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RESEARCH ARTICLE

EMPIRICAL STUDY ON DRUG AND MEDICAL UTENSILS SUPPLY IN PUBLIC HOSPITALS

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ABSTRACT

Health is a basic Human right; hence one of the most important determinants of quality health service delivery is availability of essential drugs in public health facilities. Yet expenditure on health in general and that of drugs in particular in Africa are often lamented as being inadequate, inefficient, inequitable and unsustainable. This study examined deep across subject under the supply of Drugs and Medical Utensils in Public Hospitals. Drug Supply in Ethiopian Health sector conveyed as a very low rates. For those patients who visited public Hospitals (Mekelle and Quah), about 52.04% % were unhappy with the service delivery because drugs were not available and got medicine from private pharmacies with a higher price. Low income layer (66%) of the public hospital users in this study earn a salary below 120ETB moreover (28% are unemployed and 40% are students and farmers) in Mekelle and Quaha where the study was undertaken. They were exposed to unnecessary expenses to purchase drugs and medical utensils from the private pharmacies at high cost. On average private pharmacy price was greater than hospital price by 88.89% and this indicated that the service users were highly exploited by private pharmacy service suppliers and this was the result of low accessibility in public hospitals of the most demanded medicines and utensils.

INTRODUCTION

1.1GENERAL BACKGROUND

Ethiopia has one of the worst health status in the world as could be evidenced by conventionally accepted health indicators. As Tassew in his research reviewed, The Ethiopian health care delivery system has a demand –supply mismatch. It has been long that the service unable to respond qualitatively or quantitatively to the health needs of the people. It has been highly centralized and services are delivered in a fragmented way with a reliance on vertical programs and there is little collaboration between public and private sectors (Tassew Dejene, 2003). Shaw and Griffin (1995) stated that Health nowadays approved as a basic human right. However in developing countries like Ethiopia it is a common problem. Beyond to health service delivery the major problem in the country is drugs and medical supplies; it is the fact that they are in short supply at health institutions and private vendors most of the time. Lately, they are becoming more and more inaccessible and unaffordable to the vast majority. This is mainly because drugs and medical supplies are imported and systems of procurement and distribution are not well organized. As Tassew put in his conclusion, as drugs become in short supply and inaccessible, the visible symbol of quality care disappears and public confidence in the overall health service is eroded. Provision of a good quality primary care cannot be envisaged without a regular and adequate supply of drugs. As a matter of fact some drugs which are imported by NGO for free delivery are subjected to waste due to the disagreement between government and NGOs in supplying them. In the short term, basic drugs will have to be made available at all health care units and essential drugs provided in a sustainable manner (Tassew Dejene, 2003).

Preparing a list of essential drugs and medical supplies for all levels of the health service must be given priority attention. Overhauling the system of procurement, distribution, storage and utilization of drugs and medical supplies will then follow. In the medium and long term, production capability of basic drugs, medical supplies and vaccines need to be built and quality control mechanisms instituted, (Tassew Dejene, 2003).
The status of drug supply in the public Hospitals in Ethiopia remains problematic and is considered one of the most poorly implemented corollary strategies. In this regard, different evaluations indicated that storage and inventory control was poor; and shortages of drugs in public facilities are still common due to budgetary, procurement, and logistical problems. For example, the overall waste of drugs was estimated at 8 percent in 2004/05E.C (Tassew Dejene, 2003). Moreover, acquiring public goods and service at the lowest cost and at right time is the privilege of the society as they are the ultimate tax payers. However, it is very critical and difficult during medication and operation (surgical) to get drugs and medical Utensils at the right time and right price in public

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hospitals like Mekelle and Quha as we can attest the finding of this research. As a result the society is exposed to unnecessary expenses to purchase drugs and medical utensils from the private pharmacies at high cost. On average private pharmacy price was greater than hospital price by 88.89% and this indicated that the service users were highly exploited by private pharmacy service suppliers and this was the result of low accessibility in public hospitals of the most demanded medicines and utensils.

The issue becomes too sever challenge to the meager and subsistence poor particularly low income earning and unemployed who cannot afford to pay for the drugs from private pharmacies. However Part of the society may have a potential to purchase drugs and medical utensils even at price from the private pharmacies. But the core intention of the study is not for this group of service users rather it becomes profoundly important to investigate the social cost and social benefit of the practice prevalence in drugs and medical utensils supply shortage in public hospitals and their micro and macro consequences.

1.2 Statement of the problem

As Federal Ministry of Health stated in its report (2001), many low and middle-income countries like Ethiopia to attain their MDG (Millinnuim Developmetn Goals) in relation to health have developed health policies and strategies to improve health service delivery however it is ambitious, as a result they have faced difficulty in matching implementation with their aspirations. Availability of essential drugs in public health facilities is one of the most important determinants of the patients' perception of the quality of service offered. Unfortunately, drug shortages have occurred almost constantly during the Ethiopian Health sector Development program (HSDP) period, explaining at least partly the very low utilization rates. For those patients who visited public facilities in the recent past, about 37 % were unhappy with the service delivery because drugs were not sufficiently available (FMOH 2001).

Tigray is the northernmost national regional state of Ethiopia and is located between latitude 12o and 15o north. The Tigray National Regional State is located in the most Northern part of Ethiopia. It is bordered by Afar region in the East, Eritrea in the North, Amhara region in the South and Sudan in the West. Based on the 2007 census conducted by the Central Statistical Agency (CSA), Tigray has an approximate area 53,386 Square-kilometers (about 7% of Ethiopia) and an estimated population of 4,314,456 (about 6% of the country's population) of which 49.2% of the population are males and 50.8% are females (CSA, 2007).

According to the new administrative set up, Tigray is divided into six zones. These are Western, North-Western, Central, Eastern, Southern and Mekelle (the regional capital). Mekelle Zone (The study area) is the capital city of Tigray region. Quha is also under the boundary of Southern and Mekelle Zone. Mekelle Hospital and Quha Hospital so that are the sample we have taken to investigate the challenges and consequence of drug and medical utensils supply.

The study is only limited to these hospitals among twelve in the region such as; Adwa, Adigrat, St.Marry, Alamata, Wukro, Shire, Kahsay Abera, Maereg, Abi adi and Lemelem hospitals because these two hospitals are proximate and located at the town and have a large number of consumers and can be a true representative for Tigray region. Hence the service users have travelled with distance ranges from 0.6 KM (Mekelle city) to 800KMs (Gonder) to get the hospital service. The Service users of these two public hospitals were mainly people living in lower economic status with low purchasing potential of medical services in private hospitals. At the time of survey the public hospitals were unable to meet the need of the low income group of society and patients were forced to purchase from external private pharmacies at higher price. So that, throughout this research paper we will review the challenges and causes of the problem for this shortage and unavailability of Medicines within the Hospitals Pharmacies. This is the rationale to persue the research idea and the whole study will rest to answer the following fundamental research questions.

1.3 Objective of the study

This study tried to achieve the following specific research objectives are formulated:

1. To investigate the source of drug and medical tools with in the public hospitals pharmacies
2. To assess the type of available drugs and medical utensils with in the hospital
3. To examine the ability of consumers to pay for the drug and Medical utensils from private pharmacy

2. MATERIALS AND METHODS

2.1 Data Source and Sampling Design

Survey data from the service users in public hospitals pertaining to accessibility of the basic drugs and medical utensils were the main source of information for this study. In addition, documentary sources like budg *et al.* located, purchasing procedure, and legal guidelines, manuals are explored to the maximum**.** The study concentrated on public health service institutions in Mekelle city i.e. Mekelle Hospital and Quha Hospital which are situated in Mekelle zone. Standardized questionnaire were distributed to randomly selected service users of the hospitals at least for two round survey so as to interview a total 101 service user respondents. Documentary data which explore the annual Budg *et al.* location to drugs and medical utensils by Bureaue of Health Tigray Regional State was part of potential source of data. Moreover, Focus Group Discussion with the principal agent of hospitals, bureau of Health and other concerned body regarding to supply of drugs and medical utensils and in charge of problem settlement was involved entirely in the survey. The study adopted descriptive survey approach in collecting the necessary information from the respondents (Hospital service users). The descriptive investigation method was preferred because it has ensured complete explanation of the situation, make sure that minimum bias in the collection of data and finding out the what, where and how of a phenomenon was the situation that the researchers were take care of empirically. The sampling frame of the study was the list of patients (indoor

and outdoor) during the survey time at the public hospitals (Mekelle and Quha) Hospital.

2.2 Data Collection Instruments

The data used in this study was mainly (80%) primary and collected in the year 2012. Hospital service user's inspection considers as the main source. Data collection process was undertaken through a face to face (personal) interview with the patients. The list of patients for this purpose has drawn from randomly selected service users (indoor and outdoor) visiting the hospital and private pharmacies service users in Mekelle where prescribed by physicians in need of drugs and medical utensils. A total of 101 patients (75 patients from Mekelle Hospital and 26 patients from Quha Hospital) were involved in the survey. The study also has encompassed secondary data from the Hospital's documents, archives, bulletins and other relevant sources. For the primary sources of data, a standardized multipurpose questionnaire was developed after reviewing relevant literatures and exhaustively assessing the internet sources. In the first step towards preparing a questionnaire, the questionnaire was prepared in English and then translated into Amharic and back to English to ensure consistency, so that finally it can be administered in Amharic. The content of the questionnaire focused on the variables which were very important for obtaining information on socio- demographic characteristics of patients and their satisfaction level on the different types of the hospital services where the availability of drugs and supplies, price of drugs and supplies, and service category. Accordingly, the questionnaire was designed to comprise the following sections. Part one; hospital service user's characteristics**:** focus on the sex and age, occupation and education status, and residential area of patients. Part two; the attribute of the service offered to the clients was explored to the maximum like, the quality, accessibility, service category, and service price. In Part Three, the survey was incorporated the merit of hospital service accessibility with the overall welfare effect of the service users.

2.3 Data presentation and analysis

Data from questionnaires was analyzed using the descriptive statistics and Heckman two step with the help of data analysis software - Statistical Package; STATA which offered extensive data handling capabilities and numerous statistical analysis routines that can analyze small to very large data statistics. The investigators performed data entry and cleaning. Ten percent of the questionnaire was cross checked with the already entered data to maintain its validity. Frequency distribution, percentages and Chi squared (x2) test to detect associations at 5% level of significance for selected variables were calculated as appropriate. Heckman two step model was also used to address factors affecting private pharmacies expenses on drugs and supplies which are in accessible in public hospitals.

3. RESULT AND DISCUSSIONS

3.1 Introduction

In this part of the study primary data result will be presented. The total number of observation were 101; the characteristics of the sample were described in the previous chapter since it is a descriptive research. 75% of the data was obtained from Mekelle Hospital patients and the rest 25% is from Quha Hospital, from both there are missing variables in some of the questions otherwise all the questions are responded fully and satisfactorily.

3.2 Socio-Economic Characteristics of Patients

In this section the sex,educational backgroung,age, Income, Marital status,Residential area and other elements of the socio-economic variables because they are relevant for the subject will be analyzed and interpreted below.

Table 3. Socio -Economic Characteristics of the patients treated in public Hospital (Mekelle and Quha) hospitals,(n = 101)

Character	Number	Percentage
Sex		
Male	49	48.51
Female	52	51.49
Age(year)		
05-14	13	12.9
15-24	24	23.8
25-34	28	27.7
35-44	14	13.9
>=45	22	21.8
Resid Area		
Mekelle	62	61.39
Out of Mekelle	39	38.61
Education Status		
Illiterate	29	28.71
basic education	4	3.96
Primary	15	14.85
Junior	10	9.90
Secondary	21	20.79
Preparatory	5	4.95
Diploma	11	10.89
BA	6	5.94
Type of service users		
Inpatient	58	57.43
Outpatient	43	42.57
Payment status		
Company Sponsor	11	11.00
Kebelle sponsor	1	1.00
Hospital sponsor	9	9.00
Pocket money	71	71.00
Others	8	8.00
Admission type		
Medical ward	24	23.76
Skin treatment	10	9.90
TBA_HIV center	7	6.93
Recovery	9	8.91
Maternity	3	2.97
Child ward	7	6.93
Emergency	12	11.88
Physiotherapy	3	2.97
Others	26	25.74

Source: Survey data, 2012

There were 101 hospital service users (75 patients from Mekelle hospital and 26 patients from Quha hospital) enrolled in the study. These service users have travelled with distance ranges from 0.6 KM (Mekelle city) to 800KMs (Gonder) to get the hospital service. Out of the total 52(51.49 %) were female patients and 49(48.51) male patients. Most of the patients 62 (61.39%) were came from Mekelle city and the remaining from different Weredas and towns of Tigray, Amhara region, and Afar region to demand better hospital services(referral). Twenty-nine (28.715%) of the patients were illiterate and the

remaining can read and write. Regarding their marital status, 48 (47.52%) were married, 29 (28.71) unmarried or single and the rest were divorced, widowed, separated, and too young. Most of the service users, 23 (27.77.7%) were unemployed part of society while 22 (21.78%) were students and 18(17.82%) farmers and these group of society were classed as lower income earner and exhibited low living standard. Only 12(11.88%) of the sampled patients employed as civil servants. Out of the total respondents, 43(42.57%) were outdoor patients while 58(57.43%) were indoor patients and treated in the public hospital from one day to 360 days (one year). Fifty-three (52.48%) of the respondents were household heads and 49% of the heads were treated in the emergency case. Greater size 71(70.29%) of the patients covered all of the medical expenses from their own pocket and free/ sponsored medical treatment accounts only 29%.

As it is depicted from the table the number of Male service users are greater (55.75%) than female service users (44.25) in a series of five years, and there is a significant difference in the number of outpatient (92.67%) than inpatient (7.33%). In year 2000 the numbers of service users are significantly high (26.1%) than the preceding three years and the outpatients are 31%.

3.3 Occupation of Patients by Admission

As it can be reaveled from the above table 32.6% of the patients who came to the Hospital on emergency base are Unemployed followed by 21.7 % who are students. 30(29.7%) of the total services users regardless of their occupation difference came to the Hospital for checkup, however the majority (40%) of the total who came to the Hospital for check up are Merchant's and civil servants .Thus, we can conclude

Table 3.2. Annual service users (hospital service) for the last five years

Year	Male	Female	Total	% (M)	% (F)	In patient	Out patient	Total	% (IN)	% (Out)
1999	51,685	37,735	89,420	.233	.214	6,264	89,420	95,684	.237	.267
2000	57,890	45,775	103,665	.261	.26	7,363	103,665	111,028	.278	.310
2001	38,216	28,446	66,662	.172	.162	6,752	66,662	73,414	.255	.199
2002	38,777	33,286	72,063	.175	.189	4,014	72,063	76,077	.152	.215
2003	35,040	30,640	65,680	.158	.174	2,039	2,237	4,276	.077	.007
Total	221,608	175882	397,490	100	100	26432	334,047	360,479	100	100

Table 3.3. Occupation of Patients and their Admission Type

Occupation of the patient	Admition type of the patien					
	Emergence	Checkup	Referfrom Urban Hos.	Referfrom Rural Hosp.	Other	Total
Unemployed	15	5	0	3	0	23
Farmer	7	4	5	0	2	18
Civil Servant	4	6	0	2	0	12
Merchant	5	6	0	1	0	12
Company employ	2	0	0	0	2	4
Pensioner	0	2	0	0	0	2
Soldier	0	0	0	1	0	1
Student	10	4	4	3	1	22
Handicraft	2	1	0	0	0	3
Other	1	2	0	0	1	4
Total	46	30	9	10	6	101

Source; Survey data, 2012

Table 3.4. Medicine and Medical Utensil in shortage in the Public Hospitals

Type of Medicine _Utensils in shortage	Freq	Percentage	Commutative percentage
Tablet	58	61.05	61.1
Glove	2	2.11	63.2
Glucose	2	2.11	65.3
X_rayexam	1	1.05	66.3
Ultrasound exam	1	1.05	67.4
Urine_bloodanalysis	3	3.16	70.5
GlucoseandX_ray	1	1.05	71.6
Tablet andglove	7	7.37	79
Other	20	21.05	
Total	95	100	100

Source: Survey data, 2012

Table 3.5. T- test for the inaccessibility of Drugs and Medical Utensils in public hospitals

Medicine/ utensil name	Obs	df	T-statics	P-value
Tablet	95	94	3.45	0.0004***
Glove	95	94	3.08	0.0013***
Glucose	95	94	2.71	0.0040***
X ray exam	95	94	2.34	0.0107**
Ultrasound	95	94	1.96	0.0260**
Urine/Blood	95	94	1.59	0.0568*
Other	95	94	1.22	0.1118

Source: survey 2012

*** Significant at 1%, ** significant at 5% , * significant at 10%

that because the Hospitals are public and their expense relatively is inexpensive unemployed and students are preferring the service here.

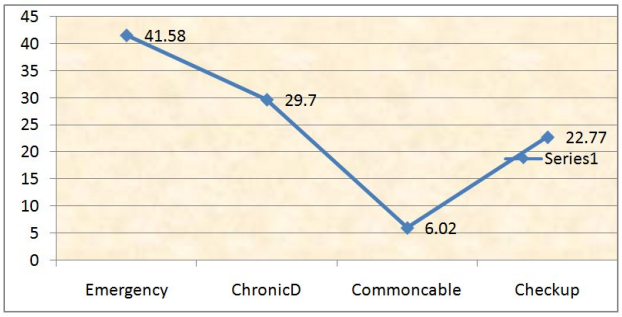
3.3 Occupation of Patients by Admission

As it can be reaveled from the above Table 32.6% of the patients who came to the Hospital on emergency base are Unemployed followed by 21.7 % who are students. 30(29.7%) of the total services users regardless of their occupation difference came to the Hospital for checkup, however the majority (40%) of the total who came to the Hospital for check up are Merchant's and civil servants .Thus, we can conclude that because the Hospitals are public and their expense relatively is inexpensive unemployed and students are preferring the service here. Table 3.6 depicted that except Urine/blood and other non short listed items, we fail to accept the null hypothesis at 5% level of significance and intuitively, the mean value of the items were quite different from zero and then; one can realized that there was inaccessibly of drugs and medical utensils in public hospitals and the situation was significant at 5% level. Patients were visited to the public hospitals in need of various medical services even though they were not satisfied by the offering of appropriate medicines and supplies .Most of patient's problem need was urgent intervention of right service at the right time.

3.5 Reasons Patients come to the Hospital

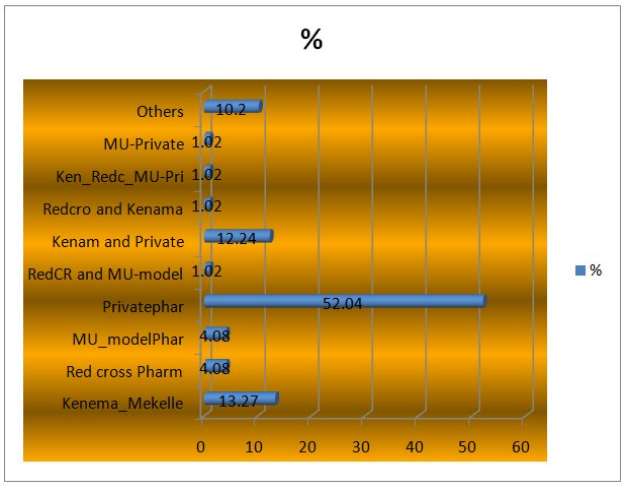
Visiting to the hospital in an emergency case has taken the greater share (45.55%) and (65%) of them were accepted as indoor patient while (29.7%) of patients were visited hospital for check up and only (33.33%) of the patients were accepted for continuous treatment (indoor) and the remaining (67.33%) were visited for short period of time (outdoor). Most(88.88%) of the patient came from other rural areas for better treatment (referral service) were detained as indoor and the rest (12.22%) were back to their home right after the appropriate treatment was given. The following figure showed the cases why patients came to the public hospitals. Accordingly, 41.58% of patient sampled were visited in Emergency case, 29.7% for treatment upon their chronic diseases, 27.7% and 6.02% were for a medical check-up and to cure from transmitted diseases respectively. Subsequently, the survey addressed which type of patients (indoor or outdoor) and the case for their visiting to the hospital gate was revealed by the following table.

pharmacy. In view of that, the patients were search and match the appropriate service providers probably in Mekelle city with slightly high or higher price as compared to the public hospital price. To examine the probability of accessibility of medicine and medical utensils in an alternative to the public hospitals, the survey portray as follows.



Source: Survey data, 2012

Figure 1. Reason why Patients visit to the public Hospital



Source: Survey data, 2012

Figure 2. Alternative medical service supplier other than the public Hospitals

Figure 2 above revealed alternative supplier of medical service (medicine and utensils) if these services were inaccessibility in Mekelle and Quha hospitals. High percentages (52.04%) of

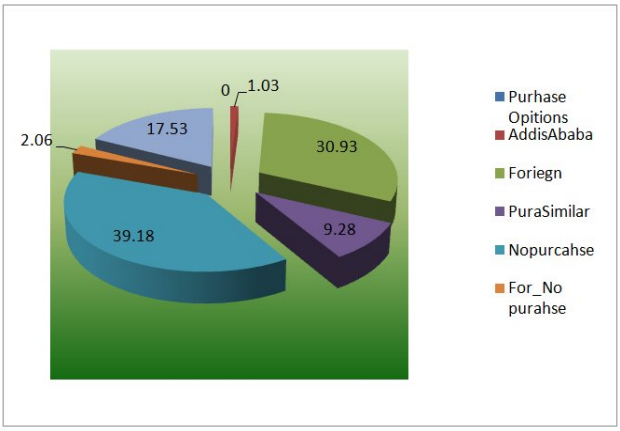
Table 3.6. Reason to visit hospital by patient type

Patient type	Reason for visiting hospitals					
	Emergencey	Check-up	Refer from Rural	Refer from Urban	Other	Total
Indoor	30	10	8	5	5	43
Outdor	16	20	1	5	1	58
Total	46	30	9	10	6	101

Source: Survey data, 2012

The consequence of less accessibility of medicines and medical utensils in public hospitals reinforced to the service users to purchase from the external service provider (private or semi public pharmacies). While no accessibility of Medicines and Medical utensils in the hospital, the survey tries to address where they will get the service other than the hospital patients get medicines from private pharmacies at higher price. Likewise 12.24% and 13.27% of the patients get drugs from ''Kenema'' and other Private pharmacies and ''kenema'' pharmacy respectively. According to the above graph, eventhough the private pharmacy has taken the greater share in service provision especially in supplying medicine, semi public

pharmacies like Mekelle University model pharmacy and Kenema pharmacy also play a great role in solving the inaccessibility problem. On the other hand, one can draw a conclusion that there was great difference of price between the semi public and the private pharmacies for the same type of medical utensils and medicine and patients were significantly affected in affording the higher price margin. Other point which aggravated the problem of inaccessibility of the appropriate medicine and utensils was not found even in Mekelle city of various pharmacies. The seriousness of the problem was acute especially for the poor one. As a result, patients were forced to take alternative decisions either purchasing from other cities (Addis Ababa) or regret to purchase given that they were poor to afford economically and their life may be highly tempted. To way out from their problem, patients were oblige to take the following options.



Source: Survey data, 2012

Figure 3. Options of Getting Medicine if not available in Mekelle city (%)

The problem of less supply of medicines by public hospitals exposed the patients to unnecessary expense. The above graph depicted that 30.93% of respondents purchased the medicines from external (Foreign) at high opportunity cost and 39.18 % of surveyed patients were regretting from purchasing of the medicine if not available in Mekelle private pharmacies. Such harsh decision was emanated from the poor potential of the patients in obtaining of the required medicines and utensils at higher price elsewhere. Alternatively, if the right medicine was not available in Mekelle private pharmacies, they are forced to purchase closer substitute medicine which might be order by the pharmacists.

3.6 Hospital Service accessibility and quality: Previous Vs Current

Health service is becoming an increasingly important element of national economies and it is time to appreciate the distinguishing qualities of health services and resulting management implications with specific focus on healthcare services. According to (Jager *et al*., 2009), public healthcare organisations all over the world were increasingly concerned about their insufficient financial resources and their ability to meet social obligations. Even though it was possible to compare service delivery quality and accessibility across time, but difficult to measure and evaluate because patient's observation was different as compared to last year.

Table 3.7. Service quality and accessibility comparison across time (current with previous year)

Current Vs before year	Frequency	Percentage	cum
Good	10	10.53	10.53
Medium	24	25.26	35.79
Similar to previous year r	7	7.37	43.16
Overlooked	4	4.21	47.37
Not user last year	33	34.74	82.11
No idea	17	17.89	100.00
Total	95	100.00	

Source: Survey data, 2012

About (10.53%) of the respondents replied that there was high quality level of health services provided in the hospital currently as compared to previous while (25.26%) of the respondents pointed out that there was medium quality health services provision in the hospital. On the other hand, (7.37%) of patients were unable to differentiate service delivery quality current with previous year. But greater share (37.74%) were not service user in the previous year and were not in a position to put their view.

3.7 Econometric Analysis

Heckman two stage welfare effect of drugs inaccessible in public hospitals

Health service must be quickly delivered to the service users so that people can move on to other commitments. There should be a practice that given limited resource to provide adequate health service, rigorously allow good quality service delivery to be the acceptable benchmark becomes profoundly important. However, the descriptive part of this paper revealed that larger percentage of patients was suffered to get appropriate service at the right time in Mekelle and Quha public hospitals and this inconveniency has created immense frustration on the patients. One common and always prevailing problem of public hospitals (Mekelle and Quaha) was incapable to make available the highly demanded drugs and medical utensils at the hospital pharmacy and the patients were exposed for unnecessary expenditure and ultimately distressed their welfare. This section has focused in examining the welfare effect of drug and medical utensils inaccessibility in public hospital pharmacies through public – private pharmacies price differentiation and show the correlation of this price disparity with the socio-economic profiles of patients.

From the ongoing discussion, it was clear that patients in public hospitals of Mekelle and Quha were devise to get the drugs and medical utensils from outside pharmacies than hospitals at high accounting as well as opportunity costs. To point out the effect of high price of external purchase drugs on the welfare of the service users, the researchers develop an econometric technique of Heckman two step. For that reason, Part of the surveyed hospital patients were not in a point to get demanding drugs and sample selection method was prevailed. Selection of service users was occurred in a linear regression model when data on the dependent variable were missing non-

randomly conditional on the independent variables. The standard approach in Heckman selection assumed that the error terms of the decision equation in service users who were affliction of getting drugs at hospital pharmacy and the outcome equation in making of drugs and medical utensils expenditure at external were non correlated $\mathrm{cov}ar(\varepsilon_i, \upsilon_i \neq 0)$.

Table 3.8. Heckman two step welfare Analysis of patients

Heckman selection model — Number of obs = 65
(regression model with sample selection) — Censored obs = 4
Uncensored obs = 61
Wald chi2(7) = 23.30
Log likelihood = -82.2074 — Prob > chi2 = 0.0015

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Drugavaila~e						
ServiceUse~r	-.5001165	.2442925	-2.05	0.041	-.9789211	-.021312
Patientsex	-.302766	.2407219	-1.26	0.208	-.7745723	.1690403
MaritalSta	.1347683	.0547521	2.46	0.014	.0274561	.2420806
EducSt	.011034	.0669094	0.16	0.869	-.120106	.1421741
Occup	-.0104696	.043042	-0.24	0.808	-.0948303	.0738911
Patientinc~e	-.0004901	.0002324	-2.11	0.035	-.0009456	-.0000347
familysize	.0856968	.0539303	1.59	0.112	-.0200046	.1913982
_cons	1.398147	.3771275	3.71	0.000	.6589902	2.137303
PrivateP_P~i						
ServiceUse~r	-.394832	.2838329	-1.39	0.164	-.9511343	.1614703
Patientsex	.3238838	.2736677	1.18	0.237	-.2124951	.8602627
Age	-.0020783	.000211	-9.85	0.000	-.0024918	-.0016648
MaritalSta	-.2493708	.0673518	-3.70	0.000	-.3813779	-.1173637
EducSt	.0645456	.0775767	0.83	0.405	-.0875019	.216593
Occup	.0603293	.0504682	1.20	0.232	-.0385865	.1592451
Patientinc~e	-.0007347	.0002821	-2.60	0.009	-.0012877	-.0001817
familysize	-.1036352	.063076	-1.64	0.100	-.227262	.0199915
_cons	1.834198	.4485357	4.09	0.000	.9550845	2.713312
/athrho	-16.06675	154.0115	-0.10	0.917	-317.9237	285.7902
/lnsigma	-.1386249	.0897585	-1.54	0.122	-.3145482	.0372985
rho	-1	6.87e-12			-1	1
sigma	.8705545	.0781396			.7301186	1.038003
lambda	-.8705545	.0781396			-1.023705	-.7174037

LR test of indep. eqns. (rho = 0): chi2(1) = 5.99 Prob > chi2 = 0.0144

Source: Survey data, 2012

Firstly, binary probit method of estimation was applied to address whether hospital service users were in a position of hospital service inaccessibility. Secondly, once service users become voluntary to purchase from external pharmacies, his/her capacity or potential in entertaining the external drugs expenditure was examined using OLS method. However, the nature of sampling technique was non random, errors term of the two equations(in access and outcome) were correlated and OLS coefficients were subjected to biased and inefficient, and the regression of decision model on outcome model for the selected sample was baised estimates. For that matter, the first step, estimating the binary selection equation through probit over the full sample i = 1…N is run in order to obtain estimates of β. Secondly, using observations with di = 1(inaccessibility for drugs and medical utensils in public hospital refer equation (X) to estimate the regression function using OLS of the observed against the explanatory variables. The following Table 12 illustrated the decision (being inaccess of drugs at hospital) and outcome models (the potential in affording the external pharmacy price) estimation.

From the sample surveyed service users, (57.43%) were indoor service users. Out of these, only 25% received the recommended drug and utilises at the right time and the remaining (18.4%) sometimes get some times not; (43.6%) get irregularly and (13%) mostly they can't get the desired medicines. Addressing the loss in welfare of the patients who were unable to get in the hospital but purchased from external pharmacy at high accounting and economic cost were one theme of the survey. To effective drawing of a conclusion, first those individuals unable to get the service at hospital pharmacy was selected and following by their potential in purchasing from external pharmacy expressed by drug price divergence was considered as the outcome analysis. Finally, which part of the society was seriously affected by the external price was investigated by using Ordinary Least Square (OLS) method of estimation.

Table 3.9. Heckman two step welfare analysis of private pharmacy drug and medical utensils price

	Dep var: Drugavaila~e		Dep Var: logPrivate~e	
variables	Probit Estimation	t-value	OLS estimation	t-value
Patientsex~e	-1.39	-1.91		
Age	-.147***	-3.12		
ResidA_Mek~e	-.617	-0.90	.197	0.63
familysize	.616 ***	2.69		
Admiontype	-.950**	-2.25	-.057	-0.49
Married	-4.196**	-2.13	-.110	-0.26
Single	-2.39	-1.50	-.045	-0.11
Divorce	-7.26**	-2.42		
Illitrate	4.61**	2.40		
Basiceduca~n	1.91	1.30		
Primary	2.27	1.52	-1.07**	-1.85
Junior	.693	0.51	-.026	-0.05
Secondary	1.72	1.43	.171	0.46
Unemployed	2.21	1.45		
Farmer	-.587	-0.38		
Campnayemp~e	3.98	1.86		
Student	4.09**	-2.04	-.569	-1.38
Campanyspo~r	-4.45	-2.87		
Pocket money	.105	0.12	-.130	-0.37
IMR |			359	. -1.08
LR chi2(22)=	63.93		F(10, 82) =	2.02
Prob > chi2 =	0.000		Prob > F =	0.0416
Pseudo R2 =	0.6089		R-squared =	0.1389
Number of obs =	91		Root MSE =	1.4097

Source: Survey data, 2012

The top part of the above Table 5.9.1 demonstrated estimation result of the outcome equation and the bottom part referred to the inaccessibility decision. From the total service users survey, (65/101) were unable to get the required service at the right time in the public hospitals. Likewise, (61/65) purchase drugs and medical utensils from external with price difference against of hospital pharmacies and Heckman two stage has taken only the right censored service users. The Wald chi2(7)= 23.30 shows that at degree of freedom (7) the model specification

was quite sense and complement by the rejection of the null hypothesis at 5% of significance with probability of 0.0015. rho = estimate of $\rho_{\varepsilon u}$ indicated the correlation coefficient between error terms of the inaccessibility and the expenditure equation. They were negatively correlated with (rho=-1) and little analysis seems quite common; which means individual service users who were inaccessible of the right service at the right time in the hospital and forced to purchase from external pharmacy creates negative implication on their welfare by increasing the price of drugs and medical utensils. Sigma values. 0.870 (actual the log of sigma) was the standard error of the residuals of the expenditure equation. Lambda (-.870) was rho multiplied by sigma which is the standard error of the residual of the inaccessible equation. The Loglikelhood ratio (LR) test indicated the correlation was very significant and there was sample selection problem. Hence, to the problem of sample selection, we have been used Heckman by hand technique of estimation. The first step in the correction of the selection biased was generating error correction factor which is Inverse Mill's Ratio (IMR). It is the ratio of the probability density function [f(x)] which pdf over the cumulative distribution function of a distribution [F(x)] which CDF after probit regression. Finally, take the IMR as one of the regressors and the significance of the IMR at 5% level. In the probit estimation, positive coefficients indicated patient's profile was exposed to inaccessibility at the hospital pharmacy drugs and with negative coefficient not faced the problem. Most of the patient's profile didn't countenanced to the difficulty of drugs and medical utensils and one can deduced that individual patient's side view has no any relationship with the inaccessibility of drugs at large and its association was entirely from supply side. Result of the outcome equation was interpreted like to OLS results. Nevertheless the intuitive is similar to the probit results

4. Conclusion

In view of the fact that health is a principal need and indeed a basic human right of every individuals and a healthy citizen is an asset for the nation, public Hospitals should ensure supply of drugs at the least possible cost to the service users who demand them. In the entire survey of this study we come across searching an information about the source of drugs and Medical Utensils for the Hospitals, Type of essential available drugs and medical utensils , Ability of consumers to pay for the drugs and consequences of the non availability of drugs up on the welfare of the society. We have been depicting solid findings this research presumed to attain by analyzing the information in the previous chapter and here is the conclusion finally drawn from the findings:

The service users have travelled with distance ranges from 0.6 KM (Mekelle city) to 800KMs (Gonder) to get the hospital service. The Service users of these two public hospitals were mainly people living in lower economic status with low purchasing potential of medical services in private hospitals. As information obtained from the respondents: they will later make a decision either to buy searching the means or leave it, however the second option is the worst and will lead them to death if the disease is serious. Donation and procurement are the two major sources of drugs and supplies for the Hospitals. The type of drugs and supplies obtained through donation are commonly; ARV Drugs, TB, Malaria and contraceptive, besides the hospital may purchase from a government distributor (PHARMID) with a fixed price and direct purchase without bargain. Local and International procurement for the public health facilities is mainly done by two governmental agencies called PHARMID and Pharmaceutical Supply and Logistics Department (PSLD) of the FMOH. PHARMID distributes drugs and medical supplies to all regions through its eight wholesale distribution branch offices located in different regions

The problem arises when the drugs and supplies are unavailable from PHARMID. It subjects to long procedural purchase from private distributors. Both Hospitals have formed a committee drawn from various departments of the Hospitals to prepare EDL (Essential Drug List). According to the list of essential drugs, lab agents and supplies required to be purchased by the pharmacy, the purchasing committee will be assigned to purchase from PHARMID. However, the ordered drugs and supplies may not be available in most cases so that the purchasing committee will announce for the private distributors (They are a total of eight in Mekelle) to submit proforma and the one who wins the competition will supply. The serious problem should be resolved here is the long purchase procedures in the course to select the best vendor. On average price of Drugs in private pharmacy was greater than Hospital price by 88.89 %. In terms of individual average drug price difference between public and private pharmacies it is 17 ETB and 51 ETB respectively.

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