

**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

ASSESSMENT OF OBSTETRIC NEEDS IN EMERGENCY

OBSTETRIC SERVICES, ADDIS ABABA 2006

BY

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ACRONYMS

AMI- Absolute Maternal Indications
ANC- Antenatal Care
BOC- Basic Obstetric Care
CBR- Crude Birth Rate
CDR- Crude Death Rate
CIA- Central Intelligence Agency
COC- Comprehensive Obstetric Care
CPR- Contraceptive Prevalence Rate
CSA- Central Statistics Authority
C/S- Caesarean Section
DHS- Demographic Health Survey
EB- Expected Birth
EmOC- Emergency Obstetric Care
FHU- Family health Unit
HF- Health Facilities
IMR- Infant Mortality Rate
LE- Life Expectancy
MMR- Maternal Mortality Ratio
MOH- Ministry of Health (FMOH- Federal MOH)
MOI- Major Obstetric Interventions
MON- Met Obstetric Needs
MPS- Making Pregnancy Safer
OL- Obstructed Labor
RR- Reference Ratio
TFR-Total Fertility Rate
UON- Unmet Obstetric Need
UONN- Unmet Obstetric Need Network
WHO- World Health Organization

ABSTRACT

Introduction: Obstetric needs are health problems that necessitate EmOC services or interventions. The sum of incidence of pathologies (obstetric emergencies and complications) is taken as an indicator of obstetric need. The assessment of UON has never been articulated in studies conducted on EmOC in Ethiopia. This study identifies gaps and deficits in MOI for AMI in comparison to the existing need.

Objective: To assess UON in Emergency Obstetric services in hospitals of Addis Ababa.

Methodology: A Cross-sectional study was conducted from July-September 2006 on 625 mothers who delivered with Absolute Maternal Indication (AMI), Major Obstetric Intervention (MOI) and non-AMI in 19 hospitals of Addis Ababa 6 Public and 13 Private. The data collectors were Midwives working in the Obstetric units of the hospitals. They were trained on pre-tested structured formats. Data quality was ensured through continuous supervision.

Results: A total of 666 MOI were conducted and Caesarean section took the largest share 531(80.5%). The C/S rate per 100 births was 5.3%. The number of women with AMI was 367 where majority had Obstructed Labour 145(39.5%) The number of MOI done without AMI was 354 where majority were done for previous C/S 143 (40.4%) and foetal distress 127(35.9%). The odds of C/S in Private hospital 1.77 (1.09, 2.90) and daytime admission 1.61 (1.01, 2.57) was significantly higher than in public hospitals and night time admissions.

The results of the new born showed that 538(92.4%) were born alive and discharged alive. Some of the mothers 39(5.4%) had complication after delivery mainly sepsis and haemorrhage with 4 resulted in maternal deaths which occurred in public hospitals. The

average hospital stay in days was 3.9 and 7.1 for private and public respectively where the difference of means was statistically significant ($p=0.000$). Nearly 9 out of 100 births which needed major obstetric intervention in Addis Ababa during the period of data collection (July 17-September 17, 2006) did not receive it. In other words the deficit of MOI/AMI per 100 births is 9.46%.

Conclusion: The UON in Addis Ababa was higher than urban figures of other countries that underwent the UON exercise. The rural situation is expected to be worse than the capital where better socioeconomic indicators and several health facilities exist. If purely preventive measures are out of favor, the move towards managing maternal health through a hospital network still seems in its infancy. Finally, this study should not remain one more theoretical study, but should pave a way for practical and effective decisions to be taken which will through advocacy and resource mobilization allow the country to move out of the poverty of the maternal health services.

Words used: Unmet Obstetric Needs, Major Obstetric Intervention (MOI), Absolute Maternal Indication (AMI), non Absolute Maternal Indication (non AMI), Caesarean Section (C/S), Emergency Obstetric services.

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1. INTRODUCTION

1.1 STATEMENT OF THE PROBLEM

The MMR in Ethiopia is estimated to be 871/100,000, the TFR is estimated to be 5.4 and CPR is 14%. (DHS 2005) More than half of the women with age 30 years and above had their first birth in their teens. The proportion of women attending ANC is 45% with wide variation in Rural (22%) and Urban (67%) respectively. (DHS 2005) Trained worker assists only 25% of the deliveries. (Health Indicators MOH 2003)

Obstetric Needs are health problems that necessitate EmOC services or interventions during pregnancy and labor. The concept of need integrates the epidemiological and mathematical value. The sum of incidence of pathologies (obstetric emergencies and complications) is taken as an indicator of obstetric need. The concept of unmet needs is elaborated below

$$\text{Number of Unmet Need} = \text{Number of Problems Expected} - \text{Number of Problems}$$

(UN)	in a population and a specific	adequately dealt with
	period	in specified population
		and period

The obstetric need is expressed in terms of health problems, which necessitate an intervention, by the health care system. Among indications for intervention some are more essential to the survival of the mother (and the child) than others. These are called “absolute maternal indications (AMI)”; and it is on this basis that the indicator of obstetric need is constructed. It is necessary, if the indicator is confined to major obstetric interventions for absolute maternal indications (MOI/AMI), to select these in such a way as to leave least room for discussion and in a way that is most relevant to the planning of

the minimum interventions required. The AMI are severe ante-partum hemorrhages caused by a placenta praevia or a retro-placental haematoma (premature detachment of a normally inserted placenta), incoercible post-partum hemorrhages, major foeto-pelvic disproportions (due to a narrow pelvis or a hydrocephaly), transverse positions (shoulders neglected) and face presentations.

The major obstetric interventions for absolute maternal indications comprise Caesareans, laparatomies, hysterectomies, internal versions, craniotomies or embryotomies and symphysiotomy which may be carried out to avoid a caesarean in a case of cephalo-pelvic disproportion.

These interventions are selected not only because they are designed to save the mother's life (for the indications mentioned above) but also because they can be performed only in hospital. This last point is particularly important, since it enables the collection of data to be restricted to maternity institutions with operating facilities.

1.2 RATIONALE OF THE STUDY

Studies done in Ethiopia have addressed the barriers to Obstetric service utilization, preference of place of delivery, quality of family planning services; post abortion care, ANC attendance etc... These have provided indirect information on obstetric services and the level of utilization. There had been no direct way of informing policy on the deficits of Obstetric needs through MOI for AMI. This study will focus on the use of UON as a tool to assess the gaps existing in the provision of EmOC services.

One main focus for making pregnancy safer in Ethiopia is proper provision of EmOC through both development of infrastructure and ensuring optimum functionality. This

study therefore attempts to identify deficits in MOI for AMI in comparison to the existing need (Do those who need EmOC services actually receive them?). The information will also highlight where exactly to focus in planning interventions. Strategies to reduce Maternal Mortality in the country require such kind information for decision-making.

2. LITERATURE REVIEW

2.1 ESSENTIAL OBSTETRIC SERVICES

Maternal Mortality has been given due emphasis on the MDGs for its reduction by $\frac{3}{4}$ by the year 2015. This indicates the need to acquire reliable baseline information for monitoring progress. Several approaches have been adapted to acquire reliable data on maternal deaths.

The Making Pregnancy Safe (MPS) strategy puts the essential services as the specific responsibilities of the health sector. These services include client centred family planning services and information targeting men, women and adolescents; post abortion care, safe abortion provision where it is legal to do so; basic antenatal and postpartum care; a skilled attendant present at every birth and presence of good quality obstetric services at referral centres for the management of complications, as about 15% of all births require expert care.

The two components of Essential Obstetric Care are the Basic Emergency Obstetric Care (BEOC) that is (performance of life saving obstetric functions including parenteral antibiotics, oxytocic drugs, sedatives for eclampsia, manual removal of retained products and basic neonatal life support) and the Comprehensive Essential Obstetric Care (CEOC) (all those in BEOC plus obstetric surgery, anaesthesia and blood transfusion). The MPS strategy has been long adopted in Ethiopia. As part of formulation of its national policy the MOH has set a target of reducing total fertility rate from 5.8 to 4, an increase in contraceptive prevalence rate to 44%, a substantial reduction in maternal and infant mortality rates, an increase in female participation in all aspects of development and

improvement in women's right issues throughout the country by 2015. (MOH Family Health Department, 2002)

In addition to the availability of services; the functionality and utilization are important aspects of the strategy. Assessment of utilization of EOS in north Shoa and Gondar has indicated that institutional delivery is very low in the region. (FIGO and ESOG, 2003 and Mesfin Nigussie, Ethiop. J. Health Dev.2004) Different reasons were identified regarding underutilization of obstetric services. The studies indicate that most women deliver at home. In urban areas there exists a different scenario. In the capital Addis Ababa the institutional delivery rate is 78.5%, which is much higher, compared to the regions. Obstetric services are provided by both private and public hospitals and clinics. The functionality of the existing infrastructure in terms of the requirement has not been studied.

2.2 THE UON

The Unmet Obstetric Needs (UON) for emergency obstetric services have been evaluated and identified in different countries. A group in the Antwerp University, Belgium first developed it. The method was implemented in countries with high ratios of maternal mortality. It was then adopted by WHO as one of the process indicators of obstetric services. There is an Unmet Obstetric Need Network (UONN) working with different partner organizations and countries highly affected by maternal mortality.

The concept of unmet obstetric need (UON) refers to the discrepancy between what the health care system should do to deal with the obstetric problems in a given population and the care it actually delivers. Operationally, UON is expressed in terms of women who should have benefited from an obstetric intervention, but for whom this intervention did

not take place. It is possible to consider only those interventions that are performed for absolute maternal indications (AMI) such as severe ante-partum haemorrhage requiring surgical intervention; foeto-pelvic disproportion, including pre-rupture and uterine rupture; shoulder or transverse lie and brow presentation. It is then possible to make low end estimates of the frequency of such indications for major obstetric interventions (i.e. the amount of need that must be covered). This can be done either by reviewing the indications of MOI in (urban) areas without problem of access; or by extrapolating from few populations based studies with data on indications for MOI. If a suitable and realistic rate chosen as a reference, it becomes possible to estimate UON by comparing observed MOI and AMI, without resorting to major investments in survey operations. Low- end estimate of these ranges between 1% and 2% of expected deliveries. The discrepancies between observed and expected rates of MOI/AMI can be used not as a direct indicator of maternal mortality, but as one indicator of failures of health care system to provide adequate delivery care. (A.Belghiti et al. Tropical medicine and International health; 1998)

Measuring the rates of MOI for AMI is theoretically simple, and limiting calculations to a group of indications for which an incidence can be estimated makes it easy to calculate deficits. In practice, however, there can be several difficulties. It is not always easy to obtain reliable figures on the expected births per area. It may be even more difficult to obtain reliable numerator, i.e. A complete inventory of MOI performed for AMI. (A.Belghiti et al. Tropical medicine and International health; 1998 and Dubourg D., July 2000). The common type of bias in this type of study is information bias. There is variation in diagnosis from one to other facility. The AMI should therefore be specified

and one should also limit the range of MOI. The major sources of information for such studies are delivery books and operation theatre records.

According to the studies of UON in African countries; Caesarean section was found to be the commonest form of MOI. (Burkina Faso. Document March 2001 and Mali, December 1998-2000). The rate of C/S is one of the process indicators of obstetric services. Its high rate doesn't necessarily reflect the proportion of obstetric needs that are met. The importance of the reference is rather to be aware of the influence of supply or supply induced demand than by need. The reference for rate of caesarean section according to the UN is 5-15%. C/S rate in the Latin America is different according to a study in 12 Latin American countries which account for the 81% of deliveries in the region, the rate ranged from (16.8%-40%). A positive and significant correlation was observed between the gross national product per capita and rate of caesarean section ($r_s=0.746$), and higher rates were observed in private hospitals than in public ones. Taking 15% as a medically justified accepted rate, over 850 000 unnecessary caesarean sections are performed each year in the region. The reported figures represent an unnecessary increased risk for young women and their babies. From the economic perspective, this is a burden to health systems that work with limited budgets. (José M Belizán et al. *BMJ* 1999)

The other important indicators include the number of facilities with emergency obstetric services. According to the UN recommendations, there should be at least one comprehensive and four basic EmOC facilities per 500,000 populations. These should also be accompanied by adequate number of births in those facilities treating most obstetric emergencies. An estimated 15% of pregnant women develop major direct obstetric complications that require medical care, so the recommendation is that at least

15% of births should take place in EmOC. This is estimated through the Met obstetric need (MON) which is an indicator for the interventions conducted for those with absolute maternal indications should be 100% with the expectation that all women in need of major intervention get it from the health system. The case fatality rate (CFR), which is a proportion of women with obstetric complications, admitted to a facility that dies should not be above 1%. (WHO & UNICEF, Geneva 1993 and AMDD: Niger, Rwanda and Tanzania, 2003)

The measurement of unmet need for major obstetric interventions makes it possible to provide data on the situation of obstetric services in a particular geographical area. These measurements can be used for the planning and follow-up of the development of health services and provide a very concrete starting-point for dialogues on health policy and strategies at local, regional or national level. From an operational point of view, unmet need for major obstetric interventions are expressed in terms of the number of women who should have had a surgical intervention; and it is thus possible to estimate the need for interventions in obstetric emergencies without the need to carry out extensive and costly studies in the population. This is influenced by the institutional delivery rate which should be taken into account while quantifying the deficit. Estimates made in this way are useful in comparing the availability of obstetric techniques in different geographical areas, identifying regions where the needs are greatest, and thus defining more effectively the expenditure required to ensure the development of services. Those responsible for health planning can also use unmet need for major obstetric interventions to follow up the improvement of health development and its impact on maternal mortality.

3. OBJECTIVES

3.1 GENERAL OBJECTIVE

Assessment of UON for Emergency Obstetric services by comparing the private and public hospitals of Addis Ababa.

3.2 SPECIFIC OBJECTIVE

- To measure unmet obstetric needs (UON) among women attending hospitals for delivery in Addis Ababa.
- To measure the differences in provision of MOI for AMI and non AMI in hospitals of Addis Ababa.
- To conduct inventory of hospitals providing maternity services.

4. METHODOLOGY

4.1 STUDY DESIGN

A Cross-sectional study was conducted among all the Hospitals providing obstetric services in Addis Ababa. Comparison was made between private and public hospitals providing maternity services.

4.2 STUDY AREA

Addis Ababa is the capital of Ethiopia. The city is estimated to accommodate more than two million of the population. It is administratively divided into ten Sub cities. There are several health facilities in the city where most operate at clinic level. There are 9 Public and 17 private hospitals where the Police and the military have 1 each. Some of the hospitals are specialized to provide only MCH services while few others do not provide those services.

Figure 1. List of Hospitals based on ownership and activity 2006. (Source: AA Regional Health Bureau 1998 E.C.)

Ownership	General (No)	Specialized MCH (No)	Specialized Other (No)	Total
Public	6	1	2	9
Police	1	-	-	1
Military	1	-	-	1
Private	13	4	-	17
Total	21	5	2	28

4.3 STUDY PERIOD

The study was conducted from July 17 to September 17, 2006 only among 19 hospitals. Among the 28 hospitals in the city 1 public and 1 private namely Tikur Anbessa Hospital and Muyung Sung (Ethio-Korea) Hospitals refused to participate in the study. 2 Public and 4 Private hospitals didn't have obstetric services.

4.4 POPULATION

4.4.1 TARGET POPULATION

All pregnant women delivering in the hospitals of Addis Ababa

4.4.2 STUDY POPULATION

All mothers who have AMI and all mothers who have received MOI in Hospitals during July 17-September 17, 2006 in private and public hospitals.

4.5. SAMPLE SIZE

The number of expected births in Addis Ababa is 63,674 in a year. In the two months period the number of expected births is 10,612. The Institutional Delivery rate is 78.5% giving 8,330 births assisted in health institution. (DHS 2005) Assuming that 15% of the births would need MOI; the number of EB in hospitals of Addis Ababa requiring obstetric intervention will be 1,250. (WHO & UNICEF, Oct.1993 Geneva and AMDD: Niger, Rwanda and Tanzania 2003) According to studies on UON conducted in ten countries; the average deficit of MOI for AMI per 100 expected births is 22%. (UON network report 2001). Private and public hospitals were comparison groups; the proportion of MOI for AMI in the exposed group (private hospitals) was assumed to be

82.35% while the unexposed group (public hospitals) was 72%. A 95% CI, power of 80% were considered. The EPI info displayed the following options of sample size:

CI	Power	Ratio Public: Private	Sample size		Total
			Public	Private	
95%	80%	1:1	201	201	402
95%	80%	4:1	520	130	650
95%	80%	3:1	414	138	552
95%	80%	2:1	308	154	462
95%	80%	1:2	148	295	443
95%	80%	1:3	129	386	517
95%	80%	1:4	120	480	600

4.6 SAMPLING

The selection was done consecutively. There was no expected seasonality in the outcome under study. The data collection has included all who arrived during day time and night time. All mothers who got emergency and elective procedures were included. The inclusion criteria based on the list of diagnoses as recorded by physicians were:

1. Any mother with AMI
2. Any mother who received MOI

4.7 DATA COLLECTION

The information was gathered from hospital records. These were theatre registries, delivery books/ obstetric records and other relevant documents. A structured format was prepared to gather information on the mothers as mentioned above and information on the hospitals in a form of inventory.

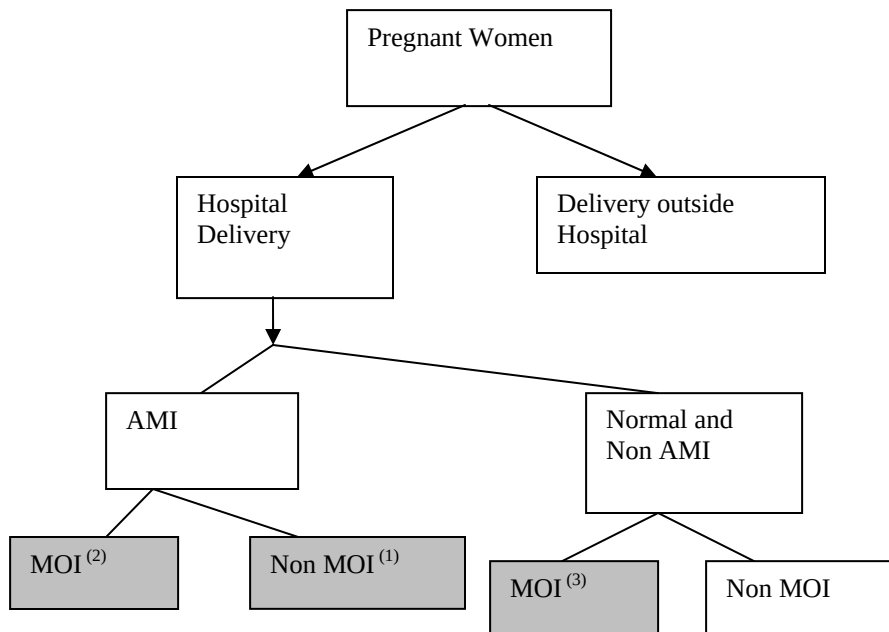


Figure 2. Flow chart showing the study subjects in the study. (The Shaded were included in the study and the numbers indicate the specific objectives)

Data collectors were midwives working in the labor wards of the hospitals. They were preferred because of their orientation on the technical terms stated in the formats and the fact that they read the registries better as they handle most of the records in their Units. They were trained for one day. The training focused on the inclusion criteria of study subjects, filling the format, getting clarification on the records whenever important information were missing from the records. The formats then were piloted in one private and one public hospital where the clarity and appropriateness were tested and modified accordingly. On the 17th of July the formats were distributed simultaneously to all hospitals and the data collection continued for 2 months (17th of September).

4.8 OPERATIONAL DEFINITIONS

1. **Abruptio Placenta:** Premature detachment of the placenta that results in blood clot behind the placenta.

2. **Absolute Maternal Indications:** Indications arising from pregnant mothers that necessitate major obstetric interventions to salvage the mothers lives.
3. **Comprehensive obstetric care:** emergency obstetric care plus performance of surgery (C-section...) and performance of blood transfusion.
4. **Destructive Delivery:** A method of delivery done on a dead fetus. When the approach is through the skull it is called *Craniotomy*, and when the approach is through the viscera it is called *Embryotomy*.
5. **Eclampsia:** Loss of consciousness and convulsion in an otherwise healthy pregnant woman with elevated blood pressure, body swelling and protein in urine.
6. **Ectopic pregnancy:** Conception outside the uterus.
7. **Emergency basic obstetric care (EmOC):** comprises of services like administration of parenteral antibiotics, parenteral oxytocic drugs, parenteral anticonvulsants for pregnancy induced hypertension, removal of retained products, performance of manual removal of placenta, assisted vaginal delivery.
8. **Essential obstetric services:** clean and safe delivery with clean umbilical cord care.
9. **Parity:** number of deliveries a woman underwent.
10. **Placenta Praevia:** A placenta implanted near the outlet of the uterus, so that at the time of delivery the placenta precedes the baby.
11. **Preeclampsia:** A condition in pregnancy characterized by abrupt hypertension, large amounts of the Protein in the urine and swelling of the hands, feet, and face.

12. **Public Hospital:** Hospitals owned by the government and run through revenue from tax payment. Here Military and Police hospitals are included

13. **Symphysiotomy:** A procedure done to avoid C-section during an obstructed labour by widening the pelvic diameter through dissection of the symphysis pubis.

4.9 DATA ANALYSIS

The collected data were cleaned, coded and fed to Statistical package for social sciences (SPSS) version 11.0. The data were cleaned again for inconsistencies and missing values. After categorizing and defining variables descriptive analyses, comparison of means, comparison of proportions and OR were calculated. Significances were established within 95% confidence limits. Based on the findings, the results are presented in text, tables and graphs.

The calculation of the UON used the formula “ $UON = EB \times RR - MOI/AMI$ ”

EB= number of expected births

RR=Reference ratio (derived from maternal mortality ratios for Addis Ababa)

MOI/AMI= number of major obstetric interventions done for absolute maternal indications

4.10 DATA QUALITY

There was a two weekly supervision to the sites during data collection. The supervisors collected the filled formats and checked them for completeness, consistency and clarity. The validity of the information gathered was ensured by random cross-checking of the already filled formats with the original documents. 20% of the filled formats were cross-checked. Incomplete formats were identified and the data collectors were asked to refill them. Data collectors were blinded to the study question where the hypotheses were

hidden throughout the data collection period. This was done to avoid information bias. Double entry of data was done to ensure data quality.

4.11 ETHICAL CONSIDERATION

4.11.1 INFORMED CONSENT

In this study human subjects were not interviewed rather records were reviewed. The study participants namely selected hospitals were free to enrol in the study and withdraw from it. The consent form is attached as annex at the end.

4.11.2 PRIVACY AND CONFIDENTIALITY

The research used hospital records which had individual addresses and names. But these were not taken as part of the study. All data manipulations were done anonymously. Subjects involved in the data collection, entry or analysis were under close supervision by the researcher. The data collected were not used other than the purpose of the study which are specified on the objectives.

4.11.3 BALANCING HARMS AND BENEFITS

The study is did not bring direct harm on individuals or groups. The main benefit of the research was its information on the existing condition of optimal delivery of obstetric services that identified areas with deficits and those to be improved. Therefore, the preliminary results of the study will be presented for relevant stake holders in the Administrative region and a copy of the final thesis will be sent to the concerned bodies in the region. There was no problem that arose that made the researcher seek help from the DCH and local authorities.

5. RESULTS

GENERAL DESCRIPTION

The data were obtained from only 19 hospitals giving a total number of mothers with MOI and AMI were 625. The ratio of Public to private was 354: 271 giving 1.3:1

The private and public hospital composition was 13 and 6 respectively, where 354 (56.6%) were gathered from public hospitals (Table 1). The mean age of the mothers was 28.8 and 27.8 years for public and private hospitals respectively. When comparison of two means was done assuming equal variance, the difference between the two means of age was statistically significant ($p=0.014$). Majority were married 582(93.5%), educated above 6th grade 489 (78.2%), primipara 229 (37.1%) and attended Antenatal care 553 (88.5%). (Table 2) Many of the women 606 (96.9%) delivered in the particular institution their data were obtained from while 11(1.7%) delivered at home. The timing of admission, 399 (64%) were during the day while 225 (36%) were during the night. Among the mothers who had specific illness and risk at the present pregnancy 255(40.8%), majority had anaemia during the present pregnancy 112 (43.9%) followed by Preclampsia 74(29%) and multiple pregnancy 25 (9.8%). (Table 3)

A total of 666 MOI were conducted and Caesarean section took the largest share 531(80.5%). The C/S rate was 5.3%. The number of women with AMI was 367 where majority had Obstructed Labour 145(39.5%) followed by malpresentation 67 (18.3%), Haemorrhage antepartum and postpartum combined 44 (12%) and failed induction 36(9.8%). The number of MOI done without AMI was 354 where majority were done for

previous C/S 143 (40.4%) and foetal distress 127(35.9%). The results of the new born showed that 538(92.4%) were born alive and discharged alive, 34 (5.8%) were still born and 10 (1.8%) were born alive but died within 24 hours. Some of the mothers 39(5.4%) had complication after delivery among whom 21 (53.8%) had sepsis followed by 14 (35.9%) Haemorrhage. There were 4 maternal deaths recorded and all occurred after intervention and in public hospitals. The Case fatality rate was 0.64%. The causes incriminated were sepsis and haemorrhage. The average hospital stay in days was 3.9 and 7.1 for private and public respectively while the maximum stay was 26 recorded in a public hospital. The difference between the two averages of hospital stay was found to be statistically significant ($p=0.00$).

Table 1 Distribution of hospitals that participated in the study and the number they contributed, Addis Ababa, 2006

Hospital name	Ownership	Number
Armed Forces General Hospital	Public	13
Gandhi Memorial Hospital	Public	73
Saint Paul General Hospital	Public	101
Yekatit General Hospital	Public	50
Zewditu Memorial Hospital	Public	110
Federal Police General Hospital	Public	7
Addis Hiwot General Hospital	Private	6
Asegedech MCH	Private	16
Bethzatha General Hospital	Private	20
Betsegah MCH	Private	61
Bethel Hospital	Private	11
BGM MCH	Private	34
Brass MCH	Private	50
Dinberwa MCH	Private	50
Ethiotebib Hospital	Private	5
Hayat General Hospital	Private	7
National Hospital	Private	3
St.Gabriel General Hospital	Private	4
Tibebu General Hospital	Private	4
Total		625

Table 2. Distribution of the study Population in the hospitals of Addis Ababa, 2006

Variables	Private		Public		Total	
<i>Age (years)</i>	Frequency	Percent	Frequency	Percent	Frequency	Percent
15-19	5	1.8	14	3.9	19	3.0
20-24	46	16.9	79	22.3	125	20.0
25-29	108	39.8	129	36.4	237	37.9
30-34	66	24.4	82	23.1	148	23.7
35-39	41	15.1	45	12.7	86	13.8
40-44	4	1.6	4	1.1	8	1.3
45-49	1	.4	1	.5	2	.3
Total	271	100	354	100	625	100
<i>Marital status</i>						
Single	13	4.7	30	8.5	43	6.5
Married	258	95.3	324	91.5	582	93.5
Total	271	100	354	100	625	100
<i>Education</i>						
None	1	.1	70	19.8	71	11.4
<6 grade	5	1.9	60	16.9	65	10.4
6-12	98	36.3	172	48.6	270	43.2
12+	167	61.7	52	14.7	219	35.0
Total	271	100	354	100	625	100
<i>Parity</i>						
Primi	140	51.7	141	39.8	281	44.9
M ulti	131	48.3	199	56.2	330	52.8
Grand multi	0	0	13	3.7	13	2.1
Greatgrandmulti	0	0	1	.3	1	.2
Total	271	100	354	100	625	100
<i>ANC</i>						
Yes	247	91.1	306	86.4	553	88.5
No	24	8.9	48	13.6	72	11.5
Total	271	100	354	100	625	100

Table 3. Distribution of conditions of the present pregnancy among mothers in hospitals of Addis Ababa, 2006

Present Obstetric conditions	Frequency	Percent
None	370	59.2
Anemia	112	17.9
Preclampsia	74	11.8
Multiple pregnancy	25	4.0
HIV	15	2.4
Diabetes	8	1.3
Post term	8	1.3
PROM	7	1.1
Breech	6	1.0
Total	625	100

QUANTIFICATION OF UON

The UON is based on the following concept:

Number of Unmet Need = Number of Problems Expected - Number of Problems

(UN) in a population adequately dealt with

The calculation of the UON used the formula “ $UON = EB*RR - MOI/AMI$ ”

EB*RR represents the MOI/AMI expected

- EB =10,612 (Expected birth; this is taken from the estimate for Addis Ababa obtained from health indicator of Ethiopia 1996 E.C to be 63,674 for two months assuming no seasonality it will be 10,612)
- In the general circumstances 15% of births get complicated or require MOI. The EB that needed MOI therefore becomes 1591.8
- The RR (reference ratio) is estimated to be 0.79% (it is based on the average of a community based and facility based study of MMR in Addis Ababa)
- MOI/AMI= 311 (Major Obstetric Intervention actually performed for Absolute Maternal Indication in the same population in the same period).
- Since Tikur Anbessa and Muyung Sung hospitals refused to participate into the study; the result obtained will be slightly lower

The UON is therefore $1591*0.79 - 311 = 945.89$

Nearly 946 births which needed major obstetric intervention in Addis Ababa during the period of data collection (July17-September 17, 2006) did not receive it. In other words the **deficit of MOI/AMI per 100 births is 9.46.**

INVENTORY OF HOSPITALS

The inventory of the different resources in the hospitals were described and compared by ownership. The average number of vacuums, forceps and ambulances in the public hospitals were similar to that of the private ranging from 1 to 3. The average number of beds in the public hospitals was much higher (254) than the private beds (33.2). The ratio of the human resource for health in public hospitals per amount of service provided is much lower than the private hospitals. (Figure 3 and 4) The activity of hospitals by ownership indicated that there were no cases of uterine rupture and maternal death in the private hospitals where as the average numbers of uterine ruptures and maternal deaths in the public hospitals were 171.5 and 7.5 respectively. The proportion of C/S per deliveries in private hospitals was in average 40.9% while in public hospitals it was 30.4%

(Table 4.1, 4.2, 4.3)

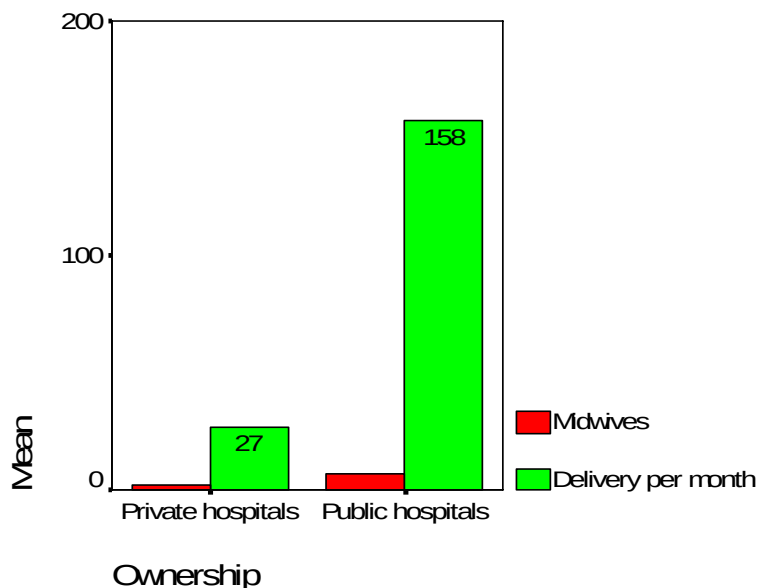


Figure 3 Distribution of average deliveries per month and number of midwives by ownership of hospitals, Addis Ababa 2006

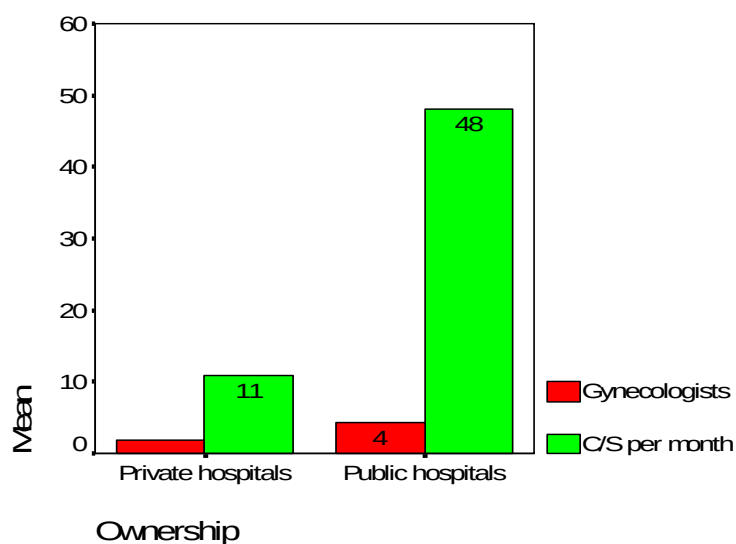


Figure 4 Distribution of average number of C/S per month and gynecologists by ownership of the hospitals, Addis Ababa 2006

Table 4.1 Distribution of material resources in 19 hospitals of Addis Ababa, 2006

Hospital Name	Number of Maternity Beds	Number of total beds	Number of OR for obstetrics	Number of OR	Number of Vacuums	Number of Forceps	Number of Ambulances
AFGH	12	240	3	1	3	4	5
Addis Hiwot	5	38	1	0	1	1	1
Asegedech MCH	25	25	1	1	3	1	0
BGM	17	20	1	1	2	1	2
Brass	25	25	1	1	1	3	1
Betsegah	20	20	1	1	3	3	0
Bethel	10	48	2	1	2	3	3
Bethzatha	10	52	1	0	1	3	1
Dinberwa MCH	10	20	1	1	1	2	2
Ethiotebib	18	25	1	0	1	2	1
Gandhi MH	50	75	2	2	1	4	1
Hayat hospital	10	48	1	1	1	2	2
National Hospital	4	44	1	0	1	1	2
Federal Police	8	35	1	0	1	1	1
St. Gabriel	28	400	2	1	1	2	2
St. Paul	2	32	1	0	1	1	2
Tibebu	25	416	3	1	1	3	2
Yekatit	17	179	1	0	1	4	2
Zewditu MH	19	19	19	19	19	19	19
N							

Table 4.2 Distribution of Human resources in 19 hospitals of Addis Ababa, 2006

Hospital Name	Gynecologists	Surgeons	GPs	Midwives	Paramedical
AFGH	4	6	23	3	17
Addis hiwot hospital	1	1	2	1	0
Asegedech MCH	3	0	1	2	4
BGM	3	0	0	3	0
Brass	4	0	0	4	2
Betsegah	2	0	0	2	0
Bethel	2	0	12	3	0
Bethzatha	2	2	6	4	3
Dinberwa MCH	2	0	0	3	1
Ethiotebib	1	0	2	2	2
Gandhi MH	8	0	7	12	8
Hayat hospital	2	2	14	2	4
National Hospital	0	2	4	1	0
Federal Police	3	4	12	4	8
St. Gabriel	1	4	6	2	3
St. Paul	2	6	15	9	32
Tibebu	0	1	5	1	0
Yekatit	5	11	18	7	8
Zewditu MH	4	6	16	8	3
N	19	19	19	19	19

Table 4.3 Distribution of activities per year of 19 hospitals of Addis Ababa, 2006

Hospital Name	Maternity Admissions	Deliveries	Still births	Maternal Deaths	C/S deliveries	Uterine Rupture
AFGH	832	640	39	7	60	16
Addis Hiwot	153	147	0	0	48	0
Asegedech MCH	420	360	4	0	184	0
BGM	625	383	12	0	161	0
Brass	1268	1150	24	0	408	0
Betsegah	560	480	24	0	252	0
Bethel	158	137	2	0	45	0
Bethzatha	280	203	5	0	91	0
Dinberwa MCH	900	720	24	0	310	0
Ethiotebib	248	215	6	0	120	0
Gandhi MH	1903	2320	308	19	769	13
Hayat hospital	316	292	4	0	59	0
National Hospital	12	12	0	0	6	0
Federal Police	987	810	26	3	41	9
St. Gabriel	103	89	2	0	28	0
St. Paul	3000	2821	358	2	1039	524
Tibebu	36	36	0	0	12	0
Yekatit	1980	3200	293	8	921	463
Zewditu MH	1811	1545	205	6	620	4
N	19	19	19	19	19	19

The difference between the proportion of MOIs, AMIs and non AMIs were compared among the private and public hospitals and working shifts using “*test for difference of two proportions*”. The difference between the proportions of MOIs among the day and night working shifts was found to be statistically significant $P=0.0159$ with 95% CI between 0.03 and 0.53. The difference between proportions of non AMIs during day and night working hours was also statistically significant with $P=0.0314$ and 95% CI lying between 0.01 and 0.66). (Table 5)

Caesarean section as the most frequent MOI, Obstructed Labor as the most frequent AMI, Previous Caesarean and Fetal distress as representatives of non AMI were chosen to compare and study their variations with private/public ownership of the hospital, time of admission, parity, education and ANC attendance. The results showed that the odds of C/S in Private hospital 1.77 (1.09, 2.90), daytime admission 1.61 (1.01, 2.57) and ANC non attendants 2.45 (1.38, 4.67) were slightly higher than in public hospitals, night time admissions and ANC attendants respectively. The odds of Obstructed Labor (OL) was lower in private hospitals .58 (0.33, 0.89), ANC attendants 0.49 (0.28, 0.86) and with education 0.32 (0.18, 0.55) than the public hospitals, ANC non attendants and those with no education. OL was higher with statistical significance among the primiparous mothers 1.66 (1.11, 2.48) than the multipara mothers. Fetal distress as a non AMI was significantly higher among primipara mothers 3.41 (2.21, 5.28) than multipara mothers. (Table6)

Table 5 Distribution of MOI, AMI and non AMI and confidence interval of the difference of proportions by ownership and work shifts in the hospitals of Addis Ababa 2006

Variables	MOI			AMI			Non AMI		
	#	%	Comparison (proportion)	#	%	Comparison (proportion)	#	%	Comparison (proportion)
<i>Ownership</i>									
Public	388	58.3	P=0.3015 95% CI (-0.452,0.768)	228	62.1	P=0.0721 95% CI (-0.82, 0.56)	179	53.3	P=0.347 95% CI (-0.72, 0.40)
Private	278	41.7		139	37.9		157	46.7	
<i>Total</i>	666	100		367	100		336	100	
<i>Shift</i>									
Day	423	63.5	P=0.0159 95% CI (0.03, 0.53)	232	63.2	P=0.164 95% CI (-0.061, 0.58)	221	65.8	P=0.0314 95% CI (0.01, 0.66)
Night	243	36.5		135	36.8		115	34.2	
<i>Total</i>	666	100		367	100		336	100	

THEORETICAL MODEL

As the study identified there are several factors that directly or indirectly influence outcomes of obstetric needs and enhance or hinder the fulfillment of these needs in resource constrained countries where maternal health is at jeopardy. A theoretical model is therefore drawn by the investigators of this study to address the gaps and improving access to each level of health care delivery system. (Annex 10.1)

Table 6 Distribution of Odds Ratios (OR), Chi squares (X^2) and P values of the association of selected variables of MOI, AMI and non AMI with selected factors, Addis Ababa, 2006

	Exposure	OR (95% CI)	X^2	P value	n (E)	n (UE)
MOI (C/S)	Private hospital	1.77 (1.09, 2.90)*	5.37	0.020	241	290
	Day time admission	1.61 (1.01, 2.57)*	4.02	0.044	348	182
	Primipara	1.12 (0.70, 1.79)	0.16	0.692	241	290
	ANC	4.45 (2.50, 7.92)*	31.03	0.000	486	44
	Educated	2.54 (1.38, 4.67)*	9.68	0.001	480	51
AMI (OL)	Private hospital	0.58 (0.33, 0.89)*	6.54	0.010	45	90
	Day time admission	0.75 (0.50, 1.12)	1.91	0.167	79	56
	Primipara	1.66 (1.11, 2.48)*	6.26	0.012	74	61
	ANC	0.49 (0.28, 0.86)*	6.42	0.011	110	24
	Educated	0.32 (0.18, 0.55)*	18.82	0.000	105	30
Previous C/S	Private hospital	1.29 (0.87, 1.91)	34.52	0.212	69	74
	Daytime admission	1.25 (0.83, 1.90)	1.01	0.315	97	46
	ANC	1.53 (0.77, 3.99)	1.28	0.250	131	12
	Educated	1.71 (0.84, 3.55)	2.03	0.154	132	11
Fetal Distress	Private hospital	1.49 (0.99, 2.24)	3.58	0.05	65	62
	Daytime admission	0.84 (0.55, 1.27)	0.59	0.442	77	50
	Primipara	3.41 (2.21, 5.28)*	34.52	0.000	87	40
	ANC	3.03 (1.23, 7.97)*	6.20	0.013	121	6
	Educated	1.29 (0.65, 2.62)	0.36	0.546	132	11

(*) made to show statistical significance

6. DISCUSSION

This systematic analysis of the study showed results that require to be briefly discussed. The number of private hospitals was more than twice the number of public hospitals yet the coverage of public hospitals is higher. The difference between the mean ages of the subjects in public and private hospitals showed statistical significance ($p=0.014$) showing younger mothers go to private hospitals which probably be linked with quality perception. Majorities were educated above grade 6 and attended ANC which is similar to the DHS 2005 finding of ANC coverage in Addis Ababa. Many of the mothers got admitted during the day which allows them to get adequate service as the whole health team will be available in many instances. The majority of mothers with illness during the current pregnancy had anemia and Preclampsia. This is consistent with the findings of a study in rural Ethiopia. (Mesganaw Fantahun et al. *Ethiop.J.Health Dev.* 2000; 14(2): 155-160) The two disorders have been incriminated among the indirect and direct causes of maternal deaths globally. (Khalid S Khan, Daniel Wojdyla, Lale Say et al. March 28, 2006)

Among the MOI conducted Caesarean section took the largest share (80.5%) giving a C/S rate per 100 births expected 5.3% which is within the UN range of 5% to 15%. This is consistent with a study in West African countries (Burkina Faso. Document March 2001 and Mali, December 1998-2000) and Brazil (José M Belizán et al. *BMJ* 1999) It is worth to note that the increased rate of C/S is not directly proportional to the quality of care. The comparison of the difference of proportion of MOI during the day or night time of admissions was statistically significant at $P=0.0159$ showing an apparent increase during the day which is in line with the increased admission during the same period. The

commonest AMI in this study was Obstructed Labor accounting for 39.5% which is one of the five commonest causes of maternal death in the world. (WHO Geneva 1999; 10-22) Nearly half of the MOI were done for non AMI mainly for Previous C/S and foetal distress. The UON study done in Burkina also showed foetal distress to be the commonest non-AMI. (Burkina Faso. Document March 2001) The difference between the proportions of non AMI during day and night admissions was also statistically significant at $P=0.0314$ also may be due to the increased admission during the day. The outcomes of the new born stated the majority 92.4% to be alive until discharge while 5.8% were still born and the rest died within 24 hours. The death of a new born within 24 hours could result either from an intrauterine insult or low neonatal resuscitation capacity. It is beyond the scope of this study to go in depth for the exact cause. The mothers that suffered from complication after delivery accounted for 5.4% whereby majority of the causes were sepsis and haemorrhage. The causes incriminated for the maternal deaths were also these two problems. In a study that did a systematic analysis of causes of maternal deaths in different countries situated in Africa, Latin America and Asia found out that Haemorrhage was the commonest cause of death in all continents while deaths due to sepsis were commoner in Africa as compared to the rest of the world. (Khalid S Khan, Daniel Wojdyla, Lale Say et al. March 28, 2006) The case fatality rate was 0.64% which is less than the upper limit set by the UN i.e. 1%. All of the maternal deaths occurred in public hospitals in the context of the study meaning government owned hospitals. The possible explanation being the case load of government hospitals and the fact that the poor, the possibly complicated mothers access the service. The average hospital stay in public hospitals was much higher than the private hospitals. The

maximum stay 26 day was also recorded in public hospitals. The difference between the two averages was also statistically significant at $p=0.000$. Because public hospitals are run by government funds and do not depend on the profit that the hospital makes; health professionals are reluctant to discharge patients on time. The public also does not pay much for the service public hospitals provide resulting in longer stay in the hospital. Durations of hospital stay have been linked to the quality of care in different studies, where longer stay meant poor quality of care.

The deficit of MOI/AMI was 9.46% which is lower than the average of ten countries; according to which is 22%. (UON network report 2001). In the case of Burkina Faso the urban areas range of deficit was 0-4% where the figure in Addis is much higher. (Burkina Faso. Document March 2001) A study done in Morocco set the value between 1% and 2%. That study emphasized on setting appropriate reference ratio which is obtained from a recent data or a pilot project. (A.Belghiti, V.De Brouwere, G. Kegels & W. Van Leberghe, 1998) The figure could have been moderate had the two hospitals providing major service and the all of the higher clinics providing MOIs in the city participated. But a moderate figure would not be expected to be halved. The deficit in some instances is termed as deprivation. This meant that 9.46% of mothers who were eligible to MOI were deprived of the intervention. Such remarks are made to give due emphasis on the right to access health services.

The inventory of the hospitals was analyzed using the average of the resources grouped into private and public. The proportion of Gynecology and Obstetric beds to the total number beds, the number of equipments such as vacuum, forceps and the number of ambulances were similar in both private and public hospitals. The ratio of obstetricians to

the obstetric beds was also comparable. As the annual activity of the hospitals indicated public hospitals cover larger group of the population where similarity in ratio of professionals and equipments would not been expected. The annual activity of the hospital clearly indicated that uterine rupture and maternal deaths occurred in only public hospitals. Where as the proportion of C/S per delivery for private hospitals was 10% higher than the public hospitals showing a tendency to opt to C/S mode of delivery in private hospitals. A study in Brazil showed increased C/S rate among the educated and the economically strong. (José M Belizán et al. *BMJ* 1999)

The odds of C/S in private hospitals and daytime admission were significantly higher than public hospitals and night time admission. The odds of OL among private hospitals, those who attended ANC and with any level of education were significantly lower than the public hospitals, those who didn't attend ANC and with no education. This is similar to the findings of a study in Tigray where mothers with OL were with low economic status and no education. (A Gessesew, M Mesfin. *Ethiop.J.Health Dev.* 2003;17(3):175-180)

The main imitations of the study are

- The absence of complete and recent demographic data that rendered the estimation of ED and RR to rely on projections and derivations.
- The study was conducted in hospitals where majority of the deliveries (home and deliveries in other health facilities) were excluded.
- The data relied on the diagnoses whose accuracy was assumed on records
- Two hospitals refused to participate in the study

The major strengths of the study are

- It has quantified the Unmet Obstetric Needs
- It has identified the limitation in human resource for obstetric services marked in public hospitals
- It has shown the existence of inefficiency in public hospitals

7. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

- The proportions of pregnant mothers with anaemia and Preclampsia are high
- Long average hospital stay at the public hospitals despite the increased activity of the hospital
- The ratio of human resource to the activity of hospital was lower in public hospitals. Majority of MOI are C/S which comprise large proportion of deliveries particularly in private hospitals.
- The UON in Addis Ababa was higher than urban figures of other countries that underwent the UON exercise which showed that maternal health problems are not only in rural areas
- The high levels of maternal and perinatal mortality in urban areas, in spite of the fact that these areas have hospitals equipped with adequate human and material resources.
- If purely preventive measures (such as the identification of risk factors) are out of favor, the move towards managing maternal health through a hospital network still seems in its infancy.
- Finally, this study should not, as some of the participants feared, remain one more theoretical study, but should pave a way for practical and effective decisions to be taken which will allow the country to move out of the poverty of the maternal health services endeavor.

RECOMMENDATIONS

- To make the best use of this study it is essential that structured feedback at the regional and national level is carried out promptly.
- There needs to be a renewed commitment of the MOH and the RHBs towards the cause by mobilizing resources, convincing development partners for technical assistance and the health care providers to give Maternal and Neonatal Health similar priority as highly funded programs such as HIV.
- The shortage of human and material resources in public hospitals should be given due attention as the workload of these facilities is enormous
- The long hospital stay in public hospitals requires immediate consideration given the existing scarcity of resources
- A study on where exactly the gap exists in meeting obstetric needs shall be conducted

9. REFERENCES

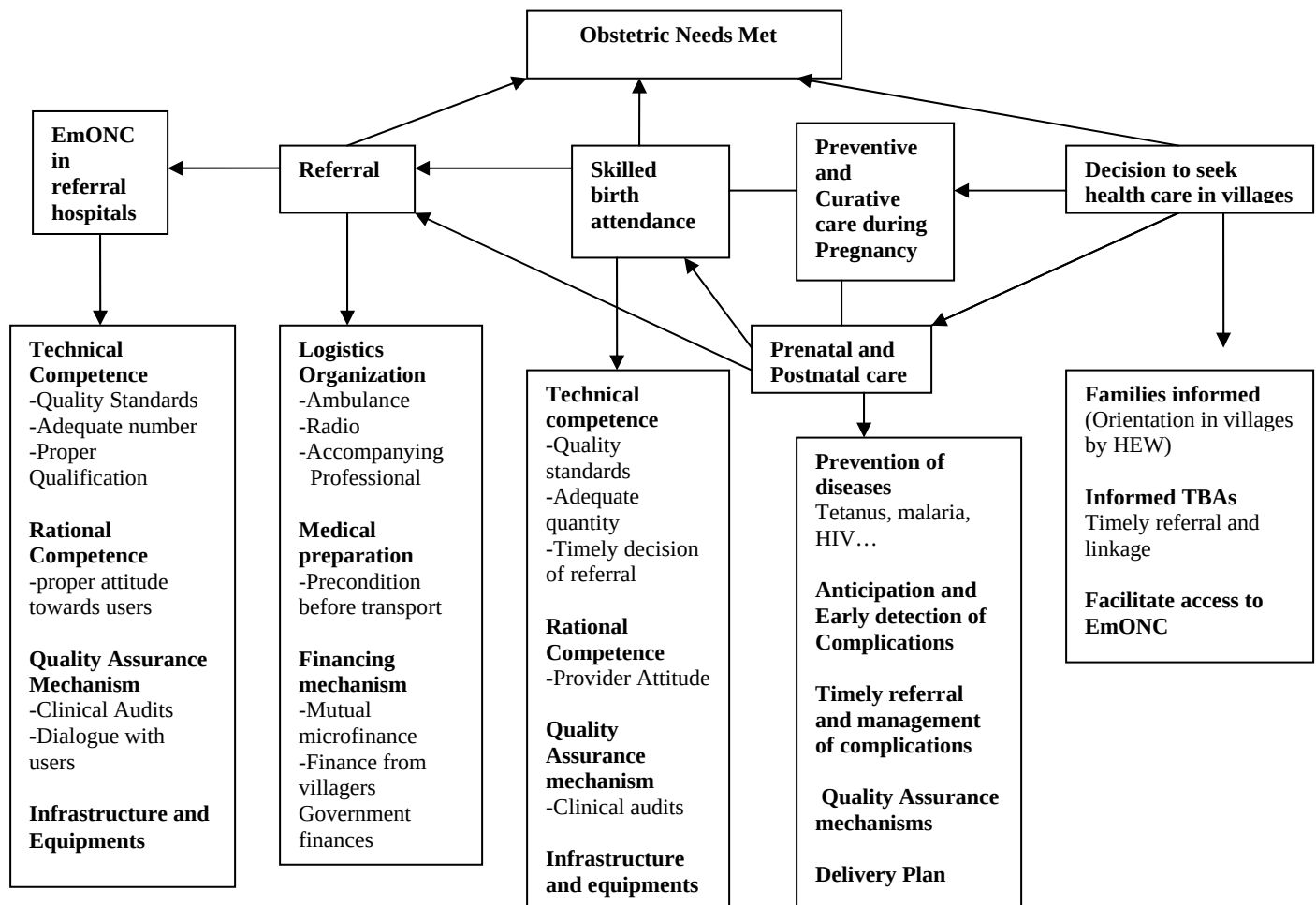
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10. ANNEX

10.1 THEORETICAL MODEL

(FOR A STRATEGY IN THE HEALTH CARE SYSTEM TO RESPOND TO OBSTETRIC NEEDS)



10.2 INFORMED CONSENT

We have selected this hospital for the study of Unmet Obstetric Needs in Emergency Obstetric services of Addis Ababa, 2006. The study will be conducted from July-September 2006. We would therefore like to collect the data in the Obstetric Unit of the Hospital. The purpose of the study is to develop a Masters thesis as a requirement for the degree of Master of Public health in the Department of Community Health, Medical Faculty of Addis Ababa University. The study is expected to come up with findings that enrich existing knowledge and informs policy on the Obstetric services provision. We assure that the data collected will be used only for Assessment of Obstetric Needs. The summary of the results of the study will be reported to the Hospitals who participated in the study.

The Hospital is free to enroll or withdraw from the study. We therefore request your consent and full cooperation throughout the data collection period.

Hospital Representative

Name.....

Signature.....

Researchers

Mesrak Nadew (Dr)

Yemane Berhane (Professor)

10.3 QUESTIONNAIRE

A Format for Data Collection for a survey on Assessment of Unmet Obstetric Needs in Emergency Obstetric Services, Addis Ababa 2006. Department of Community Health. Medical Faculty of Addis Ababa University.

Format One

Maternal Information

Serial No	Questions	Code
1	Name of Hospital:	
2	Identification of Parturient Admission Number:	
3	Date of admission: dd/mm/yy	
4	Timing of admission: 1. Day 2. Night	
5	Address of Parturient: Town or Sub city(Addis Ababa)	
6	Address of Hospital: Sub city	
7	Age of Mother (years)	
8	Education level 1. None 2. < 6 grade 3. 6-12 grade 4. 12 +	
9	Marital status 1. Single 2. Married	
10	Gravidity(#)	
11	Parity (#)	
12	ANC Follow-up 1. Yes 2. No	
12	Place of delivery 1.Home 2. This Institution 3. Other Institution 4. Other	
13	Present Obstetric History 1. Anemia 1. Yes 2. No 2. Preclampsia 1. Yes 2. No	

	3. Diabetes 1. Yes 2. No 4. Heart disease 1. Yes 2. No 5. Multiple gestation 1. Yes 2. No 6. Malaria 1. Yes 2. No 7. HIV 1. Yes 2. No 8. Other (Specify) 1. Yes 2. No	
14	Major Obstetric Intervention 1. C/S 1. Yes 2. No 2. Hysterectomy 1. Yes 2. No 3. Laparotomy for ectopic 1. Yes 2. No 4. Destructive delivery 1. Yes 2. No 5. Version and Extraction 1. Yes 2. No 6. Symphysiotomy 1. Yes 2. No 7. Blood transfusion 1. Yes 2. No 8. Manual extraction of Placenta 1. Yes 2. No 9. Curettage 1. Yes 2. No	
15	Indication 1. OL 1. Yes 2. No 2. APH for Placenta Previa 1. Yes 2. No 3. APH for Abruption 1. Yes 2. No 4. PPH 1. Yes 2. No 5. Preclampsia 1. Yes 2. No 6. Eclampsia 1. Yes 2. No 7. Antecedent C/S 1. Yes 2. No 8. Puerperal Infection 1. Yes 2. No 9. Foetal distress 1. Yes 2. No 10. Other 1. Yes 2. No 11. Not recorded 1. Yes 2. No	
16	Results for the newborn 1. Born alive and discharged alive 2. Born alive and died within 24 hours 3. Still Born 4. Not recorded	
17	Condition of mother at discharge 1. Recovered 2. Complicated but alive 3. Referred to other health formation 4. Died (go to Questions 20,21)	
18	Type of Immediate (5 days) complication	
18.1	Haemorrhage	
18.2	Sepsis	

18.3	Wound Dehiscence	
18.4	Perforation	
18.5	Anaesthesia Complication	
18.6	Other (Specify)	
19	When did the mother die? 1. Before intervention 2. During Intervention 3. After intervention 4. Not recorded	
20	Cause of maternal death 1. Pregnancy induced hypertension 2. Haemorrhage 3. Infection 4. Other 5. Unknown	
21	Date of discharge: dd/mm/yy	
22	Form completed by	
23	Date of completion of Questionnaire: dd/mm/yy	

A Format for Data Collection for a survey on Assessment of Unmet Obstetric Needs in Emergency Obstetric Services, Addis Ababa 2006. Department of Community Health. Medical Faculty of Addis Ababa University.

Format Two

Hospital information

Serial No	Questions	Code
1	Identification of Hospital Sub-city	
2	Type of Hospital 1. Public 2. Military 3. Private	
3	Material resources	
3.1	# maternity beds	
3.2	# gynecology and obstetric beds	
3.3	Total # of beds	
3.4	# operating theatres	
3.5	# operating theatres reserved for obstetrics	
3.6	# functional vacuum extractors (electronic)	
3.7	# functional forceps	
3.8	# Ambulances	
4	Human Resource	
4.1	Medical	
4.1.1	# gynecologists	
4.1.2	# surgeons	
4.1.3	# general practitioner	
4.2	Paramedical	
4.2.1	# Midwives with state diploma	
4.2.2	# Midwives with certificate	
4.2.3	# other paramedical	
5	Activity of hospital per year	
5.1	# Admission to maternity unit	
5.2	Total # deliveries	
5.3	Total # still births	
5.4	Total # maternal deaths	
5.5	Total # C/S	
5.6	Total # uterine rupture	
6	Form completed by	
7	Date of completion	

DECLARATION

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or any other University and all the source materials for this thesis have been duly acknowledged.

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Place: Addis Ababa University

Date of submission: 06/7/2007

**This thesis has been submitted for examination with my approval as University
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