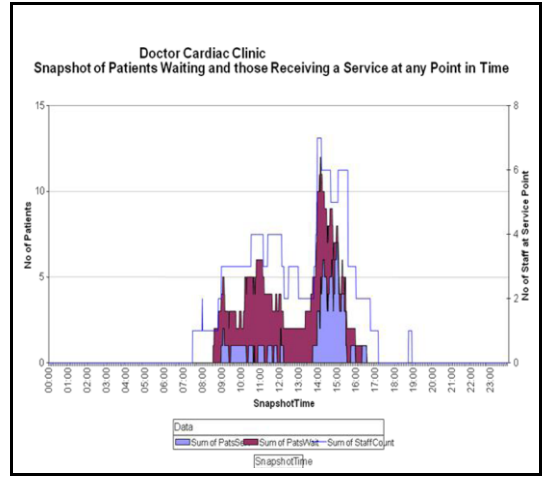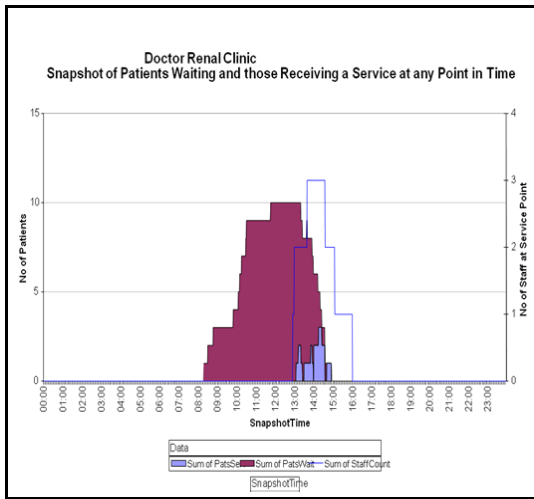

Figure 5- Snapshot graph of a service point in a health facility showing mismatch. Patients start arriving at 0800hrs for a service which starts at 1300hrs

Figure 6- Snapshot graph of a service point showing relative inefficiency between 0900hrs-1200hr (3 Staff in the facility but only one patient is attended to at any point in time); absolute inefficiency between 1200hrs-1350hrs (staff present but no patients are attended to) and good efficiency between 1400hrs-1630hrs. Flow problem between 07.30 and 08.30 as staff are present but no patients have arrived yet.

By the second half of 2007, we had all the valid and necessary ingredients to allow the rollout of the WTSES: a robust methodology and a database had been developed, a training manual had been produced and we had demonstrated that it could be done in a very cost-effective, standardized manner. We had also successfully conducted repeat surveys in a total of 125 primary level care facilities in the Western Cape and supported several others in KwaZulu Natal. The only thing lacking was trained health workers and a desire by health managers to implement the survey routinely. It was also unclear whether the methods successfully used at primary level care facilities would be appropriate for larger and more complex secondary and tertiary level care facilities.

In 2008, we were asked to undertake surveys of regional and academic/tertiary level facilities in the Western Cape. This required that the survey took into account the complexities associated with the delivery of these higher level healthcare services and the vagaries in the process of service delivery in such sections as Trauma and Emergency units. Working with Quality Assurance Managers of the Department of Health we conducted surveys in 7 secondary and tertiary-level hospitals in the Western Cape Province.

Discussion

We have developed a robust method of measuring how long patients wait for services. Importantly in addition to determining the extent of long waiting times and the service points affected, our survey method identifies the reasons why the long waiting time arose and consequently suggests ways to reduce

them. The survey also measures the workload of the staff, the efficiency of service provision and the percentage of time staff spent attending to patients.

Beyond merely being a time measurement activity, our experience has espoused a wide scope of benefits of the WTSES in primary care, *inter alia*; it serves as a process evaluation tool of service time efficiency; a quality measurement tool; an epidemiological profiling tool; and has been successful in its primary aim of identifying and suggesting solutions to long waits for health care services.

The WTSES is quintessential of a routine large scale survey with universal applicability across the tiers of the health care delivery system (primary, secondary and tertiary). Our experience provides evidence that:

1. Regular monitoring and evaluation of health services via large scale routine surveys such as the WTSES is possible in health systems of developing countries

2. Such high benefit surveys can be undertaken using valid and robust methodologies and yet be conducted at a low cost.

3. Existing human resources within health systems can be used to implement the survey in its entirety – including planning, data collection, data cleaning, analysis, interpretation, presentation of results and then development of appropriate interventions based on the findings

Routine surveys must have sufficient depth to assess all the major contributing causes of the problem being investigated. With the addition of routine large scale surveys such as the WTSES to their routine health information system, health departments would be in the envious position of having an unprecedented amount of high quality information to guide strategic and operational planning, as well as to assist with day to day decision making.

Conclusion

Given the current tools, it is possible for health facilities in developing countries to routinely conduct WTSESs. The benefits of increasing systems efficiency and reduction in waiting times allows increasing improvements in quality of services over a period of time. Because health workers undertake the survey themselves, not only is the survey conducted at a low

cost, but also it imminently impacts high staff morale as service provision improves and staff assume the role of researchers in their own right. However, health delivery systems will need further support in modifying particular work environments and mode of service provisions and further training of staff to do this adequately.

Further research is needed to evaluate the success of interventions undertaken to reduce waiting times at facilities and to explore the integration of the survey database application with other large databases utilized by Health Departments.

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