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COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCE

DEPARTMENT OF STATISTICS

RESEARCH ON: STATISTICAL ANALYSIS OF SATISFACTION OF MOTHERS DELIVERY AT ATAT HOSPITAL

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ACRONYMs

ANC	Antenatal Care
EDHS	Ethiopian Demographic and Health survey
FMOH	Federal Ministry of Health
IMR	Infant Mortality Rate
LMICs	Low and Middle Income Countries
MHCS	Maternal Health Care Service
MMR	Maternal Mortality Rate
ML	Maximum Likelihood
PNC	Postnatal Care
RCOG	Royal College of Obstetricians and Gynecologists
SBA	Skilled Birth Attendance
SPSS	Statistical Package for Social Sciences
SNNPR	Southern Nations, Nationalities and People's Region
WHO	World Health Organization
SVD	Spontaneous Vaginal Delivery

ABSTRACT

Maternal satisfaction is a means of evaluating quality of maternal health care given in health facilities. Maternal health is important not only to the individual women requiring maternity care, but to her newborn and immediate family as well as national and global development. The WHO recommends that women's satisfaction be assessed to improve the quality and effectiveness of health care. The general objective of this study to assess the factors affecting the maternal satisfaction with delivery services in Atat Hospital. Data was collected by using well-designed questionnaires from a sample of 120 respondents were selected by using systematic sampling technique. The data were analyzed by statistical software packages (SPSS). To analyze the data, descriptive statistics, chi-square test of associations and binary logistic regression were used. The descriptive result revealed that about 72.5% of the mothers were satisfied with delivery services compared to (27.5%) who were not satisfied. Educational Level, gender of delivery attendant, waiting time, Status of pregnancy and general hospital cleanliness has significant association with maternal satisfaction with delivery services at 5% level of significance. From the result of study the variable educational status of women, gender of delivery attendant, Status of pregnancy, waiting time and general hospital cleanliness had statistically significant effect on maternal satisfaction with delivery services. Therefore, the hospital administration should improve the cleanness hospital compound. Mothers should accept' preferences of the gender of the personnel who attends their delivery.

. ***Key word***:-*Chi-square, maternal satisfaction , Systematic Sampling, Logistic Regression.*

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CHAPTER ONE

1 INTRODUCTION

1.1 Background of the study

Maternal satisfaction is a means of evaluating quality of maternal health care given in health facilities. Maternal health is important not only to the individual women requiring maternity care, but to her newborn and immediate family as well as national and global development. The WHO recommends that women's satisfaction be assessed to improve the quality and effectiveness of health care. Many stillbirths and newborn deaths could be averted if more women could receive quality maternal care. Good quality maternal health services are those which are readily accessible, safe, effective, and acceptable to potential users and are staffed by technical competent, respectful and none judgmental people who provide rapid comprehensive care and Linkage to other reproductive health services (Erin S et al., 2006).

Globally, about 800 women die from pregnancy or labor related complications around the world every day. About 99% of these deaths are from developing countries, especially from Sub-Saharan Africa and southern Asia. According, to the World Health Organization , one out of six women in developing countries die from pregnancy-related cause compared to one out of 30,000 in the advanced countries(WHO ,2014).

Studies done in Dhaka, Bangladesh, and South Australia showed that the level of maternal satisfaction with delivery care was 92.3% and 86.1%, respectively (Hasan et al., 2007; Australian Government, 2007).

Two hundred and eighty-seven thousand women died during pregnancy and childbirth in 2010; more than half of these deaths occur in Africa. The ratio of maternal mortality in the Sub-Saharan Africa region is one of the highest, reaching 686 per 100,000 live births (Bongaarts, 2016). However, the level of satisfaction among laboring mothers in African countries is not enough; only 51.9% and 56% of mothers were satisfied with delivery services in South Africa and Kenya, respectively (Lumadi and Buch, 2011; Eva and Michael, 2009).

The case of Ethiopia has not significant difference with most Sub- Saharan African countries. Despite encouraging efforts have been made in minimizing maternal mortality rate, still Ethiopia has registering high burden of maternal mortality rate. In Ethiopia, maternal mortality rate is among the highest in the world. The maternal mortality ratio was 401deaths per 100,000 live births in 2017. In other words, for every 1,000 live births, about seven women (4.01) died during pregnancy, during childbirth, or within two months of childbirth (ECSA and ICF International, 2017). The lifetime risk of maternal death (0.036) indicates that about 4 percent of women died during pregnancy, during childbirth, or within two months of childbirth . As a matter of fact, the recent 2019 reports of global organizations(WHO, UNICEF, UNFPA and World Bank ,2019) shows that maternal mortality rate reaches to 199 death per 100,000 live birth which is actually still far from the intended target(WHO, 2019).

Although Ethiopia is one of the Ten low- and middle-income "fast-track" countries LMICs who have seen significant progress, it continues to face several challenges, particularly around maternal mortality (WHO 2014) .The FMOH aims to ensure that health services at all levels are being provided according to quality standards that satisfies the community's health care needs through the delivery of relevant, safe and optimum quality health services in an integrated and user-friendly manner(FMOH 2010_2015). Satisfaction from services is considered as a reliable index for quality of services(J Res Health 2011) .Satisfaction Isa statement reporting quality of service and relationship between caregiver and patient, measured by comparing quality services and patient's expectations(Int J Health Care Quality Assur2011). Women's satisfaction from maternal services and their qualities can be considered as an outstanding factor affecting mental health of family and society. And also it is considered as an index for quality and justice in women and infants' health by health care authorities and health policy makers (Am J ObstetGynecol ,2002).

In Amhara region shown mothers who were satisfied with delivery care in this study was 61.9% (Azmeraw T,et,2011) and overall satisfaction of mothers' on delivery service was found to 81.7% in DebreMarkos (Kurabachew B et al, 2015). Similar study done in Jimma revealed that supportiveness of the provider and cleanliness of delivery room pays the major role on the satisfaction level (Biniyam H et al, 2017). A large percentage of maternal and neonatal deaths take place during the first 48 hours after delivery. Access to proper medical attention and

hygienic condition during delivery can reduce the risk of complications and infections that may lead to death or serious illness for the mother, baby, or both.

The study area of the region (SNNPR) is one of the most backward regions on the satisfaction of mothers with delivery service. According to Ethiopian demographic and health survey (EDHS) report of the 2011 indicates that the ANC, SBA, Health facility delivery and PNC satisfaction was 27.3% ,6.1%, 6.2% and 5.5% respectively(ECSA and ICF International, 2012). These numbers reveal that the study area of the region is highly far from national and international figures of MHCS progress. However, the studies done in wolaita zone and Gamo Gofa Zone showed that the level of maternal satisfaction with delivery care was 82.9% and 79.1% respectively(Abrham A et al ,2018; Rahel T et al,2017).

Maternal satisfaction was determined by Care givers attitude from patient's perspective and it contributes to mothers' satisfaction with delivery services. Physical, interpersonal, and technical aspects of care influence client satisfaction with delivery care services. Healthcare providers also addresses problems related to physical, technical, and intrapersonal aspects of care and develop friendly and courteous relationships with clients and cleaner environments to increase satisfaction. There is limited information on delivery service and mothers' satisfaction on delivery care services, especially South Ethiopia. Therefore, this study was conducted to know the level of mothers' satisfaction and associated factors with delivery services Atat Hospital in Gurage Zone, SNNPR, and Ethiopia.

1.2 Statement of the problem

The WHO African Region bore the highest burden with almost two thirds of global maternal deaths occurring in the region. One of the members of this region is Ethiopia then maternal and neonatal deaths occurring in large scale. A large percentage of maternal and neonatal deaths occur during the first 48 hours after delivery and this the first two days after delivery are essential for examining complications occurring from the delivery (Ewunetu M et al, 2014).

Many maternal and neonatal deaths could be avoided with simple, cost-effective and high-impact interventions that address the needs of women and newborns across the continuum of care, with an emphasis on care around the time of birth. However, analysis shows that too many newborns and mothers miss out on these key interventions. In maternity services, patient satisfaction has been widely recognized as one of the critical indicators of the quality and the efficiency of the health care systems. Satisfaction strongly increases when care is provided in accordance with the clinical standard procedures. Users, who perceive the quality of care in a health center to be good, are more likely to visit it again, thereby increasing demand for the service (Atiya, K. Mohammed, 2016).

Satisfaction is an obscure which involves collection of factors such as the service provider's knowledge, medical and communications skill, personal attributes, accessibility, convenience of location and surrounding area, resource availability, stability of care, effectiveness and efficiency, and personal control during child birth is an important factor related to the mothers' satisfaction with the child birth practice (Ewunetu M et al, 2014).

Thus, the purpose of this study was to examined the maternal satisfaction in Atat Hospital, so that this study was be conducted to assess such problem that faced during the treatment; and also at the end of this study the following questions was be expected to be answered.

1. What is the level of maternal satisfaction with delivery services at Atat Hospital?
2. What are factors that affecting maternal satisfaction with the delivery services at Atat Hospital?

1.3 Objectives of the Study

1.3.1 General Objectives

The general objective of this study to assess the factors affecting the maternal satisfaction with delivery services in Atat Hospital.

1.3.2 Specific Objectives

The specific objectives are to:

- To determine the level of maternal satisfaction with the delivery services.
- To see the association between socio-demographic characteristics, process factors, structural factors, and obstetric history with satisfaction of delivery services.
- To identify factors affecting maternal satisfaction with the delivery services.

1.4 Significance of Study

The important of this study was provided relevant and accurate information to the society and provides scientific evidence regarding mothers' satisfaction with delivery care at Atat Hospital as performance measurement and also as consideration of satisfaction by health policy makers might be necessary for improving the quality of mother and newborn care, and reducing MMR and IMR.

Recommendations and interventions was be developing base on findings of the study to improve overall quality of care given in the maternal and newborn care services. In addition, this study will be helps to a baseline data for future studies in the context of maternal satisfaction in health delivery system.

1.5 Scope of study

This study was be conduct on the statistical analysis of maternal satisfaction on the treatment of mothers and quality of services in Atat Hospital. In this study, the data was be collected from the mothers who was be present during the time of data collection by using questionnaire.

1.6 Limitation of the study

Some challenges were encountered during data collection. In order to cater for their babies, some women hurriedly read and answered the questionnaire. This implies that care was not taken to understand the questions and responses that were needed. Retrieval of some questionnaires was a challenging task as some discharged women went home with the questionnaires. The non-inclusion of women who had complicated SVD could possibly effect the results of this study since they have a different child birth experience and could possibly have a different perception about the quality of child birth services. Future research should consider interviewing such women in their homes after discharge from the hospital. Finally the data collector was not able to speak local language and some respondents only speak local language, as a result communication with in some respondents very difficult. Future researcher should contain at least one data collector able to speak local language.

CHAPTER TWO

2 LITERATURE REVIEW

2.1 Introduction

This part of the study presents the theoretical and empirical findings that are relevant to the research topic. Relevant studies in both developing and developed countries are reviewed.
Satisfaction is a critical issue that pertains to the service sector. It is justified by the oriented philosophy of the customer and the need for continuous improvement in modern-day ways of service delivery. Due to this, customer satisfaction ought to be measured and translated into a number of measurable parameters. Satisfaction measurement is regarded as an effective means through which clients preferences and experiences with services can be meaningfully and effectively identified (Arokiasamy, 2013).

The term satisfaction defines a singularly accepted definition (McCollough, 2000). It was conceptualized as a cognitive process by tradition (Westbrook, 1987). This has led to the ongoing debate on the extent to which satisfaction is regarded as an emotional state or a cognitive process (Mill, 1990). Hunt,(1977, p. 459), defined satisfaction as "an evaluation rendered that the consumption experience was at least as good as it was supposed to be". According to Oliver, (1981, p. 27), satisfaction is defined as "a summary psychological state resulting when emotion surrounding disconfirmed expectation is coupled with consumers prior feelings about the consumption experience". This definition of satisfaction is an indication that, satisfaction is regarded as an evaluation process.

Interest in the quality of health services in developing countries is on the rise, with increasing efforts towards maintaining acceptable quality standards. This, together with the growing evidence of the relationship between patient perception, satisfaction and utilization of services, calls for more studies on patient perception and maternal satisfaction to be carried out. The Royal College of Obstetricians and Gynecologists (RCOG) in the United Kingdom have called for patient satisfaction surveys to be included among the parameters in the Maternity dashboard(RCOG ,June ,2008).

In Ethiopia there has been a marked improvement towards increasing SBA coverage; however, the service quality provided by Health Facilities is not up to expectations. Poor infrastructure, inadequate and inconsistent drug supplies, a lack of basic equipment and inadequate human resources prevent health facilities from providing quality delivery services (World vision Ethiopia, 2014).

2.2 Measurement of quality of care in health facilities

Quality measurement in health care is the process of using data to evaluate the performance of health plans and health care providers against recognized quality standards. Measuring the quality of health care is a necessary step in the process of improving health care quality. Researches consistently show that there is chronic under use, overuse, and misuse of services. Furthermore, the way health care is delivered is often fragmented, overly complex, and uncoordinated (families USA, 2014).

Quality measurement can be used to improve our nation's health care by: -preventing the overuse, underuse, and misuse of health care services and ensuring patient safety, identifying what works in health care and what doesn't to drive improvement, holding health insurance plans and health care providers accountable for providing high-quality care, measuring and addressing disparities in how care is delivered and in health outcomes and helping consumers make informed choices about their care(families USA ,2014).

Quality measures in health care fall into four broad categories: -structure, process, outcome, and patient experience. One of the sources of the data that are currently used to track quality measures is patient surveys. As we collect and evaluate more data on quality, we'll be closer to ensuring that everyone gets the right care at the right time, the first time(families USA ,2014).

2.3 Maternal satisfaction with delivery services

Maternal satisfaction has often been defined using theoretical models of patient satisfaction. But there is consensus that its multidimensional concept, influenced by variety of factors. It is therefore also defined as positive evaluation of distinct dimension of delivery (Srivastava A et al, 2015). Overall satisfaction of mothers is concerned with the maternity

delivery services as a whole offered to the women. A study from Pakistan indicated that 61% of the women were satisfied with the delivery services and 39% were dissatisfied (Mariam A et al, 2012) .According to a study from west Arsi zone, Assela, the overall satisfaction level of mothers with delivery services was 74.6%(Aman Urgessa ,2016) . And in a study from debremarkos, the overall satisfaction level on delivery service was found to be 81.7 % (Kurabachew B et al, 2015).

Satisfaction with delivery service is a multidimensional construct embracing satisfaction with self (personal control), and with the physical environment of delivery ward and quality of care (Mehata et al., 2017).The mother's satisfaction during the birthing process is the most frequently reported indicators in the evaluation of the quality of maternity delivery services (Goodman et al., 2004). Dimensions of care that may influence client satisfaction includes: Health care provider client interaction, service provision, physical environment, access, bureaucracy and attention to psychosocial problems.

These are crucial causes in regarding satisfaction, patients' differences (excepting gender difference). In this regard, the role of age and education level (socio-cultural status) has been highly discussed. In a study conducted in Iran, there was a positive and significant correlation between satisfaction rate and age of patients (the older patients, the higher satisfaction).There was also a significant difference between satisfaction rate and educational level in that patients with an associate degree were the most satisfied (Simin T et al. ,2015). But in a study conducted at public and private hospitals of Addis by chi-square analysis the socio demographic factors, maternal age, marital status, educational status, occupation and average house hold income did not have significant association with mothers' level of satisfaction with delivery services (B.Assefa, 2017).

According to , (N. Amadu,2018) The chi-square analysis showed that age of women, type of occupation, place of residence and delivery outcome were the significant demographic factors that were associated with satisfaction with delivery service. Also, their study showed that satisfaction level with the delivery services rendered at the health facility was 80.7% and affected by the cleanliness and other environmental factors. Socio-demographic characteristics such as age, educational level and religion of respondents were found to be significantly associated with satisfaction with services (G.Dessie, 2018).

Additional the Other identified factors that influenced satisfaction with childbirth services are: having clean and orderly labour rooms and women-friendly delivery processes, such as having been prepared in advance for what to expect during the labour/postpartum/breast feeding period; involvement in the decision-making process; having a birth plan and being able to follow it; having pain relief during labour; having a birth companion and respectful care providers; receiving help from care providers in performing self and neonate's care; and experiencing less symptoms in the postpartum period (Zasloff et al., 2008; D' Orsi et al., 2014; McKinnon et al., 2014; Jafari et al., 2017). A woman's obstetric history, mode of delivery, and her feelings towards recent childbirth can also affect maternal satisfaction. For example, being multi porous, preferring a spontaneous vaginal delivery and being able to have a spontaneous vaginal birth (Karkee et al., 2014; McMahon et al., 2014) enhances the women's satisfaction with giving birth. Qualitative studies on Indian women's experiences and opinions on giving birth at a health facility reveal that they are not fully satisfied during delivery service, primarily due to the long waiting time before they meet a healthcare provider, having few opportunities to communicate with providers, not being involved in decision-making, and having stern care providers (Melese et al., 2014; G.Dessie, 2018). However, they settle for delivery service perceived as „essential" for safe childbirth rather than „desirable" for a pleasant experience (G.Dessie, 2018). While the community's access to institutional delivery has improved, the assumption that accessibility is synonymous with quality of care, especially among policymakers, gives concern.

According to, (N. Amadu,2018) the Binary logistic regression showed that women who were aged 21-30 years were approximately 2 times more likely to be satisfied with the child birth services as compared to those aged 16-20 years. Also, women aged above 30 years were approximately 6 times highly likely to be satisfied with services as opposed to those aged 16 -20 years. Women who responded no to the availability of a waiting area for client and relatives at the study hospitals hospital were approximately 2 times more likely to be satisfied regarding child birth services than those who did observe a waiting area. Respondents who indicated no to the assurance of privacy found to be 76% highly likely to be satisfied with the delivery service as opposed to those assured of privacy. Among women who indicated that cost of service was low it was found that they were also 76% more likely to be satisfied with delivery service as compared to those who indicated the cost of child birth services were high.

CHAPTER THREE

3 DATA AND METHODOLOGY

3.1 Description of the Study area

The study was conducted at Atat Hospital. Atat Hospital was begins in 1976 E.C (1969, G.C). The Hospital is located 175km southwest of Addis Ababa, 17km from the town of Wolkite on the road to Hossana. The Hospital's service covers mainly Cheha Woreda in the Gurage Zone SNNPR Ethiopia. Deliveries numbered in 2018 G.C, 4085 this number higher than 9.6% from the data of 2017 G.C. As a result the numbers of mother who use the Atat Hospital delivery service increase year to year in large percent.

3.2 Target population of the study

The target population of this study is the currently existing mothers who care delivery services in Atat Hospital.

3.3 Method of data collection

The methods of data collection was be involves self-administrative questionnaires because of this data will wide consequence and hence primary data collection will be used.

3.4 Sampling design

3.4.1 Sampling frame

The target population of this study is Atat Hospital mothers who care delivery services and the sample frame is the list of currently existing mothers who care delivery services in the Hospital.

3.4.2 Sampling techniques

Sampling technique is a system of taking small ratio of observation from a large population with the aim of getting information of those large populations from the sampled observation by using some statistical techniques. From the study in order to get probability sampling techniques is systematic sampling method was be used.

Systematic sampling is a more commonly used selection procedure. Systematic sampling means the selection of units at a fixed interval from a list, starting from a randomly determined point.

3.5 Sample size determination

In order to reduce efforts, time and cost it is important to determine representative sample from study population. To determine sample size we can use either prior information of variance and proportion in previous research or pilot surveys. But for this study we will to use the previous research from the analysis in capital city of our country in Addis Ababa public health centers.

Therefore, to determine sample size confidence level and margin of error is considered, since it is difficult to guess the distribution of the population. In this case:

- Assume the degree of confidence is 95% means that the level of significance 5% (alpha=0.05)
- The margin of error or the degree of precision is 8% (d=0.07)
- Prevalence of Mothers satisfaction with delivery service was 82% from public health centers in Addis Ababa, Ethiopia.
- The estimate produced by a set of sample form the sample population will be normally distributed.

Based on the above assumption (information) we can calculate the sample size according to Cochran, the sample size determination formula written as;

$$n_0 = \frac{pq(Z_{\frac{\alpha}{2}})^2}{d^2} \qquad [3.1]$$

Then, p= 0.82, q=1-p=0.18 α=5%, $(Z_{\frac{\alpha}{2}})^2 = 3.8416$ and the total population N=4085.

$$n_0 = \frac{pq(Z_{\frac{\alpha}{2}})^2}{d^2} = \frac{(1.96)^2 * 0.82 * 0.18}{(0.07)^2} = 115.7184 \approx 116$$

n_0 = is initial sample size

Then we have two cases to check the obtain value divided to the total population, is greater than or less than 5%?

If $\frac{n_0}{N}$< 5%, not need of adjustment, then n = n_0 but: $\frac{n_0}{N}$> 5%, its needed adjusted, then

$$n = \frac{n_0}{1+\frac{n_0}{N}} \qquad [3.2]$$

$$\frac{116}{4085} = 0.028 < 0.05$$

Then we use the first one formula which is n = n_0=**116** and allowance for possible non-response rate of 10% makes the final sample size; 116+11.6= 127.6≈128.

3.6 Variable of the study

3.6.1 Dependent variable

The dependent variables are response that affected by other explanatory variables, for our study the dependent variable is the level of maternal satisfactions with delivery services.

Satisfied:-mothers who scored 75% and more from the items of Patient Satisfaction Questionnaire, were categorized under "satisfied" for the overall satisfaction level and for each responses of 'very satisfied' and 'satisfied' are classified as satisfied.

Unsatisfied:- mothers who scored below 75 % from the items of Patient Satisfaction Questionnaire, were categorized under "unsatisfied" for the overall satisfaction level and for each responses, 'very dissatisfied', 'dissatisfied' and 'neutral' as unsatisfied.

Therefore, Neutral responses were classified as dissatisfied considering that they may represent a fearful way of expressing dissatisfaction. Mothers may get reluctant to express their dissatisfaction as they were interviewed within the health centers (B.Assefa, 2017).

- We will see the Appendix: A in the last page (27).

$$Yi=\begin{cases}1, & if\ \ i^{th} mother\ is\ \ satisfied\\ 0, & other\ wise\end{cases}$$

3.6.2 Independent variables

Table 3.1 Category of Socio demographic characteristics and their codes

Common variables	Category	categorical coding's
Marital status	Married	0
	Single	1
	Others (separated, divorced)	2
Age of respondent	<=20	0
	21-30	1
	>30	2
Place of residence	Rural	0
	Urban	1
Education level	No formal education	0
	Primary	1
	secondary and above	2

Table 3.2 Category of Obstetric history and their codes

Status of pregnancy	Unwanted	0
	Wanted	1
Mode of delivery	Spontaneous vaginal delivery	1
	Assisted by instruments	0
ANC follow up	No	0
	Yes	1

Table 3.3 Category of Structural factors and their codes

Cleanliness of physical environment	No	0
	Yes	1
Availability of prescribed drugs	No	0
	Yes	1

Table 3.4 Category of Process factors and their codes

Waiting time to see a doctor or midwife/nurse	>15 minute	0
	< 15 minute	1
Cost of service	High	0
	Low	1
Sex of delivery attendant	Male	0
	Female	1
Privacy of Hospital	No	0
	Yes	1

3.7 Method of data analysis

Method of data analysis is depend on the nature of variables incorporated in the study, objective of research and the data type of basic variable included in the study. Depending on the above mentioned points the study is used the following methods of data analysis on this research.

These are:-

- Descriptive statistics
- Inferential statistics
    - ✓ Chi square test of independency
    - ✓ Binary logistic regressions

3.7.1 Descriptive Statistics

Descriptive statistical analysis summary measure such as number and proportion will be used to describe the sample information. It is utilized numerical and graphical methods to look for patterns in the data set to summarize and to present that information in convenient form. It describes the data collected through charts, frequency table, Statistical graphs and so on.

3.7.2 Inferential statistics

It deals with making inference or conclusion about population based on data obtains from a limited number of observations from population. In this study we use both chi-square test of independency and binary logistic regression model was used to analyze data.

3.7.2.1 Chi-square test of Independence

The chi square test of independence is used to test the association between two variables. Chi-square(x^2) is a statistical measure which helps to access the significance of the different between the observed frequencies and expected frequencies obtained from some hypothetical universe.

Assumptions of chi- square test of independence

- The populations must be normally distributed for the variable under the study.
- The observations must be independent each other.
- The sample must be randomly selected from the population.
- The sample size is large.
- Each data cell should contain at least five observations

The statistical test would be:

Hypothesis test is the following

H_o: There is no association between two factors.

H_1: There is association between two factors.

2. Level of significance α= 0.05
3. Test of statistics

$$X^2=\sum_{i=1}^{n}\sum_{j=1}^{m}\frac{(oij-eij)^2}{eij} \qquad [3.3]$$

Where: oij is observed frequency

eij is expected frequency

The test statistics is distributed approximately as chi-square with (r-1) (c-1) degree of freedom.

Note that: c is number of the columns on the data sand r is number of rows on the data.

Expected frequency = (row total * column total)/Grand total.

P-value is the smallest level of the test for which the null hypothesis (Ho) is rejected. That is when

P-Value greater than the significance level, Ho is not rejected.

3.7.2.2 Logistic regression analysis

Logistic regression is a popular modeling approach when the dependent variable is dichotomous or polychromous as well. This model allows one to predict outcomes, from a set of variables that may be continuous, discrete, dichotomous, or a mix of any of these.

3.7.2.2.1 Binary logistic regression model

Binary logistic regressions were used to perform logistic regression on a binary response variable. A binary variable has only two possible values, such as presence or absence of a particular event. Models with one or more predictors we fitted using an iterative-reweighed least squares algorithm to obtain maximum likelihood estimates of the parameters. Binary logistic regression has also been used to classify observations into one of two categories, and it may give fewer classification errors than discriminates analysis for some cases.

Assumption of binary Logistic Regression Model

- Normally distributed errors terms are not assumed.
- Logistic regression does not assume a linear relationship between the dependent and the independent variables.
- The dependent variable must be categorical.
- Linearity in the logit regression equation should have a linear relationship with the logit form of be the dependent variable.
- Absence of multicollinearity.
- Logistic regression requires large sample to guarantee higher level of accuracy.
- The dependent variables need not be homoscedasticity for each level of independent variables; that is there is no homogeneity of variance assumption.

3.7.2.2.2 The Model specification

The model with binary logistic response variable in regression problem takes only two possible values, 1 = satisfied, 0=unsatisfied. The relationship between the predictor and response variables is not a linear function in logistic regression; instead of, the logistic regression function, which is the logit transformation of π, is used. Consider a collection of explanatory variables

denoted by the vector x=(x1, x2,…,xp).let the conditional probability that the outcome is success be denoted by p (y=1/x)=π

$$\pi = \frac{\exp(\beta 0+\beta 1x1+\beta 2x2+\cdots+\beta pxp)}{1+\exp(\beta 0+\beta 1x1+\beta 2x2+\cdots+\beta pxp)} \qquad [3.4]$$

Then the logit or log- odds of having y=1is a model as a linear function of the explanatory variables as:

$$\text{Ln}\left(\frac{\pi}{1-\pi}\right) = \beta 0 + \beta 1x1 + \beta 2x2 + \cdots + \beta pxp; \quad 0 \leq \pi \leq 1 \qquad [3.5]$$

Where: - β_0 is the constant of the equation and$\beta 1\ldots\ \beta p$ are the coefficients of the predictor variables.

The odds ratio

The odds of an event happening (y=1) is defined as the ratio the probability that the event will occur divided by the probability that the event will not occur. Mathematically the odds of the event π are given by:

$$\text{Odds } (\pi) = \boldsymbol{\theta} = \frac{\pi}{1-\pi} \qquad [3.6]$$

3.8 Parameter Estimation

Maximum likelihood estimation (ML) is the most popular technique for estimating the parameters of the logistic regression model, instead of Ordinary Least Squares (OLS) method. Mainly for this reason the ML method based on Newton-Raphson iteratively reweighted least square algorithm becomes more popular with researchers (Ryan, 1997). The sample likelihood function is, in general defined as the joint probability function of the random variables whose realizations constitute the sample.

Suppose (y1, y2 … yn), the corresponding random variables are (Y1, Y2… Yn). Since the Yi is

A Bernoulli random variable, the probability mass function of Yi is:

$$fi(yi) = \pi i^{yi}(1-\pi i)^{yi} \qquad [3.7]$$

Yi = 0 or 1 and i=1, 2,…, n

Since the Yi are assumed to be independent, the likelihood function is given by:

$$L(\beta/y) = \prod_{i=1}^{n} p\left(yi/Xi\right) = \prod_{i=1}^{n} \left[\frac{e^{xi\beta}}{1+e^{xi\beta}}\right]^{yi} \left[\frac{1}{1+e^{xi\beta}}\right]^{1-yi} \quad [3.8]$$

The principle of maximum likelihood states that we use as our estimate of the value which maximizes the likelihood function. However, it is easier mathematically to work with the log likelihood function the log likelihood is:

$$L\ (\beta 0, \beta 1,\ldots,)=\sum yi(\beta 0+\beta 1x1+\ldots+\beta pxp)-\sum ln\{1 + \exp\ (\beta 0+ \beta 1x1+ \cdots + \beta pxp)\} \quad [3.9]$$

The objective of stating likelihood function is to get an estimator $\hat{\beta}= (\hat{\beta}0, \hat{\beta}1 \ldots\ldots\ldots, \hat{\beta}k)$of β which maximizes the likelihood function. In fact all the parameters $\hat{\beta}0, \hat{\beta}1 \ldots\ldots\ldots, \hat{\beta}k$ and estimates of $Prob\ (yi/X)$ for each subject could be facilitated by the widely available statistical software .in this study SPSS version20 will be used to analyze the data.

3.9 Goodness of Fit of the model

The goodness of fit of a model measures how well the model describes the response variable. Assessing goodness of fit involves investigating how close values predicted by the model are to the observed values. The appropriateness of the fitted logistic regression model needs to be examined before it is accepted for use as in the case of all regression models. In practice, several different measures exist for determining the significance or goodness of fit of a logistic regression model. These are Pearson, Hosmer-Lemeshow, Deviance goodness of fit, likelihood ratio test and the classification table. In theoretical sense, all measures are equivalent. To be more precise, as the number of observation goes to infinity, all measures converge to the same estimate of the model significances. The test can detect major departures from a logistic response function (Alan, 1990).

3.9.1 Test of overall model fit

Likelihood-Ratio Test

The likelihood ratio test statistic (G^2) is the test statistic commonly used for assessing the overall fit of the logistic regression model. (Agresti1990) argues that the likelihood ratio test is better, particularly if the sample size is small or the parameters are large. The likelihood-ratio test uses the ratio of the maximized value of the likelihood function for the full model (L_1) over the maximized value of the likelihood function for the simpler model (L_0).The likelihood-ratio test statistic is given by:

$$G^2 = -2 \log (L_0/L_1) = -2 [\log (L_0) - \log (L_1)] = -2 (L_0 - L_1) \quad [3.10]$$

Where: - L is the likelihood of the full model and

L_0 is the likelihood of the null model.

The likelihood ratio test statistic has an approximate distribution with k degrees of freedom. (Where, k is the number of predictors in the full model). If significant, it suggests that, taken together, the predictors contribute significantly to the prediction of the outcome.

It tests the null hypothesis that all population in logistic regression coefficients is zero except the constant one. And a small p-value, for example, $p < 0.05$ leads to rejection of the null hypotheses that all of the predictor effects are zero. Thus when likelihood test is significant, at least one of the predictors is significantly related to the response variable.

Hosmer and Lemshow (H-L) Test

The final measure of model fit is the Hosmer-Lemeshow goodness of fit statistics, which measure the correspondence between the actual and the predicted value of the dependent variables. The Homers -Lemeshow test is commonly used test for assessing the goodness of fit model and allows for any number of explanatory variables, which may be continuous or

categorical. In this case better model fit is indicated by smaller difference in observed and predicted statistic. The Hosmer–Lemeshow test uses a test statistic that asymptotically follows an x^2*distribution* to assess whether or not the observed event rates match expected event rates in subgroups of the model population. The test statistic is constructed by grouping the data set into groups (of ten g=10). The groups are formed by ordering the existing data by the level of their predicted probabilities. So the data are first ordered from least likely to have the event to most likely for the event. Then g roughly equal sized groups are formed. The observed and expected numbers of events are computed for each group.

The test statistic is:

$$G^2_{HL}=\sum\left\{\frac{(ok-Ek)^2}{Ek\left(1-Ek/_{nk}\right)}\right\} \qquad [3.11]$$

Where, Ok and Ek are the observed and expected number of events in the k^{th} group, and k is a variance correction factor for the k^{th} group. If the observed number of events differs from what is expected by the model, the statistic G^2_{HL} will be large and there will be evidence against the null hypothesis. This statistic has an approximate chi-squared distribution with (g – 2) degrees of freedom. The advantage of a summary goodness-of-fit statistic like G^2_{HL} is that it provides a single easily interpretable value that can be used to assess fit (Hosmer and Lemeshow, 2000).

3.9.2 Test of individual predictor

The Wald Statistic

The Wald statistic is an alternative test, which is commonly used to test the significance of individual logistic regression coefficients for each independent variable (that is to test the null hypothesis in logistic regression model that a particular logit coefficient is zero). If the Wald test is not significant, then these explanatory variables can be omitted from the model. Wald $\chi 2$ statistic is used to test the significance of individual coefficients in the model and is calculated as:

$$W=\left(\frac{\widehat{\beta}}{SE(\widehat{\beta})}\right)^2 \qquad [3.12]$$

Each Wald statistic is compared with a χ2distribution with 1 degree of freedom. Wald statistic is easy to calculate but their reliability is questionable, particularly for small samples (Alan, 1997) Where: $-\hat{\beta}ii$is the estimated parameter for βi and

SE ($\hat{\beta}i$) is standard error of $\hat{\beta}$

Z=normal distribution, this Z value is the squared yielding Wald statistics with a chi-square distribution of 95%CI (Alan Agresti, 1996).

CHAPTER FOUR

4 RESULTS AND DISCUSSION

The objective of this chapter is to analyze the satisfaction of mother's delivery at Atat Hospital using primary collected data from the source. The response variables considered in this study is binary assuming two outcomes (1= satisfied 0 =unsatisfied). Descriptive statistics, inferential type: chi-square test and binary logistic regression methods are used to measure the effects satisfaction of mother's delivery at Atat Hospital. The data analyzed using statistical package for social science (SPSS) version20.

4.1 Summaries of descriptive statistics

Table 4.1 Descriptive statistics of satisfaction of mother's delivery at Atat Hospital

Variables	Categories	Overall Satisfaction		Chi-square value	
		satisfied	not satisfied	DF	p-value
age of mother	<=20	(11)64.7%	(6)35.3%	2	.720
	21-30	(58)74.4%	(20)25.6%		
	>30	(18)72%	(7)28%		
Marital status	Married	(72)74.2%	(25)25.8%	2	.425
	Single	(12)70.6%	(5)29.4%		
	Others	(3)50%	(3)50%		
Educational Level	no formal Educ	27(90%)	3(10%)	2	.041
	Primary(1)	29(69%)	13(31%)		
	Secondary=<(2)	31(64.6%)	17(35.4%t)		
residence of mother	Rural	(52)80%	(13)20%	1	.045
	Urban	(35)63.6%	(20)26.4%		
status of pregnancy of mother	Unwanted	(13)50%	(13)50%	1	.004
	Wanted	(74)78.7%	(20)21.3%		
Waiting time	>15 minute	73(88%)	10(12%)	1	.000
	=<15 minute	14(37.8%)	23(62.2%)		
Cleanliness	No	(81)81.8%	(18)18.2%	1	.000
	Yes	(6)28.6%	(15)71.4%		
gender of attendant	Male	(3)17.6%	(14)82.4%	1	.000
	Female	(84)81.6%	(19)18.4%		
Privacy of Hospital	No	(9)75%	(3)25%	1	.500
	Yes	(78)72.2%	(30)27.8%		
Residence	Rural	(52)80%	(13)20%	1	.045
	Urban	(35)63.6%	(20)36.4%		
ANC	No	(17)73.9%	(6)26.1%	1	.888
	Yes	(70)72.2%	(27)27.8%		

Hint: if the p-value < 0.05 statistical significant association with response variable.

From a total of 128 questioners, 120 questioners were collected due non response and inappropriate answer.

The above table 4.1 reveals that the age of mother is the factor with regard to the satisfaction of mother's delivery at Atat Hospital. The highest percentage of mother satisfied is observed in the age of mothers between 21-30 years (74.4%) and lowest percentage is observed in age of mothers under 20 years (64.7%). Then age of mother is statistical not significant association with mother satisfaction with delivery service.

The proportion of mother satisfied, observed in table 4.1 also differs with their Marital status. For instance, higher proportion of mother satisfied was observed mother who have Married (74.2%) as opposed to the lowest percentage of mother satisfied which was recorded for in mothers who have others (separated, divorced) (50%). Then marital status is statistical not significant association with satisfaction with delivery service but there is a little association with mother's satisfaction with delivery service because the p-value is relatively small respectively.

Educational Level of mother has its own effect on the mother satisfied. Accordingly, numbers of mother satisfied mother no formal Education (90%) is the most percentage from other records, and the least percentage of mother satisfied was recorded in those respondents who are mother Secondary education and above (64.6%). Then Educational Level of mother is statistical significant association with mother satisfaction with delivery service.

The proportion of mother satisfied, observed in table 4.1 also differs with their residence of mother. For instance, higher proportion of mother satisfied was observed in mothers who have Rural (80%)as opposed to the lowest percentage of mother satisfied which was recorded for mother who have Urban (63.6%). Then residence of mother is statistical significant association with mother satisfaction with delivery service.

Status of pregnancy of mother has its own effect on the mother satisfied. Accordingly, numbers of mother satisfied wanted (78.7%) is the most percentage from other records, and the least percentage of mother satisfied was recorded in those respondents who are unwanted (50%). Then Status of pregnancy of mother is statistical significant association with mother satisfaction with delivery service.

Similarly, mother not satisfied varies by their important factor with regard to waiting time of mother, Cleanliness of the hospital and gender of attendant. A higher proportion of mother satisfied were observed in those mother with 15 minute above (88%) and a lower percentage was observed in those 15 minute and bellow (37.8%). The highest percentage of mother satisfied was observed in those Mothers who indicated no to the cleanliness (81.8%). as opposed to the lowest percentage of mother satisfied recorded for Mothers who indicated yes to the cleanliness (28.6%). A higher proportion of mother satisfied were observed in those delivery by female (81.6%) and a lower percentage was observed in those delivery by Male (17.6%). Then those are is statistical significant association with mother satisfaction with delivery service.

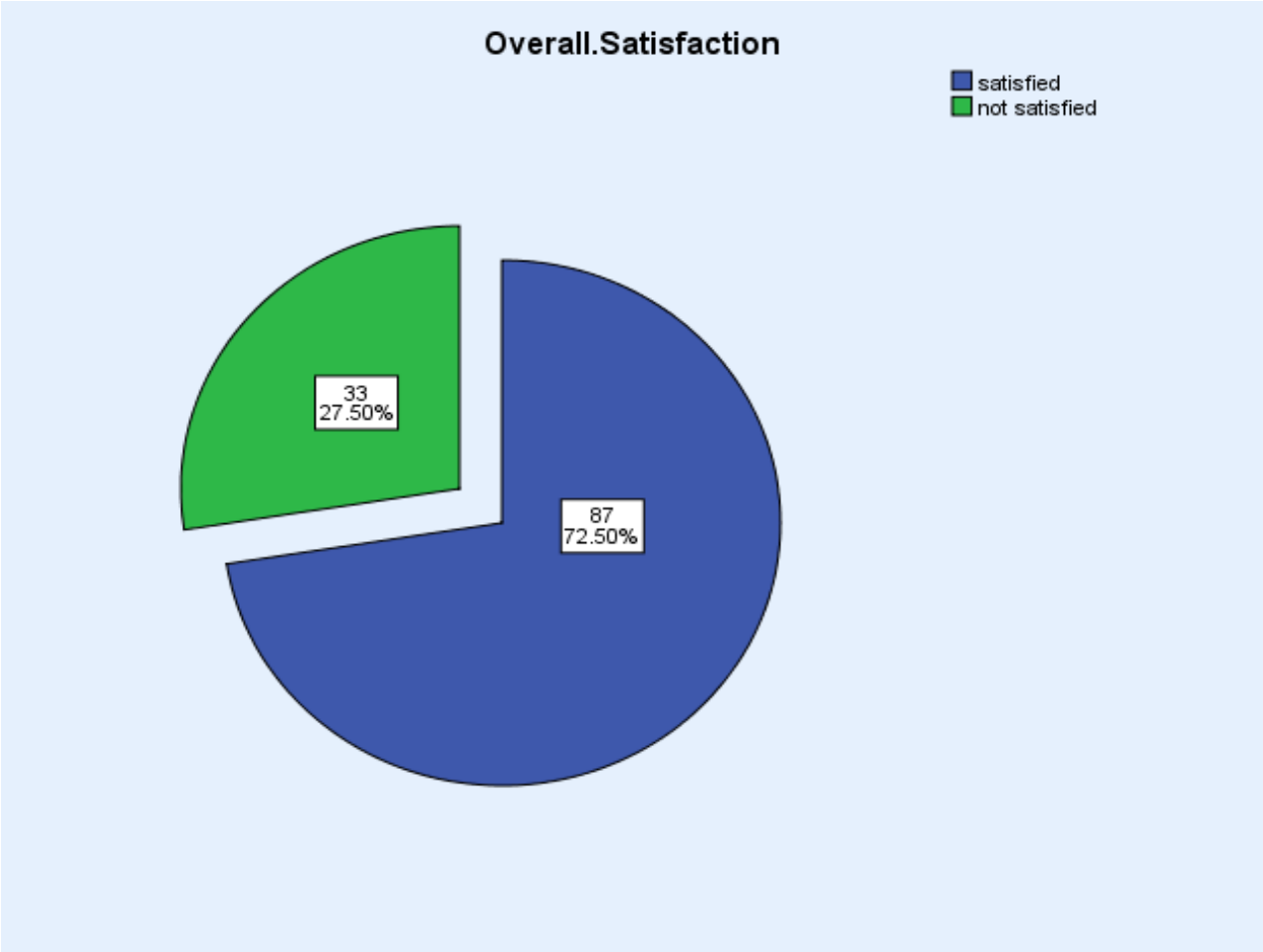


Figure.4. 1 Overall satisfaction with mother delivers service

To assess the level of satisfaction with delivery services at Atat Hospital, a composite score was generated from 7items. The composite score was computed by summing all the responses of the items measured on the 5-point Likert scale. The Likert scale responses with their corresponding numeric values are as follows: very satisfied (4), satisfied (3), somewhat satisfied (2), dissatisfied (1), and very dissatisfied (0). A score between 3-4 on the Likert scale was categorized as satisfied, and a score of 0-2 on the Likert scale was categorized as dissatisfied.

Approximately 72.5% of the mothers were satisfied with delivery services compared to (27.5%) who were not satisfied as presented in Figure 4.1.

4.2 Analysis of binary logistic regression

Binary logistic regression identifies the relationship between one or more predictor variables and a binary response variable and hence the binary logistic regression equation can be used to examine how the probability of an event changes as the predictor variable changes.

Table 4.2 Case processing summary

Un weighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	120	100.0
	Missing Cases	0	.0
	Total	120	100.0
Unselected Cases		0	.0
Total		120	100.0

Table 4.2 provides a basic descriptive window showing how many subjects were analyzed, and how many subjects were missing. As can be seen above, all 120 subjects in this analysis were included, with zero subjects missing, and none unselected

Table 4.3: Classification Table

		Predicted		
		Overall Satisfaction		
Observed		No satisfied	satisfied	Percentage Correct

Age at first Marriage	No satisfied	0	33	.0
	satisfied	0	87	100.0
	Overall Percentage			72.5

The above table 4.3 is a classification table for the response variable based on how well the model does with only a constant term include. Notice that with the constant-only model, the predictive power of the logistic regression is perfect for those respondents who are "satisfied" with 87 subjects incorrectly classified, but good for those "No satisfied". For those 33 subjects, the constant-only logistic regression correctly classified 0% of them. The overall classification of the model does not do a good job classifying subjects, which actually is expected at this stage of the analysis since we only have the constant term included in the model. That is, we have yet to use more predictors to aid in classification and to sharpen our predictive power.

Table 4.4 Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 7	Step	6.770	2	.034
	Block	84.234	9	.000
	Model	84.234	9	.000

Table 4.4 the results show that the model with explanatory variables does better at predicting the response variable, and is statistically significant at $p = 0.00 < .05$. The Omnibus test gives a Chi-Square of 84.234 with 9 df, significant beyond .05. This is a test of the null hypothesis that adding explanatory variables to the model has not significantly increased our ability to predict the decisions made by our subjects. Since the omnibus test is significant we can conclude that adding the explanatory variables to the model has significantly increased our ability to predict the mother not satisfied made by our subject. Test of individual parameter (variable) which Omnibus Tests of Model Coefficients indicate that if we add on our independent variable to the model is they are statistically significant.

4.2.1 Model adequacy checking

After a logistic regression model has been fitted, a global test of goodness of fit of the resulting model should be performed. It is necessary to see the appropriateness, adequacy and usefulness of the fitted model. The most commonly used technique is the likelihood ratio test, and the

Likelihood Ratio Test

Table 4.5 Model Summaries of logistic regression

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
7	56.927c	.504	.729

From table 4.5 Model Summary we see that the value of -2 Log Likelihood statistics is 56.927.This statistic measures how the model predicts the decisions. If the smaller statistic, the better the model, so since the value of this statistics is smaller, then our model is better model. Nagelkerke R Square .729 (72.9%) give a rough estimate of the variance that can be predicted from the combination of the independent variables. From this Nagelkerke R Square is greater than 50% it is enough to say large. This shows how better the model predicts the response variable. The value of Nagelkerke R square is good enough. Generally the model which includes the explanatory variable explains between 50.4% and (72.9%) of variation in dependent variables (satisfaction with delivery services).

Hosmer and Lemeshow Goodness of fit test

Table 4.6 Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
7	1.213	7	.991

The Hosmer-Lemeshow test is performed by dividing the predicted probabilities into 9 groups based on percentile ranks and then computing a Pearson chi-square that compares the predicted to the observed frequencies. Accordingly, the "Hosmer and Lemeshow" test is a measure of fit which evaluates the goodness of fit between predicted and observed probabilities in classifying the response variable. Similar to the -2log likelihood test, non-statistically significant (p-value=..991) if the predicted and observed probabilities match correctly. In this case we see that

the test is statistically insignificant (p-value >.05), suggesting that the fitted logistic regression model is good fit.

4.3 Result of binary logistic regression

Table 4.7 Estimates, standard errors, Wald, degree of freedom, p-values, estimated odds-ratio

Variables	Categories	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
								Lower	Upper
Marital status	Others (ref)			4.795	2	.091			
	Single(1)	2.409	1.366	3.110	1	.078	11.119	.765	161.638
	Married (0)	-2.111	1.929	1.199	1	.274	.121	.003	5.304
Educational Level	Secondary= <(ref)			10.548	2	.005			
	Primary(1)	-5.172	1.869	7.658	1	.006	.006	.000	.221
	No (0)	-6.452	2.001	10.393	1	.001	.002	.000	.080
Status of pregnancy	Unwanted(ref)								
	wanted(0)	2.160	1.036	4.352	1	.037	8.674	1.139	66.026
privacy	yes (ref)								
	No(0)	-3.682	1.461	6.351	1	.012	.025	.001	.441
gender	Male(ref)								
	Female(0)	-6.675	1.861	12.870	1	.000	.001	.000	.048
Waiting time	=<15 minute(ref)								
	>15 minute(0)	-2.148	.876	6.007	1	.014	.117	.021	.650
cleanliness	yes (ref)								
	No(0)	-2.055	.866	5.626	1	.018	.128	.023	.700
Constant		10.113	2.702	14.007	1	.000	2.467E4		

Binary logistic regression was used to measure the strength and direction of the significant factors that are associated with mother satisfaction with delivery services from the chi-square test. In table 4.7, the column labeled “coef.” is the estimated values of the parameters for the logistic regression equation. They are in log-odds units. Because these coefficients are in log-odds units, they are often difficult to interpret, so they are often converted into odds ratio. Since,

most of the covariates are categorical to compute odds ratio we need to have a reference category. Result of binary of logistic regression coefficients can be estimated using the maximum likelihood estimation method implemented in the SPSS package.

Interpretation of significant variables of odds ratio

A nice feature of logistic regression models with categorical explanatory variables is that the exponents of the parameter estimates are the odds ratios and an important interpretation of logistic regression model uses the odds ratio.Column-6 of the table4.6 gives the odds ratios for each variable.

It was revealed that Women who had primary school were.006 (OR=.006) time less likely to be satisfied with the delivery services compared to women were secondary school and above education and the Women who had no formal education were 002 (OR=.002) time less likely to be satisfied with the delivery services compared to women were secondary school and above education controlling for other variables in the model.

Respondents who indicated no to the assurance of privacy (OR=.025, 95% C.I=.001-.441) were 97.5% less likely to be satisfied with the delivery services compared with mother who indicated yes to the assurance of privacy as directly relation to those assured of privacy controlling for other variables in the model. Among women who wanted pregnancy 8.674 (OR=8.674), it was found that they were also 9 time more likely to be satisfied with delivery service as compared to those women who wanted pregnancy controlling for other variables in the model.

Mothers whose delivery was attended by female health workers were (OR=.001, 95% C.I=0.000 -.048) time less likely to be satisfied with delivery service as compared to mothers whose delivery was attended by male health workers controlling for other variables in the model. Mothers who indicated no to the cleanliness (OR=.128, 95% C.I=.023-.700) were 87.2% less likely to be satisfied with the delivery services compared to mothers who indicated yes to the cleanliness as directly relation to those cleanliness controlling for other variables in the model.

Mothers who were waiting 15 minutes and above (OR=.117, 95% C.I=.021-.650) 88.3% less likely to satisfied with delivery service comparing with mother waiting less than 15 minutes controlling for other variables in the model.

4.4 Discussion

This topic presents a discussion of the findings from the study. This is done in relation to the objectives of the study and the literature reviewed. Again, the discussion is done to ascertain if the findings of this study conform to or contradict what exist in the literature. The discussion follows the order of the study objectives-the level of satisfaction with delivery services and demographic and health facility factors that influence delivery services satisfaction.

The study has provided an insight into the factors that affect of satisfaction of mothers delivery at Atat hospital. The characteristics of this population were estimated based on the sample size of 120 by using systematic sample selection technique. The descriptive analysis: like frequency, percentage and pie chart, inferential part: chi-square test and binary logistic regression technique were used in analyses. The results are discussed as follows.

Generally, 72.50% of women seeking delivery services in the Atat hospital reported being satisfied with the level of care. This percentage reported is higher than findings from similar studies in, satisfaction with referral hospital delivery service in Amhara Region where satisfaction was reported to be 61.9 %(Azmeraw T,et,2011). However, reported satisfaction with child birth services in Gamo Gofa was 79.1% (Rahel T et al, 2017) which is higher than the percentage of satisfaction in this study. The result of this finding are relatively similar with the above pervious research result.

In this study the marital status and Assured privacy has no significant association with mother satisfaction with delivery services. A similar result had been found in the study conducted in public health centers in Addis Ababa, were marital status and Assured privacy service not found associated with mother's perceived quality of delivery care (B.Assefa, 2017).

Statistically, a significant association was established between marital statuses, Educational Level, gender of delivery attendant, waiting time, Status of pregnancy and general hospital cleanliness in this study. This contradicts with findings in Tamale Metropolis, Ghana which no significant association with Status of pregnancy and educational level (N. Amadu, 2018).

The estimated odds ratio of that Women who had primary school were.006 (OR=.006) time less likely to be satisfied with the delivery services compared to women were secondary school and above education and the Women who had no formal education were 002 (OR=.006) time less likely to be satisfied with the delivery services compared to women were secondary school and

above education controlling for other variables in the model. This is in agreement with the findings in other studies. (B.Assefa, 2017) showed that the higher the level of education, the more likely to satisfied with the delivery services.

Mothers who were waiting 15 minutes and above (OR=.117, 95% C.I=.021-.650) 88.3% % less likely to satisfied with delivery service comparing with mother waiting less than 15 minutes was highly significant. This finding is consistent with other studies (Simin T et al., 2015) showing that in the mothers who were waiting high rely affecting women satisfaction.

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The main objective of this study was to assess the factors affecting the maternal satisfaction with delivery services in Atat Hospital. From the findings in the preceding chapter, study was an attempt to examine the impact of some factors that determine the maternal satisfaction with delivery services in Atat Hospital. For these purpose, descriptive statistics and binary logistic regression were used.

The level of the maternal satisfaction with delivery services in Atat Hospital in this study was 72.50%. The highest percentage of mother satisfied is observed in the age of mothers between 21-30 years (74.4%) and lowest percentage is observed in age of mothers under 20 years (64.7%).). For instance, higher proportion of mother satisfied was observed in mothers who have Rural (80%) as opposed to the lowest percentage of mother satisfied which was recorded for mother who have Urban (63.6%).

The findings of this study identified Educational Level, gender of delivery attendant, waiting time, Status of pregnancy and general hospital cleanliness had a significant association with maternal satisfaction with delivery services ($p< \alpha=0.05$). However, assured privacy and marital status has no significant association with maternal satisfaction with delivery services ($p> \alpha=0.05$).

Finally, from the result of study the researcher have concluded that the predictor's educational status of women, gender of delivery attendant, Status of pregnancy ,waiting time and general hospital cleanliness had statistically significant effect on maternal satisfaction with delivery services.

5.2. RECOMMENDATIONS

From this research result suggests the following recommendation to increase maternal satisfaction with delivery services in Atat hospital.

The hospital should accept mothers' preferences of the gender of the personnel who attends their delivery.

The hospital administration should improve the cleanness hospital compound.

Staffs of the hospital have frequent continuing education on communication and interpersonal relationship.

Should support the mother in appropriate time, then hospital administration to add the other rooms and personnel.

Lastly, management of the study hospitals should make clients privacy a priority. Strict privacy ought to be provided all women seeking child birth services thus women should be attended to privately in separate rooms or under screens.

REFERENCE

Australian Government (2007). Maternity Service in South Australia Public Hospital: Patient Satisfaction Survey Research, Australian Government, South Australia, Australia

Atiya, K. Mohammed, Maternal satisfaction regarding quality of nursing care during labor and delivery in Sulaimani teaching hospital, International Journal of Nursing and Midwifery, March 2016, Vol. 8(3), 18-27

AzmerawTayelgn, Desalegn T Zegeye, YigzawKebede. (2011) Mothers' satisfaction with referral hospital delivery service in Amhara Region, Ethiopia. BMC pregnancy and childbirth11:78

AmanUrgessa, Mothers'satisfaction with delivery services and associated factors at health institutions in west Arsi, Oromia regional state, Ethiopia, 2016.

Bongaarts J (2016). WHO, UNICEF, UNFPA, World Bank Group, and United Nations Population Division Trends in Maternal Mortality: 1990 to 2015 Geneva: World Health Organization, 2015. Popul. Dev. Rev.42(4):726-726

Biniyam Haile Tadesse, NegalignBirhanu Bayou, Nebeb GT (2017) Mothers' Satisfaction with Institutional Delivery Service in Public Health Facilities of Omo Nada District, Jimma Zone. Clinical Medicine Research6:23-30.

BlenAssefa, Maternal satisfaction with delivery services of public health centers in Addis Ababa, Ethiopia, 2017.

D‟ Orsi E, Brüggemann OM, Diniz CSG, Aguiar JM de, Gusman CR, Torres JA (2014). Desigualdadessociais e satisfação das mulheres com o atendimentoaoparto no Brasil: estudonacional de base hospitalar. Cadernos de SaúdePública [Internet]. FapUNIFESP (SciELO). 30(suppl 1):S154-S168.

Ewunetu M, Mekonnen, Yalew WA, Anteneh ZA (2015) Women's satisfaction with childbirth care in FelegeHiwot Referral Hospital, Bahir Dar city, Northwest Ethiopia, 2014: cross sectional study. BMC research notes8:528.

Eva SB, Michael AK (2009). Women's satisfaction with delivery care in Nairobi's informal settlements. Int. J. Quality Health Care 21(2,1):79-86

Erin Sines, Anne Tinker, and Julia Ruben, the maternal–new born–child health

Continuum of care, save the children, March 2006.

FAMILIESUSA, Measuring Health Care Quality: An Overview of Quality Measures, The voice for health care consumers, May 2014.

GizewDessieAsres Satisfaction of maternal care among women delivered at AsradeZewude Memorial Primary Hospital, Bure, West Gojjam, Amhara, Ethiopia: A cross sectional study, 2018.

Goodman P, Mackey MC, Tavakoli AS (2004). Factors related to childbirth satisfaction. Journal of Advanced Nursing [Internet]. WileyBlackwell. 46(2):212-219.

HasanA, Chompikul J, Bhuiyan SU (2007). Patient Satisfaction with Maternal and Child Health Service among Mothers Attending the Maternal and Child Health Training in DahakaBangeladish, Mahidol University.

ICF and Central Statistical Agency (CSA) [Ethiopia] (2016) ETHIOPIA Demographic

Jafari E, Mohebbi P, Mazloomzadeh S (2017). Factors RelatedtoWomen‟s Childbirth Satisfaction in Physiologic and Routine Childbirth Groups. Iran J. Nurs. Midwifery Res. 22:219-224.

KurabachewBitew, MekonnenAyichiluhm, Yimam K (2015) Maternal Satisfaction on Delivery Service and Its Associated Factors among Mothers Who Gave Birth in Public Health Facilities of DebreMarkos Town, Northwest Ethiopia. BioMed research international2015:6.

KurabachewBitew, MekonnenAyichiluhm and KedirYimam, Maternal Satisfaction on Delivery Service and Its Associated Factors among Mothers Who Gave Birth in Public Health Facilities of DebreMarkos Town, Northwest Ethiopia, BioMed Research International Volume 2015, 460767:6.

Karkee R, Lee AH, Pokharel PK (2014). Women‟s perception of quality of maternity services: a longitudinal survey in Nepal. BMC Pregnancy Childbirth 14(1).

Lumadi TG, Buch E (2011). "Patients‟ satisfaction with midwifery services in a regional hospital and its referring clinics in the Limpopo Province of South Africa." Afr. J. Nurs. Midwifery 13(2):14-28.

LeontineAlkema, Doris Chou, Daniel Hogan, Sanqian Zhang (2016) Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. Articles387:462-474.

Mariam Ashraf, Fatima Ashraf, AtifRahman, Rukhsana Khan, Assessing women's satisfaction level with maternity services: Evidence from Pakistan, International Journal of Collaborative Research on Internal Medicine & Public Health, Vol. 4 No. 11 (2012), 20 1841 – 51.

McMahon SA, George AS, Chebet JJ, Mosha IH, Mpembeni RN, Winch PJ (2014). Experiences of and responses to disrespectful maternity care and abuse during childbirth; a qualitative study with women and men in Morogoro Region, Tanzania. BMC Pregnancy Childbirth. 14(1).

Mehata S, Paudel YR, Dariang M, Aryal KK, Paudel S, Mehta R (2017). Factors determining satisfaction among facility-based maternity clients in Nepal. BMC Pregnancy Childbirth 25:17(1).

Melese T, Gebrehiwot Y, Bisetegne D, Habte D (2014). Assessment of client satisfaction in labor and delivery services at a maternity referral hospital in Ethiopia. Pan Afr. Med. J. Pan Afr. Med. J. p17.

NdeogoAmaduAbdallah, Factors influencing women's satisfaction with child birth services in the tamale Metropolis University of Ghana 2018, http://ugspace.ug.edu.gh.

RahelTesfaye, AmareWorku, WanzahunGodata and BerntLindtjorn (2016) client satisfaction with delivery care service and associated factor in public health facilities in GamoGoffa zone Administration, SNNPR, Ethiopia.

Royal College of Obstetricians and Gynecologists, standards for maternity care, Report of a working party, june 2008.

Srivastava A, Avan B I, Rajbangshi P, Bhattacharyya S. Determinants of wo men's satisfaction with maternal health care: a review of literature from developing countries. BMC Pregnancy and Childbirth .2015, 15:97.

SiminTaghavi, MortezaGhojazadeh, Saber Azami-Aghadash, Assessment of mothers' satisfaction with the care of maternal care in Specialized Educational-Medical Centers in obstetrics and gynecological disease in Northwest Iran, J Anal Res Clin Med 2015; 3(2): 77-86

Temamo AA, Abebe A, Menta AA (2018) Mothers' Satisfaction with Institutional Delivery Service and Associated Factors among Women Attending Hospitals in Wolaita Zone Administration, SNNPR, Ethiopia. J Nutr Diet Pract 2: 001-012.

World vision Ethiopia, causes of low skilled-birth attendance coverage in selected woredas of Amhara, Oromia and SNNP regions, Addis Ababa, Ethiopia, 2014

WHO. Maternal mortality. Fact sheet NO 348. 2014. 4 p

WHO (2019), Trends in Maternal Mortality: 1990 to 2010: Estimates Developed by UNICEF, UNFPA and World Bank, Geneva, WHO Press Geneva.

QUESTIONNAIRE

WOLKITE UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCE

DEPARTEMENT OF STATISTICS

Dear Respondents, this Questionnaire is organized for the research partial fulfillment of Bachelor Degree in Statistics in the Wolkite University**.** The purpose of this questionnaire is to gather information about "statistical analysis of satisfaction of mother's delivery at Atat Hospital". We believed that the information obtained from your response would have a considerable importance for the success of the study. Therefore, please be objective while you respond to each item in the questionnaire. Therefore, please respond the Questions frankly and honestly.

Instruction: Please make tick (√) in the boxes or give your response on provided blank space for the specified questions.

1. Age in years…….
2. Marital status: Single ☐ Married ☐ Others (separated, divorced) ☐
3. Education level: No formal education ☐ Primary ☐ secondary and above ☐
4. Residence: Urban ☐ Rural ☐
5. Wanted status of Pregnancy: Wanted ☐ Unwanted ☐
6. Mode of delivery: 1. Spontaneous virginal delivery ☐ 2. Assisted by instruments ☐
7. Did you have ANC follow up? Yes ☐ No ☐
8. Maternal outcome: Normal ☐ With complication ☐
9. Fetal outcome Live birth ☐ Still birth ☐ Neonatal death ☐
   Others specify….
10. Measures taken to assure privacy thus attending to women in separate rooms or under screened areas: Yes ☐ No ☐
11. Delivery attendant professional gender: Male ☐ Female ☐
12. Waiting time to see a doctor or midwife/nurse: >15 minute ☐ <15 minute ☐
13. Availability of prescribed drugs Yes ☐ No ☐
14. Cleanliness of physical environment Yes ☐ No ☐

15. How satisfied are you with the availability of prescribed drugs: Very dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very satisfied ☐
16. How satisfied are you with the time spent waiting to be seen by a health care provider? Very dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very satisfied ☐
17. Have you had to pay for any services or products during your stay?
    Yes ☐ No ☐
18. If you answer yes how many birr …….
19. How satisfied are you with the cost of delivery services: Very dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very satisfied ☐
20. How satisfied are you with the professional gender: Very dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very satisfied ☐
21. How satisfied are you with measures taken to assure privacy: Very dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very satisfied ☐
22. How satisfied are you with general hospital cleanliness: Very dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very satisfied ☐
23. How satisfied are you with the overall care and support during the time of labor and delivery. : Very dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very satisfied ☐

THANK FOR YOU YOUR COOPERATION!