ADDIS ABABA UNIVERSITY

SCHOOL OF PUBLIC HEALTH,

COLLEGE OF HEALTH SCIENCE

ASSESSMENT OF LEVEL OF KNOWLEDGE AND PRACTICE OF ESSENTIAL NEWBORN CARE AND ITS DETERMINANTS AMONG RECENTLY DELIVERED WOMEN IN FICTHE TOWN, NORTH SHEWA ZONE, OROMIA REGION, ETHIOPIA

By: Yeshiwork Eshetu (BSC)

THESIS SUBMITTED TO COLLEGE OF HEALTH SCIENCE SCHOOL OF PUBLIC HEALTH, ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH IN REPRODUCTIVE HEALTH.

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Advisor: Demeke Asefa (MD, MA)

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Approved by the Examining Board

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Advisor	Signature
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Examiner	Signature
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Examiner	Signature

DICATION

This thesis is dedicated to my lovely Family especially for my father, my mother, my sister.

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List of abbreviations

ANC	Antenatal care
AOR	Adjusted Odd Ratio
BCG	Bacillus Calmette-Guerin
C/s	Caesarian –section
CI	Confidence Interval
COR	Crude Odds Ratio
EBF	Exclusive Breast Feeding
EDHS	Ethiopia Demographic and Health Survey
ENC	Essential Newborn Care
ETB	Ethiopian Birr
H/F	Health Facility
HEWs	Health Extension Workers
HWs	Health workers
IDI	In-Depth Interview
MCH	Maternal and Child Health
MDGs	Millennium Development Goal
NM	Neonatal Mortality
OPV	Oral Polio Vaccine
PNC	Postnatal Care
RDW	Recently Delivered Women
SBA	Skill Birth Attendance
TBA	Traditional Birth Attendance
TTI	Tetanus Toxoid Immunization
WHO	World Health Organization

ABSTRACT

Background- Neonatal mortality contributes a higher percentage to infant mortality rates (IMR) especially in developing countries including Ethiopia where the rate of institutional, skill assisted delivery is low and the fact that the absence of emergency neonatal support service contribute to the problem. Therefore, it is justified to the level of mothers' knowledge and practice of the Essential Newborn Care is timely.

Objective: The aim of this study is to assess the level of knowledge & practice and factors associated with Essential Newborn Care among Recently Delivered Women (RDW), in Fitche town, Oromia Region.

Methods: A community based cross-sectional study was conducted from February to March, 2015 in Fitche Town using a mixed survey method (both quantitative as well as qualitative).Quantitative data was collected from the sampled 389 women who delivered in previous 12 months of the date of the data collection in Fitche town. The survey participants were identified using a stratified random sampling technique. Structured and pretested questionnaire was used to obtain information about the knowledge and practice of Essential Newborn Care. The quantitative data were supplemented by information obtained from key informant using in-depth interview method. The sample size for the qualitative method was determined by saturation of idea. The quantitative data was first entered in to EPI-Info version 3.1 and exported to SPSS statistical packages version 21. Descriptive summary measures and association between the various background variables and knowledge and practice were done. Binary and multivariate logistic regression study analysis was done to identify factors associated with dependent variables. Thematic analysis was used for the qualitative study

Result: A total of 386 women participated in the quantitative survey. The majority of women 261(67.6%) were in the age 20-29 years. 117(30.3%) women were illiterate. The majority 367(95.1%) of women made at least one antenatal care (ANC) visit during their last pregnancy. Majority of the respondents 339(87.8%) delivered in the health facility. Only few 67(17.4%) women reported receiving a postnatal check by a health worker or health extension workers in the first week after delivery. Less than half 179 (46.4%) of the mothers' had good overall knowledge about ENC. Knowledge was rated highest with immediately and exclusive breast feeding and lowest was rated with danger signs identification, eye care and immunization. Women who were

illiterate [**AOR: 0.153, (95% CI: 0.052-0.445)]**, able to read & write, **[AOR (95%CI) 0.162(0.027-0.989)],** and also women who received grade 9-10 education, **[AOR (95%CI) 0.372(0.141-0.982)],** Those women whose household monthly income was from 1401-2350 ETB,[**AOR: 0.311, (95% CI: (0.113-0.858)]** and Women who registered for ANC sixteen weeks and above of gestation, [**AOR: 0.535, (95% CI: 0.311-0.921)],** were found significant predictors on level of knowledge about ENC. Regarding to practices, greater than half 214 (55.4%) of mothers' had good overall practices about ENC. Practice was rated highest with immediately and exclusive breast feeding and lowest rated with thermal care especially immediate placement of the newborn. Women who had poor knowledge of ENC, [**AOR: 0.158, (95% CI: 0.085-0.293)],** women who were in the age group fifteen to nineteen, [**AOR: 142.7, (95%** CI: **5.249-3880**)], and women who didn't have counseling at antenatal, [**AOR: 0.492, (95% CI: 0.245-0.987)**], were found significant predictors on level of practice about ENC.

The in- depth interview identified that: giving food and fluid immediate after birth up to 6 months & bottle feeding, bathing immediate after birth, use of unsterile and unclean material for cutting and tying umbilical cord, application of substance on cord stump and not giving colostrum or first milk for the newborn causes infection to the newborn. Concerning practices, respondents confirmed that there are cultural practices exercised in the community on the application of substances on cord stump, prelactant feeding, bathed immediately after birth using cold water especial for home delivery causes infection to the newborn.

Conclusion and recommendation

Among the recently delivered mothers, 207(53.4%) had poor knowledge about Essential Newborn Care and from the components of ENC; mothers were most knowledgeable on breast feeding. Knowledge gaps exist with regard to eye care, immunization and danger signs identification in neonate. Maternal education programs should be given emphasis for the components of ENC for mothers' knowledge gaps. Maternal education must be giving due attention for Women who were illiterate, able to read & write and also women who received grade 9-10 education, mothers whose household monthly income was from 1401-2350 ETB, Women who registered for ANC sixteen weeks and above of gestation and mothers who had poor knowledge about ENC.

1. Introduction

1.1 Background

Neonatal mortality remains high despite a declining proportion of deaths among children less than five years of age. Globally, every year, nearly 44% of all deaths in children under- five are among newborn infants (1). Close to 50% of the newborns die in their first day of life and 75% by seven days (2). According to 2012 report an estimated of 2.9 million neonates die annually in the first 4 weeks of life globally (1). Almost all (99%) of these neonatal deaths occurred in low income and middle income countries with the highest rates occurring in sub-Saharan Africa (34 deaths per 1000 live births) accounts for 38 percent of global neonatal deaths (1, 2).

Majority of the neonatal deaths that occur especially in developing countries are avoidable or preventable causes. Three major causes account for more than 85% of newborn death namely: complications of prematurity, intra- partum related neonatal deaths (including birth asphyxia) and neonatal infections. Complications of prematurity are currently the second leading cause of under-five deaths (1).

Cognizant of the magnitude of the problem, the World Health Organization (WHO) has come up with a set of guideline about the, Essential Newborn care Practices (ENCP) which are evidence based cost effective measures to improve neonatal outcomes. This guideline is to be used by all stakeholders who engaged with the neonate including the health care providers and mother, community and government. These outlines of practices include clean delivery and clean cord care, thermal protection, early and exclusive breastfeeding, initiation of breathing resuscitation, eye care, immunization, care for the low birth weight newborn, and management of newborn illness (3).

In Ethiopia, the current infant mortality rate is 59 deaths per 1000 live births, under five mortality rates is 88 deaths and neonatal mortality is 37 deaths per 1000 live births. The neonatal mortality accounts about 63% of the recent infant mortality rates (IMR) which remains higher (4)

In Ethiopia, institution/skilled assisted delivery are low. According to EDHS 2011, it is about only 10% (4) this fact may indicate the magnitude of neonatal deaths that occurs at home where neonate lack appropriate newborn care. Lack of knowledge of primary caregiver and coupled with strong cultural beliefs influence neonatal survival. Newborn care practices by the primary caregiver immediately after birth are important in determining neonatal mortality and morbidity rates (5).

1.2. Statement of the problem

Ethiopia is one of the ten countries with the highest number of neonatal deaths globally, with an estimated 122,000 newborn deaths per year (6). Close to 90% deliveries in Ethiopia took at home and attendance at antenatal care and postnatal care are also low (4). The government of Ethiopia in its effort to implement the health policy (7) and commitment to achieve the MDGS has put mother and child health as its top priority. Accordingly, the Federal Ministry of Health (FMOH) introduced prenatal and postnatal home visits by health extension workers (HEWs] in all parts of the country (8).

Study conducted in Ethiopia revealed that three quarters of newborns had clean cord cutting and tying with no difference by place of birth, but just 43% of newborns had clean cord care in the days following birth, partly because of the practice of applying ointments to the cord after birth. There was no difference in immediate drying or wrapping by place of birth, but a large difference in delayed bathing with newborns born at home being bathed more quickly than newborns born in a facility. Just half of newborns were breastfed within one hour of birth. Ten percent of mothers reported that their newborn had at least one danger sign in the first month of life and approximately three quarters sought care outside the home for their sick newborn. Similar to estimates of post-partum care, fewer than ten percent newborns had post-natal care in the first month of life, and just four percent had a post-natal check in the two days. The quality of care received during post-natal checks was low, and no newborns in the sample received the five core components of good quality care (weighed, cord checked, care giver counseling on breastfeeding, thermal care and danger signs (9).

Despite all the effort currently made, the neonatal mortality rate 37 deaths per 1000 live births remains high as compared to 2005 Ethiopian Demographic and Health Survey (EDHS) which was 39 deaths per 1000 live births (4,10). It accounts for 63% of infant mortality. Similarly; in Oromia regional state, the neonatal mortality was 40 deaths per 1,000 live births which is even higher than the national (4).

Majority of the neonatal deaths that occur are avoidable or preventable. An emerging consensus said that these deaths could be averted up to 72% of neonatal deaths if Universal (99%) coverage of proven cost effective interventions is put into effect (11). Neonatal deaths are strongly associated with inadequate care the mother receives before and during pregnancy, childbirth, and the postnatal period (12). Several factors have been identified as barriers to access care to the newborn especially in developing countries; these include unavailability of the services, inadequate number of skilled

personnel, geographical inaccessibility and poor quality of care, financial constraints, no perceived need for such services, cultural practices, mothers awareness/knowledge about newborn care, maternal health and socio- demographic characteristics good example educational status of mothers (13, 14).

Most neonatal deaths occur during birth and in the hours and days immediately after childbirth / early postnatal period and to decrease this neonatal morbidity& mortality rate primary care givers should have the appropriate knowledge & practices on ENC and yet, available literature in developing countries, including Ethiopia doesn't provide much information about mothers' knowledge & associated factors on Essential Newborn Care (15). There are also few studies on practices of newborn care in Ethiopia as well as Oromia Region (9, 16-18). The present study aims to assess level of knowledge, practices and associated factors on ENC and fill the existing information gap. The findings of the study will help in developing new approaches for improving the level of knowledge and practices and there by contributing to newborn survival.

1.3 Significance of the study

The information resulting from this research will be used as baseline information to plan appropriate interventions towards improving newborn health care services in the town. It will help to indicate the direction of intervention to the health workers and also help for improving health facility infrastructure and to take corrective measures to the existing service.

2. Literature review

World Health Organization has come up with a set of simple, cost effective measures that can be used by both the healthcare worker and the primary caregiver to ensure improved neonatal outcome. Components of the WHO Essential Newborn Care Practices include cord care, breastfeeding, thermoregulation, eye care, and immunization, management of birth asphyxia and recognition of danger signs with special emphasis on the care of low birth weight infants (3).

2.1. **General Information about Essential Newborn Care**

2.1.1 Cleanliness and Umbilical cord care

The umbilical cord connects the fetus and the placenta in utero. After birth the umbilical cord is cut and clumped. The cord stump dries, shrivels, and falls off five to fifteen days after birth (3).The umbilical stump can be a source of infection if not properly care (3, 19). The umbilical stump must, therefore, be kept clean. Principles of clean cord stump care (keep it dry and clean and don't apply anything) apply at home as well as in the health facility (3).

While it is generally agreed that cutting the cord using a sterile cutting instrument is the best practice, opinions vary on the best method of care for the cord stump (3). The stump will be dry and mummify if exposed to the air without any dressing, binding and bandages. It will remain clean if it is protected with clean cloths and is kept from urine and soiling. No antiseptics are needed for cleaning. If soiled, the cord can be washed with clean water and dried with clean cotton or gauze. Local practices of putting various substances on the cord stump- whether in the facility or homes – should be carefully examined. They should be discouraged if found harmful and substituted with acceptable ones (3).

Once the umbilical cord separates, minimal discharge is expected. Until the cord falls off, the area should be kept dry as much as is possible to promote separation and healing (3, 20). The mother should be aware of danger signs of umbilical cord infection including pus discharge, reddening around umbilical stump and/or the surrounding skin and other signs of infection including fever, lethargy and difficulty in breathing (3).

2.1.2 Thermoregulation

The newborn is much less efficient in thermoregulation than adults (21). Immediately after birth, the newborn begins to lose heat, a process which puts them at risk of hypothermia. Heat loss occurs through conduction, convection, radiation and evaporation (3). Low birth weight and premature

infants are at an even greater risk and lose heat easily (21). Hypothermia is defined by the World Health Organization as an axillary temperature below 36.5°C (3)

Recommendations have been made by WHO to ensure the newborn is not at risk of hypothermia.

These are described in 10 steps referred to as “warm chain”. They include warm delivery room, immediate drying, skin to skin contact, breastfeeding, bathing and weighing postponed, appropriate clothing/bedding, rooming in, warm transportation and resuscitation, training and awareness raising.

The mother must maintain the warm chain when she is at home, whether the delivery took place at home or in hospital. After delivery, practices to prevent hypothermia include rooming in, breastfeeding on demand and dressing the infant appropriately. Early bathing exposes the newborn to hypothermia. WHO recommends bathing after six hours of life and preferably on the second or third day of life (3).

2.1.3 Immunization

Immunization is one of the most effective preventive health measures in reducing child mortality and morbidity. WHO launched the Expanded Programme on Immunization (EPI) in 1974 following the campaign to eradicate polio. It aims to prevent deaths from vaccine preventable diseases such as tuberculosis, diphtheria, tetanus, pertussis, pneumococcal, polio, and measles.

Immunization contributes significantly to the attainment of Millennium Development Goal 4 by reducing vaccine preventable diseases (3, 22).

The Ethiopian Ministry of Health, offer routine immunization to infants which includes vaccination against tuberculosis at birth or within the first two weeks of life; polio at birth, 6 weeks, 10 weeks and 14 weeks, three doses each of the DPT-Hepatitis B-Haemphilus influenza type B (also called Pentavalent) together with pneumococcal at 6 weeks, 10 weeks and 14 weeks, and measles vaccine at 9 months (4)

2.1.4 Breastfeeding

Breast milk is the best milk for the newborn. While the proportion of breastfed babies is high worldwide, there are wide variations in the duration of breast feeding with sub-optimal breast feeding practice still the norm in most countries. Lack of exclusive breast-feeding substantially increases the risk of poor newborn and childhood outcome. Globally, less than 40% of infants under six months of age are exclusively breastfed (23).

WHO recommended, breast feeding should be started within one hour of birth. Feeding should be as frequent as the baby demand without prelactant feeds or other fluids and food. A recent trial has shown that early initiation of breastfeeding could reduce neonatal mortality by 22%, which would contribute to the achievement of the Millennium Development Goals (3).

Early and exclusive breastfeeding is important in the newborn. In Ethiopia, only 52% of neonates are initiated on breast milk within one hour. Colostrum which is the first breast milk is highly nutritious and protective to the newborn (4).

2.1.5 Eye care

Ophthalmia neonatorum refers to conjunctivitis occurring during the first two weeks of life. It typically appears 2-5 days after birth. Presents with most often both eyelids become swollen and red with purulent discharge. Neisseria gonorrhoea and Chlamydia trachomatis are the two main causes of ophthalmia neonatorum .The transmission rate for gonorrhoea from infected mother to her newborn is 30-50%. In the absence of systematic diagnosis and treatment of maternal genital infections before delivery, most cases of conjunctivitis of the newborn can be prevented by disinfection of infant conjunctivitis after birth (3).

Infection can be prevented by cleaning the eye immediately after birth and applying either1% silver nitrate solution, 1% tetracycline or 0.5 erythromycin ointment to the eyes within one hour of delivery. Without treatment, ophthalmia neonatorum may lead to serious complications including blindness due to corneal ulceration and even death (3, 24).

2.2. Knowledge about Essential Newborn Care

Study in India, urban slums of Lucknow city, revealed that one –third (30.2%) of mothers were of opinion that the initiation of breastfeeding should be within 1hour of birth and 31.6% were of opinion that it should be 1-24 hours of birth. Only 16.2% said about that it should be after 1 day. Nearly half (49%) of the mothers said that colostrum might prevent from illnesses (25).

Study in India, in the postnatal wards of selected tertiary care hospital of Udupi district, showed that knowledge of mothers was inadequate in the area of umbilical cord care 35%, thermal protection 76% and vaccine preventable diseases 43%, Most of them had opinion that vaccination is good for newborn health but a majority of them didn’t know the actual purpose of vaccination, most of them were only aware about Polio- and Hepatitis vaccine. 23 (76.7%) of mothers had good knowledge and only 7 (23.3%) had excellent knowledge (26).

Study India, central Bangalore, showed that 52 % of the samples are having satisfactory levels of knowledge, 27 % adequate and 21 % inadequate knowledge about newborn care (27). Study in India, maternity centers of Madurai Corporation showed that 65% postnatal mothers had moderate knowledge, 22% had inadequate knowledge and 13% had adequate knowledge regarding newborn care among postnatal mothers (28)

Study in Nepal revealed that mean knowledge was on keeping newborn warm 44.2, on newborn care 47.2, on immunization 67.33, on danger signs 35.63. All (100%) respondents had have knowledge to feed colostrum and exclusive breast feeding, 70 (70%) knew about early initiation of breastfeeding. Mean knowledge of respondents was on measures warm to keep 8.5 (29).

Study in Bangladesh, Dhaka Shishu Hospital revealed that only 5.8% mothers had excellent knowledge on neonatal care, 55.3% mothers had optimum knowledge and 39% mothers had poor knowledge (30). Other study in Bangladesh revealed that about 81.30%, 13.08% and 5.60% respondents had poor, moderate and good awareness on newborn care respectively. Regarding umbilical cord care 62.61%, 28.97% and 8.41% respondents had poor, moderate and good awareness respectively (31). Other study in Bangladesh revealed that the level of adequate knowledge regarding new-born care was present only in 15%, feeding practices in 39%, various components of immunization in 8%, growth and development in 42% and about newborn illness in 33% of the mothers(32).

Study in Sir-Lank revealed that 90% of the mothers knew about breast feeding on demand, the advantage of colostrum and the duration of exclusive breast feeding, Only 21.7% correctly answered that ‘surgical spirit’ (70% isopropyl alcohol) should not be applied on the umbilical stump and except for a few conditions, mothers demonstrated a satisfactory knowledge in recognizing danger signs of the newborn (15).

Study in Cameroon, Garoua city, revealed that use of sterile material for cutting newborn umbilical cord was reported by 88.5% mothers while instillation of eye drops was for 227 (65.4%) and 5 (1.4%) reported receiving information on newborn’s danger signs during ANC (33) .

Study in Kenya, Nairobi, showed that 91% and 28% of mothers knew the need of hygiene while cutting and tying the cord respectively. Regarding postnatal cord care, 40% had good knowledge. Fifty-one percent of mothers knew postnatal cord for the appropriate duration timed (34). Study in Ghana, showed that 77.2% (312) of respondents were aware of one to three newborn danger signs,

20.3% (82) of the women were aware of at least four danger signs while only 2.5% (10) of the mothers were not aware of any of the danger signs in the newborn (35).

Study in four regions (Amhara, Oromia, Tigray and Southern Nations, Nationalities and Peoples Region) of Ethiopia revealed that mother's unprompted knowledge of newborn danger signs was rather low, with only 29.3% of respondents able to name 3 or more danger signs out of a list of 11(18). Study conducted in Gondar Town, North West of Ethiopia revealed that mothers who had knowledge of three or more neonatal danger signs (good knowledge) were found to be 18.2% (36).

2.3. Practice about Essential Newborn Care

Study in Jamaica revealed that the prevalence of breastfeeding initiation was 98.2% & 22.2 % practiced it exclusively (at least 6 months) (37). Study in India, in the postnatal wards of selected tertiary care hospital of Udupi district, reveals that 53.3% of mothers had excellent practice and 46.6% has good practice on newborn care (26).

Study in India, central Bangalore, showed that 55% of samples are having satisfactory practices score, 25% inadequate and 20% is adequate practices (27). Study in India, maternity centers of Madurai Corporation, showed that more than half postnatal mothers 57% had high practices level, 43% had moderate practices level and none with low practices (28).

Study in Bangladesh, Dhaka Shishu Hospital revealed that the level of practice of the respondent mothers on neonatal care observed that only 5.5% mothers performed excellently where as 71.8% mother performed poorly, only 22.8% mother performed optimally (30).

Study in Garoua city, Cameroon revealed that Cord bandage was practiced by (85%) mothers, the application of traditional substances on the umbilical cord was for (54.2%) mothers, the first bath was given at least 6 hours after birth by 70.3% mothers (33).

Study in Ghana, showed that 90.8% of mothers reported that the umbilical cord of their babies was cut using a new blade, 93.6% reported bathing their babies within 6 hours of delivery, and 99.8% reported putting something on the cord to help it dry. Majority of the newborns (84.2%) were given colostrum (first yellowish milk) as the first feed after delivery, though some mothers practice prelacteal feeding Of the 320 children under 6 months, exclusive breastfeeding in the past 24 hours prior to the study was 88.1% compared to 85.0% exclusive breastfeeding in the past one month (35).

Study in Tanzania showed that 45% of babies born at a health facility and 19% born at home were bathed six or more hours after birth, Instillation of eye drops was carried up for 65.4% newborns. Breastfeeding within one hour was carried out by 44.3% mothers, Exclusive breastfeeding was practiced by 16.7% mothers and BCG and oral Polio vaccine was respectively conducted for 90.8% and 91% newborns respectively (38).

Study in Uganda revealed that 38% were judged to have had good cord care, 42% optimal thermal care, and 57% were considered to have had adequate neonatal feeding (39). Study in Nairobi, Kenya, showed that 66% had good practice about postnatal cord care& 54% practiced postnatal care for appropriate duration (34).

Study in four regions (Amhara, Oromia, Tigray and Southern Nations, Nationalities and Peoples Region) of Ethiopia revealed that exclusive breastfeeding for three days (87.6%), wrapping the baby before delivery of the placenta (82.3%) and dry cord care (65.2%) Practice contrary to WHO recommendation bathing during the first 24 hours of life (74.7%) discarding of colostrum milk (44.5%). The results suggest that are not large difference from most Essential Newborn Care practice in home and facility (18). Study conducted in Awabel district, East Gojjam, Amhara region, Ethiopia revealed that the level of Essential Newborn Care Practices was 23.1% (40).Study conducted in Mandura district, Metekel zone, Benishangul Gumuz region revealed that among mothers who gave births within one year, 216 (40.6%) of them had good newborn care practice (41).Study conducted in Jimma Zone, Ethiopia revealed that the overall status of neonatal care practice was 59.5 % (42).

2.4. Factors affecting knowledge of Essential Newborn Care

2.4.1. Socio – demographic characteristics

Study in India, central Bangalore showed that poor knowledge was associated with young postnatal mothers & low monthly income than counterparts (27). Studies in India & Bangladesh showed that mothers' with higher levels of education were likely to have better knowledge about newborn care as compared to their counterparts (26, 27,31) .Studies in India, Bangladesh &Sir-lank showed that mothers' who have poor knowledge/awareness were associated with unemployed women than counterparts (15,27, 31).

Studies in India revealed that increase of maternal age, education and with improvement of socio economic status had good knowledge about breast feeding and timely initiation of it as compared to their counterparts (43, 44). Study in Bangladesh, Dhaka Shishu Hospital revealed that there is a statistically significant association between education of mother and shaving hair, umbilical care, bathing, vaccination, and proper eye care (30).

Study in Nairobi, Kenya, showed that young, poor and low education mothers had poor knowledge about cord care than counterparts (34). Study conducted in Gondar town, North West of Ethiopia revealed that having good knowledge newborn danger signs was positively associated with mother's higher educational achievement (36)

2.4.2. Maternal health services

Study in Sir-lank showed that time of initiation of ANC had association with mothers' knowledge about Essential Newborn Care. The same study revealed that women with delayed antenatal visits were likely to have poor knowledge about Essential Newborn Care as compared to their counterparts (15). Study conducted in Gondar town, North West of Ethiopia showed that having good knowledge about neonatal danger signs was higher among Antenatal care and postnatal care attendant mothers than counterparts (36).

2.4.3 Obstetrics factors

Study in India, West Bengal showed that increase parity had good knowledge about breast feeding and timely initiation of it as compared to counterparts (43). Studies in India at maternity centers of Madurai Corporation and Sir- Lank showed that parity had significant association with mothers' knowledge on newborn care (15, 28). Mothers being primiparae are more likely to have poor knowledge about newborn care than multi parity (15, 28).

2.4.4. Source of information

Study in India, maternity centers in Madurai Corporation showed that source of information had significant association with mothers' knowledge about Essential Newborn Care. The same study revealed that poor knowledge was associated with women who had acquired their knowledge from sources other than health workers (28). Study conducted in Gondar town, Ethiopia revealed that access to television was also associated with mothers' good knowledge about neonatal danger signs (36).

2.5. Factors affecting practices of Essential Newborn Care

2.5.1. Socio – demographic characteristics

Study in Nepal, Nawalparasi district revealed that maternal education was found to have association with early initiation of breast feeding, delayed bathing practices and cord care (45)

Studies in India& Bangladesh revealed that education of mothers' had significant association with delay bathing, umbilical care, vaccination and proper eye care (27, 30). Study in Uganda revealed that mothers who had lower educational level and lower social classes more likely to use potentially harmful substance on the cord stump as compared to counterparts (39). Study in Ghana revealed that women in the age group 25-34 years were more likely to give good feeding practices to their babies than 35 and above years (35).

Study in Ethiopia asserted women being married, middle/ richer/ richest wealth index, and child age 0-1and 2-3 months were retained as the predictors of EBF (46). Other study in Ethiopia, Axum Town revealed that sex of child had shown a statistically significant association with timely initiation of breast feeding (47). Studies conducted in Awabel, East Gojjam, Amhara region & Mandura district, Metekel zone, Benishangul Gumuz region and Jimma Zone, Ethiopia revealed that attending primary school and above level were positively associated with good newborn practice of mothers as compared with those women who are unable to read and write (40, 41, 42).

2.5.2 Maternal health services

Study in India, Uttar Pradesh revealed that use of antenatal care and skilled attendance at delivery were significantly associated with clean cord care& breast feeding as compared to counterparts (48).Study in Nepal, Chitwan District revealed that delay bathing was more practiced in institutional deliveries as compared to home deliveries (49). Study in Nepal, Nawalparasi district revealed that antenatal check up, antenatal counseling on newborn care, place of delivery and person assisted during delivery found to be associated with early initiation of breast feeding, delayed bathing practices and cord care(45)

Study in Ghana, revealed that women who initiated ANC early in the first trimester were more likely to give good neonatal feeding to their baby than counterparts (35).Study in Ethiopia, Goba Woreda, revealed that receiving postnatal counseling & place of delivery were independent predictors of timely initiation of breast feeding (50).

Study conducted in four regions of Ethiopia, revealed that placing the baby on the mother's chest immediately after delivery was significantly higher for facility deliveries than home deliveries (18). Study conducted in East Gojjam, Amhara region, Ethiopia revealed that those women who had got immediate PNC visit after delivery and those women who had got advice about ENC practices during monthly pregnant mother's group meeting were more likely to practice ENC when compared their counterparts (40). Study conducted in Mandura district, Metekel zone, Benishangul Gumuz region revealed that women who had history of at least one ANC visit were more likely to have good newborn practice as compared to their counter parts (41).

2.5.3. Obstetrics factors

Study in India, showed that parity had significant association with safe cord care. The same study revealed that Multiparous mothers were less likely to have good cord care practices when compared to primiparae (51). Study in Ethiopia, Axum Town showed that mode of delivery had significant association with early initiation of breast feeding (47).

2.5.4 Source of information

Study in India, maternity centers of Madurai Corporation revealed that source of information had significant association with practice of ENC (28). The same study showed that poor knowledge was associated with mothers who had acquired their knowledge other than health worker (28). Studies showed that sources of information about newborn care had significant association about newborn care practices. Study in India, district of Uttar Pradesh revealed that newborn care practices during pregnancy were more likely to report the respective practices (48). Study conducted in East Gojjam, Amhara region, Ethiopia revealed that the presence of radio in the household as Source information was showed statistically significant association with ENC practice of women (40)

2.5.5 Mothers knowledge about ENC

Study in India, maternity centers of Madurai Corporation revealed that knowledge of mothers about newborn care had significant association with practice. The same study revealed that mothers' poor knowledge had significant association with poor practices of newborn care (28). Study in Nepal, Chitwan District revealed that knowledge regarding newborn care & danger sign of newborn found to be associated with cord care (45). The same study revealed that mothers who knew about newborn care were more likely to practice cord care in comparison to mothers who do not know about it. Study in Bangladesh, Dhaka Shishu Hospital revealed that maternal knowledge had

association with newborn care practices (30). The same study revealed that poor mothers' knowledge was associated with poor practices. Study in Ghana, showed that the main predictor of good neonatal feeding was maternal knowledge of newborn danger signs (35). Study conducted in Mandura district, Metekel zone, Benishangul Gumuz region revealed that those mothers who knew first bathing and first breast feeding time of their baby were more likely to have good newborn practice than their counter parts (41).

2.5.6 Culture

Study in Tanzania revealed that the main reason for early bathing believed that the baby is dirty, particularly if the baby had an obvious vernix as this was believed to be sperm. On the other hand, keeping the baby warm and covered day-to-day was considered normal practice. Skin-to-skin care was not a normalised practice, and some respondents wondered if it might be harmful to fragile newborns (36). Study in Ethiopia (Amhara & Oromia) revealed that Butter was routinely given to infants immediately after birth & mother express her breast and discard colostrum there is believed that ″the first milk might not be clean (16).

Conceptual framework

This conceptual framework was proposed after extensive review of different literatures which are mentioned as main factors/determinant of mothers' knowledge and practices about Essential Newborn Care

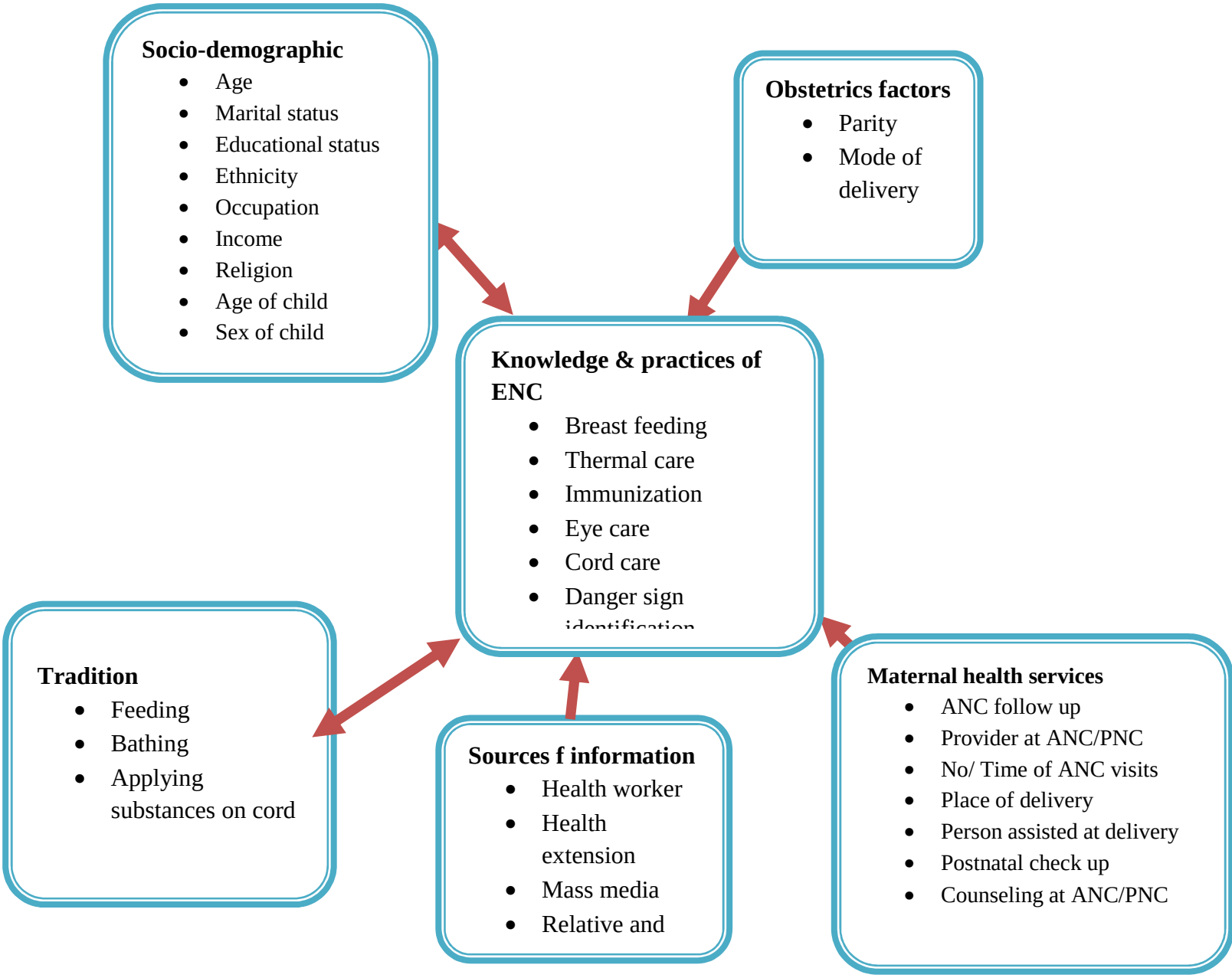


Figure1. Conceptual framework on factors that affects ENC.

3. OBJECTIVES

3.1 General objective

To assess the level of knowledge and practice about Essential Newborn Care and associated factors among women who delivered in previous 12 months of the date of the study in Fitche town, in the state of Oromia Region.

3.2 Specific objectives

- To determine level of knowledge about Essential Newborn Care among women who delivered in the previous 12 months of the date of the study in Fitche town.

- To determine level of practice about Essential Newborn Care among women who delivered in the previous 12 months of the date of the study in Fitche town.

- To identify factors that influence knowledge and practice about Essential Newborn Care among women who delivered in the previous 12 months of the date of the study in Fitche town.

4. Method

4.1. Study Area and period

The study was undertaken from February, 2015 to March 2015 at community level in Fitche Town. Fitche is the capital of North Shewa zone, Oromia region, 112km Northwest of Addis Ababa. Fitche has four Kebeles and the town has a total population of 38,307 of which female population accounts 51%. From the total population, 23.3% are women in the reproductive age group (15-49 years) which accounts 8,963. The average household size is 4.8. Fitche has 14 health extension workers those who serve the population and has a health infrastructure with health services delivered through a network of one hospital, two health centers, one Family Guidance Association and five private clinics. According to the Town's Administrative Health Office report, antenatal care, institutional delivery and postnatal care service were 63%, 33% and 74% respectively (51).

4.2. Study design:-A Community based cross-sectional study was conducted which employed both quantitative and qualitative (mixed) method.

4.3. Source population-: all women of child bearing age (15-49 year) in Fitche town.

4.4. Study population

Quantitative study-: All women who delivered in the previous 12 months prior of the date of the study in Fitche town who fulfilled the inclusion criteria were included in the study.

Qualitative study

In depth interviews were included (health providers, elderly women, community leaders, religious leaders & programmers).

Inclusion criteria

- Women who have infant up-to 12 months prior the date of the study and who live in the study area at least for 6 months.

Exclusion criteria

- Severely sick women who were unable to give consent or interview.

4.5. Sample size determination of Knowledge

Quantitative study

The sample size was determined using single population proportion formula $n = z^2 (pq)/d^2$. Proportion of mothers that were knowledgeable about newborn danger signs was 29.3% (18).

Where n=sample size

Z=Reliability Coefficient with 95% confidence interval

P=Population variance available from previous data q=1-p

d= Standard error allowed

If the value of p is 0.293 and the desired error chosen to be 0.04 b/c, the prevalence of mothers' knowledge about neonatal danger signs < 30% (18), with the reliability coefficient of 1.96% certainty (z=1.96). Then, $n = \frac{(z\alpha/2)^2 P(1-P)}{(d)^2} = \frac{(1.96)^2 0.293(1-0.293)}{(0.04)^2} = 497$

The source population was 8,963. So population correction was used to get the correct sample size including 10% non response rate that was 389.

Sample size for practice

Sample size (n) was determined based on 82% prevalence of wrapping the baby before delivery of placenta (18). Following the above procedure the sample size of practice was calculated and the sample size was 303. By comparing the sample size of knowledge and practice, I have taken the largest sample size (389)

Qualitative study: The sample size of qualitative method was determined by saturation of idea

4.6. Sampling procedure

Quantitative part: The study participants were women of Reproductive age (15-49 years) who delivered in previous 12 months of the date of the data collection in Fitche town. The study was conducted in four kebeles of Fitche town. In order to obtain the required number of sample from Four Kebeles, all women who delivered in the previous 12 months prior of the date of study were registered to get sample frame. The calculated sample size was proportional allocated based on total population of each kebele. Stratified random sampling procedure was used to select eligible participants from all kebele.

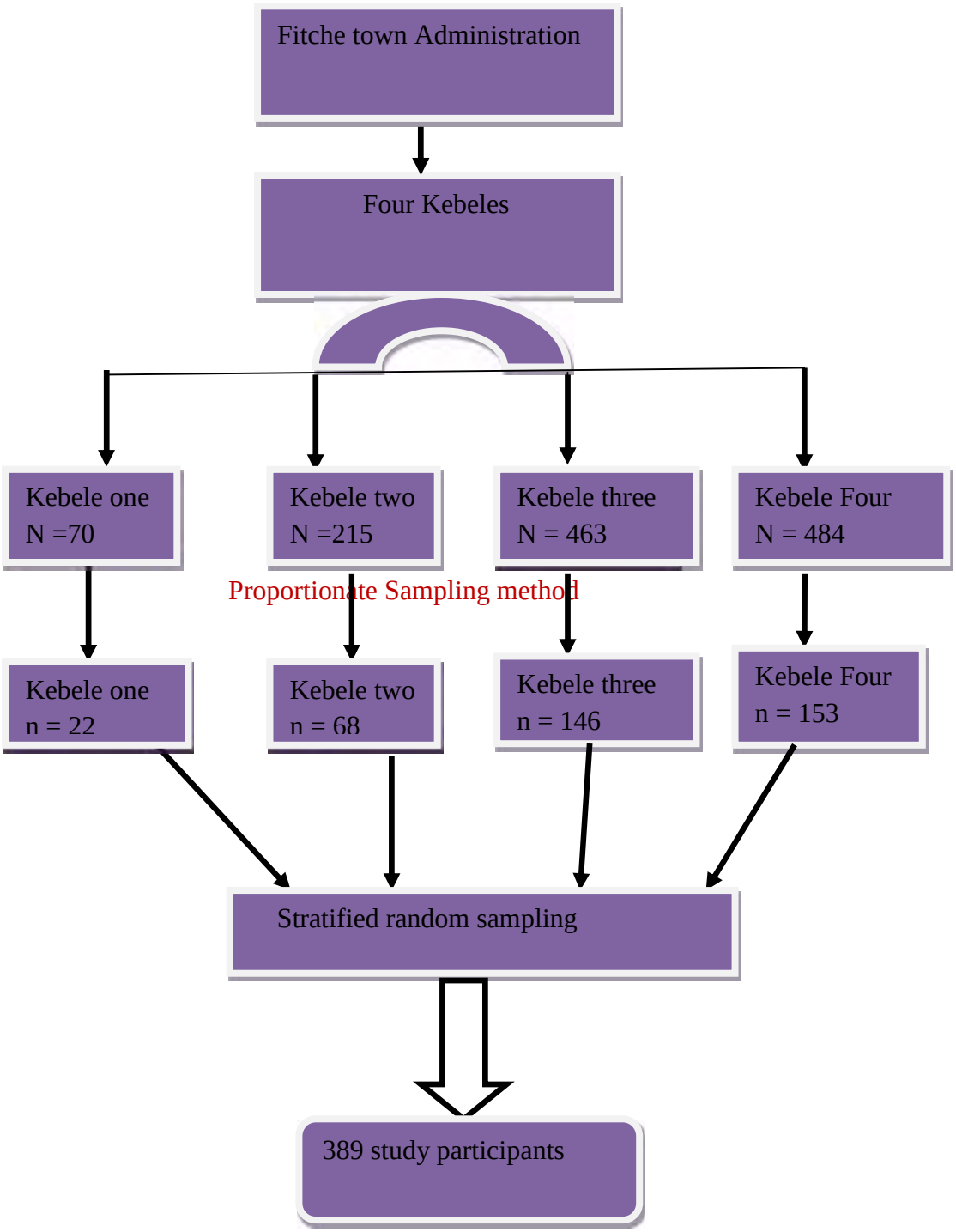


Figure 2: Schematic presentation of the sampling procedure used in the study, Fitche town, Oromia Region, Ethiopia, 2015

Qualitative

Purposive sampling technique was used for in –depth interview. A total of 26 key informants were involved in the interview, health provides (8), health programmers (4), elderly women (5), religious leaders (4) and community leaders (5) participated in the interview until the idea reached saturation.

4.7. Data collection tools and procedure

Quantitative study

A standard questionnaire developed by the Saving Newborn Lives Program was adapted for this survey. The survey questionnaire was first prepared in English language and then translated to Afaan Oromo and Amharic and then retranslated back in to English to check its consistency. The interview techniques were employed for the selected respondents in the chosen households. Explanation was given on the purpose of the study and the importance of their involvement then respondents who volunteered were interviewed face- to- face using structured and pretested questionnaires. Four interviewers were 10+3 and who know and speak the local language. They were trained on objective of the study, method of data collection and discussed thoroughly on the tools prepared for data collection. Two supervisors were health professionals who were trained by the researcher. During the training days explanation was given on the purpose of the study and discussed on the tool designed for data collection, how to implement, potential problems that can arise and how to solve them.

Qualitative study The in depth interview was also carried out to interview the key persons in the community. The key persons, community leaders (chairmen & managers of kebele & Women and children Affairs office representative), elderly women, religious leaders from the Orthodox & protestant church, health providers (those worked at delivery, ANC, pediatrics and postnatal unit and urban health extension workers) , health programmers (Head of town Administration Health office ,MCH head, Health Center heads) were involved in depth interview. The principal investigator conducted the in-depth interview using a simple checklist topic /questions to be covered to collect the suggestion of the participants. The points were manually written

4.8. Study variable

Dependent variable

Knowledge and practice of ENC (outcome)

Independent variable

Socio demographic:-Maternal age, marital status, occupation, education, ethnicity, religion and income, age of infant & sex of infant.

Culture factors: Traditional like feeding, application of substance on cord and thermal care

Obstetrics' factors: parity and mode of delivery

Source of information: Health Workers, HEWs, Mass Media, Relatives & Friends

Maternal health services: ANC follow up, time of ANC starts, Number of ANC visits, TT vaccination, places of delivery, Person assisted at delivery/SBA, postnatal check up, provider at ANC/ PNC and counseling at ANC/ PNC.

4.9. Operational definitions and Measurement

Assessment: in this study assessment refers to critical analysis and valuation or judgment of status about mothers' knowledge and practices on ENC.

Recently delivered women: in this study recently delivered women defined as women who delivered prior to 12 months of the survey.

Skilled provider/skilled attendant: people with midwifery skills (for example, midwives, doctors and nurses) who have been trained to proficiency in the skills necessary to manage normal births and diagnose or refer obstetric complications.

Essential Newborn Care: It refers to the care provided to the baby from birth to 28 days of age by care giver or by the mothers including: thermal care, hygienic care, cord care, eye care, breast feeding, immunization and identification new born danger signs.

Knowledge item on Essential Newborn Care: The mother was asked questions which cover knowledge of Essential Newborn Care that include: cord care, eye care, thermal care, breast

feeding, immunization and identification newborn danger signs. The investigator has developed an index questions in the above issues that assigned score 1=correct response (consistence with WHO Essential Newborn guidelines), 0= incorrect response (inconsistence with WHO ENC guidelines) any mother who didn't know the answer considered to have an incorrect response.

Good Knowledge: is the summary index above the mean score.

Poor knowledge: is the summary index below and equal to the mean score.

Knowledge on key danger sign of neonate: - A woman was asked questions and considered as knowledgeable on key danger signs of neonate, if she can mention spontaneously at least three or more of the eleven key danger signs for neonate.

Practice item on Essential Newborn Care. The mother was asked questions which covers practice of Essential Newborn Care that includes; cord care, thermal care, breast feeding & immunization. The investigator developed a composite index questions in the above issues that assigned a score of 1=correct response (consistence with WHO Essential Newborn guidelines), 0= incorrect response (inconsistence with WHO Essential Newborn Care guidelines) any mother who didn't know the answer considered to have an incorrect response

Good practice: is the summary index above the mean score.

Poor practices: is the summary index below and equal the mean score.

4.10. DATA QUALITY ASSURANCE

The quality of data was ensured through all data collection tools and translated to local language and back translated to English by people who have proficiency in translation to ensure its consistency. Training of data collectors and supervisors was made to enable them acquire basic skills necessary for data collection and supervision respectively. Pre-testing of data collection tool was made in Fitche town and participants who involved in the pretest were excluded in the later data collection and based on the results of pre-testing necessary adjustment to the data collection tools was made. Spot check was done on the field. Filled questionnaires were checked daily.

4.11. Data analysis procedure

Quantitative part

Collected quantitative data was edited, coded and entered to Epi Info version 3.1 computer packages. It was then transported to SPSS version 21.0 for analysis. Frequencies and percentages of the responses were calculated. Associations between variables were assessed by using Odds Ratio, 95% Confidence Intervals and p-values. Multiple logistic-regressions were used to adjust for possible confounding variables. The qualitative data was also transcribed manually form the audiotape records and the note taken. Then the result was narrated thematically.

4.12. Ethical Considerations

Ethical approval and clearance was obtained from the Research Ethical committee (REC) of the school of public health, Addis Ababa University. Ethical clearance was also obtained from Fitche Town administration Council & Town's Health Office. To collect data from participants, explanation was given on the purpose of the study, the importance of their participation and true response. It was also explained that the study had no connection with individual affairs of respondents. Confidentiality of all data collected was kept. All sample populations were encouraged to participate in the study while at the same time they were told their right not to participate was also respected.

4.13. Dissemination of results

The findings of the study will be presented at the School of Public Health, College of Health Sciences. Besides, a copy of the research findings will be given for the other responsible bodies. Publication of the findings will also be considered.

5. Quantitative Results

From the total of 389 samples 3 questioners were excluded as result of incompletes and inconsistencies making the response rate of 99.2%. The analysis was done on data collected from 386 recently delivered women participants.

5.1. Socio demographic characteristics.

The women's age range from 16 to 42 years, with a mean of 26.8 (± 4.7) years. Most of the respondents, 261 (67.6%) were between 20-29 years old. Majority of the respondents, 343 (88.9%) were married and 12(3.1%) unmarried. Of the total respondents, 117 (30.3%) were illiterate while the remaining could at least read and write. Regarding their religion, most of the respondents 363 (94.0%) was Orthodox. Out of the total respondents, 223(57.8%) were Oromo, 156(40.4%) were Amhara, the rest Tigray, Gurage and other. Concerning their occupation, 142 (36.8%) were housewives while, 91(23.6%) self employees, 45(11.6%) government employee, 66 (17.1%) daily laborer, 32 (8.3%) merchants the rest farmer and student. Most of the respondents household income, 144 (37.3%) earn 151-650 birr while, 121 (31.3%) earn 651-1400 birr, 73 (19.0%) earn 1401-2350 and the rest above. The proportion of male to female infants was almost equal. Male accounts 50.8 % while female is 49.2 %. The age distribution of the infants show that 206 (53.4%) of them were greater than 6 months while 11 (2.8%) were less than one month.(As show in Table 1)

Table -1 Socio Demographic Characteristics of Recently Delivered Women (RDW)& their children in Fitche Town, N/Shewa, Oromia Region,2015 (n =386), February to March (n=386)

Characteristics	Number	Percent
Age (in years)		
15-19	20	5.2
20-29	261	67.6
30-39	100	25.9
>40	5	1.3
Marital status		
Married	343	88.9
Unmarried	12	3.1
Widowed/ divorced	31	8.0
Educational status		
Illiterate	117	30.3
Read& write	10	2.6
1-4	57	14.8
5-8	71	18.4
9-10	81	21.0

Higher than10	50	12.9
Religion		
Orthodox	363	94.0
Muslims	6	1.6
Protestant	17	4.4
Ethnicity		
Oromo	223	57.8
Amhara	156	40.4
Other	7	1.8
Occupation		
Government employee	45	11.6
Self employee	91	23.6
House wife	142	36.8
Farmer	8	2.1
Daily Lab	66	17.1
Merchant	32	8.3
Student	2	0.5
Income (in Birr)		
151-650	144	37.3
651-1400	121	31.3
1401-2350	73	19.0
Above 2351	48	12.4
Child Age (in month)		
< 1 month	11	2.8
1-6 months	169	43.8
>6 months	206	53.4
Sex of child		
Male	196	50.8
Female	190	49.2

5.2. Maternal health service and Obstetric characteristics of the respondents.

Of the total 386 mothers interviewed, 136 (35.2%) have given their first child birth**.** The majority of respondents, 367 (95.1%) have made at least one antenatal care visit to a health facility and 186 (50.7%) reported 4 or more visits (Table-2). Less than half of respondents 177 (48.2%) initiated antenatal care before 16 weeks of pregnancy, as recommended. Most women 340 (92.6%) have received some antenatal care services from a nurse or midwife. (Multiple responses allowed: but data not shown).Among the study participants, 282 (73.1%) received counseling messages about newborn care during pregnancy. The most frequently received counseling message about newborn care was on breastfeeding 208 (74.0%). As to the area of counseling on newborn care practices; 166 (43%) of them confirmed that they received on two areas and 10 (2.6%) of them on three and above areas during pregnancy. Out of the total sample 325 (84.2%) were receipt of TT before birth.

The majority of women delivered their most recent child at health facility, with only 47 (12.2%) of women delivered at home. The most common birth attendant that the women reported was health workers 342 (88.6%), while nearly one tenth of women were attended by a relative or friend 37(9.6%), 5(1.3%) of mothers reported attended by TBA and the rest mother reported that no one attended their birth. Among the respondents, 289 (74.9%) reported that the nearest health facility took them less than 30' minute while 12(3.1%) of them needed two hours and above to reach their nearest health facility. Of the respondents, 362(93.8%) had normal vaginal delivery and 24 (6.2%) had caesarian section.

A few women 67 (17.4%) reported receiving a postnatal check by a health worker or health extension workers in the first week after delivery either at home or at a health facility. Some women reported receiving postnatal care services from physician 27 (40.3%). Among study participants, 59 (15.3%) received counseling messages about newborn care during postnatal. The most frequently received counseling message about newborn care was on immunization 50 (82.2%). Concerning to the area of counseling on newborn care practices; 39 (10.1%) of them agreed that they received on two areas and 7 (1.8%) of them on three and above areas during postnatal.

Table -2 Maternal health service and obstetrics characteristics among recently delivered women in Fitche town, Oromia religion, February to March,2015 (n=386)

Characteristics	Number	Percent
Parity (no of birth)		
1	136	35.2
2-3	206	53.4
≥4	44	11.4
ANC follow up at last pregnancy		
Yes	367	95.1
No	19	4.9
Health provider at ANC		
Physician	12	3.3
Health officer	15	4.1
Nurse/Midwife	340	92.6
Time of ANC initiation		
< 16 weeks	177	48.2
≥ 16 weeks	190	51.8
No of ANC visits		
< 4	181	49.3
≥ 4	186	50.7
TT vaccine coverage		

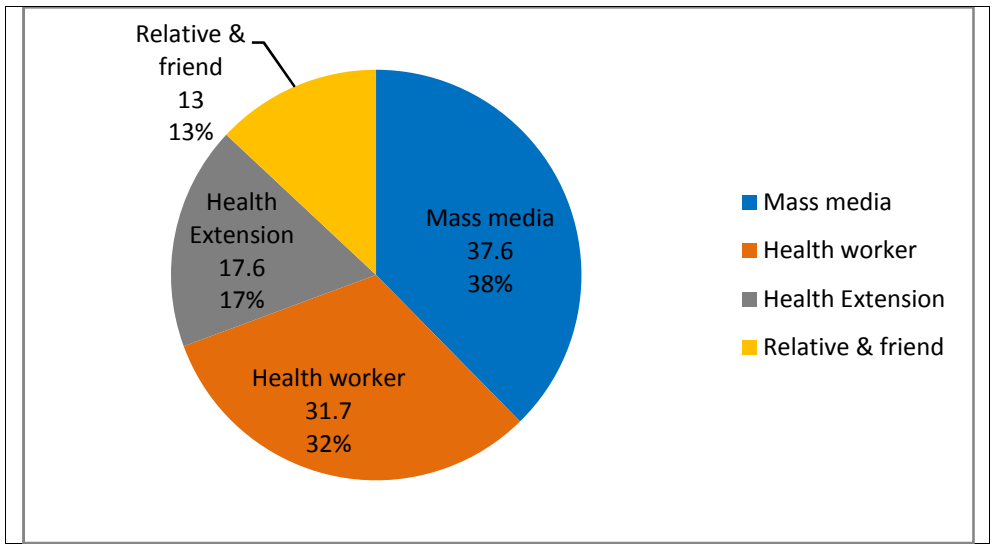
None	61	15.8
1	74	19.2
2 and above	251	65.0
Place of delivery		
Institutional	339	87.8
Home and other	47	12.2
Mothers assisted during deliver		
SBA	342	88.6
UnSBA	44	11.4
Mode of delivery		
Vaginal	362	93.8
C/section	24	6.2
Mother received PNC in1st week		
Yes	67	17.4
No	319	82.6
Provider at postnatal care		
Physician	27	40.3
Health officer	6	9.0
Nurse/Midwife	12	17.9
Health Extension	22	32.8

Table 3: Education on Essential Newborn Care among recently delivered women in Fitche Town, North Shewa Zone, Oromia Region, Ethiopia, 2015

Variables	Frequency (%)	
Mother educated/counseled on ENC	**During pregnancy**	**After delivery**
Yes	282 (73.1%)	59 (15.3%)
No	104 (26.9%)	327 (84.7%)
Type of counseling received		
Cord care	33 (11.7%)	6(9.8%)
Thermal care	22 (7.8%)	7(11.5%)
Breast feeding	208 (74.0%)	46 (75.4%)
Immunization	202 (71.9%)	50 (82.2%)
Danger signs in newborn	0(0%)	5(8.2%)
Eye care	0(0%)	0(0%)
Low birth weight	0(0%)	0(0%)
* Mothers could give more than one responses		

Area of Counseling about ENC

On one area of newborn care practice	106(27.5%)	13(3.4%)
On two areas of newborn care practices	166(43.0%)	39(10.1%)
On three & above areas of newborn care practices	10 (2.6%)	7(1.8%)



placenta, while 300 (77.7%) of responding mothers were aware that newborn should be wrapped before delivery of placenta. Concerning to the immediate placement of the newborn, only 40 (10.4%) of responding mothers were aware that the newborn should be placed on mother's chest/ belly. Of the responding mothers, 198 (51.3%) were aware that bathing of the newborn should be at least after 24 hours.

Out of the responding mothers, 37(9.6%) recognized that applying eye ointment within one hour of birth prevent conjunctivitis, while 66 (17.1%) of responding mothers were aware that the newborn eye's should be cleaned separately with sterile swab immediate after birth.

Of the responding mothers, 350 (90.7%), 356(92.2%) and 364(94.3%) knew that on demand, exclusive breastfeeding for 6 months and that colostrum/ first milk should be given to their newborns respectively and 271(70.2%) of responding mothers knew that breast feeding should be initiated within one hour. Regarding immunization, 74 (19.2%) & 53(13.7%) of the responding mothers were aware that BCG and Polio vaccines are given at birth respectively.

Table-4 Knowledge of recently delivered women on Essential Newborn Care in Fitche Town, North Shewa Zone, Oromia Region, Ethiopia,2015 , February to March (n =386).

Question	Response	Numbers	Percent (%)
What is the age of newborn child?	Birth up to one year	258	66.8
	Birth up to two years	3	0.8
	Birth up to 28 days	50	13.0
	Birth up to five years	2	0.5
	Don't know	73	18.9
Do you have information on newborn care?	Yes	386	100
	No		
What kind of instrument should be used to cut the cord?	New razor blade	256	66.3
	Boiled razor blade/scissors	105	27.2
	Any Scissors	9	2.3
	Don't know	16	4.1
What kind of materials should be used to tie the cord?	New string/thread	340	88.1
	String/thread	6	1.6
	Don't know	40	10.4

What substance should be applied to the cord immediately after cut up to 7 days except ordered medication?	Nothing applied	163	42.2
	Butter applied	190	49.2
	Vaseline	23	6.0
	Other (specify)	2	0.5
	Don't know	8	2.1
How should the umbilical cord be handled after cut?	With dressing/cover	60	15.5
	Without dressing	303	78.5
	Don't know	23	6.0
When should be the newborn body wipe/dried after birth	After delivery f placenta	62	16.0
	Before delivery of placenta	294	76.2
	Don't know	30	7.8
When should be the newborn body wrapped after birth?	Before delivery of placenta	300	77.7
	After delivery of placenta	66	17.7
	Don't know	20	5.2
How should the newborn be put immediately after birth?	On the mother's chest/belly	40	10.4
	Beside the mother	127	32.9
	With someone else	44	11.4
	On newborn bed/table	169	43.8
	Other	1	0.3
	Don't know	5	1.3
How long after birth should the newborn be washed / bathed for the first time?	Within one hour	104	26.9
	2- 23 hours	71	18.4
	At least 24 hours after birth	198	51.3
	Don't know	13	3.4
How should the eyes of the newborn be kept so that it is clean enough?	cleans the eyes separately with sterile swab	66	17.1
	Clean eye with clean cloth	129	33.4
	Clean with fingers	71	18.4
	Other	13	3.4
	Don't know	107	27.7
Applying eye ointment within one hour of birth prevents conjunctivitis?	Yes	37	9.6
	No	169	43.8
	Don't know	180	46.6

How long after birth the newborn should be breast fed?	1hour after birth. 24 hours after birth. 48 hours after birth. Within one hour	94 15 6 271	24.4 3.9 1.6 70.2
What should a mother feed her newborn baby first?	Sugar water Fresh butter First milk / colostrum	8 14 364	2.1 3.6 94.3
How many times a day should a mother feed the new baby?	On demand Not on demand	350 36	90.7 9.3
How long should a mother exclusively breast feed her child?	Less than 6 months For 6 months Greater than 6 months	8 356 22	2.1 92.2 5.7
When should the newborn be immunized with B.C.G. vaccine on the right upper arm?	At birth At 45days Between 3 to 4 months Don't know	74 153 8 151	19.2 39.6 2.1 39.1
When should the newborn be immunized O.P.V 0 oral?	At birth At 45 days Between 3 to 4 months Between 8 to 9 months Don't know	53 174 10 9 140	13.7 45.1 2.6 2.3 36.3
Do you know about newborn danger signs?	Yes No	317 69	82.1 17.9

5.4.1. Knowledge on newborn danger signs

Out of the total 386 respondents, 317 (82.1%) of them stated that they had the information about newborn danger signs. Table 4 shows that the only newborn danger sign for which there was high awareness among mothers was fever 198 (62.5%).To lesser extent, mothers were also aware of poor feeding 80 (25.2%), difficulty of breathing 75 (23.7%), Baby feels cold 61 (19.2%), convulsions 35 (11.0%), redness or discharge at the cord 34 (10.4%) and few mother listed newborn danger sign, including lethargy 21 (6.6%), loss of consciousness 20 (6.3%), Red eye 20(6.3%), and yellow palms, eyes, or soles 14 (4.4%). In general, mothers' knowledge of newborn danger signs was low,

with only 9.1% of respondents were knowledgeable (able to name 3 or more danger signs out of a list of 11) as indicated in Figure 4.

Table 5, Identified newborn danger signs among recently delivered women in Fitche town, N/ show, Oromia Region, February to March, 2015, (n=317)

No	Identified newborn danger signs	Number	Percent (%) Per case
	Convulsions	35	11
	Fever	198	62.5
	Poor feeding/suckling	80	25.2
	Difficult/fast breathing	75	23.7
	Baby too small/ born too early	0	0%
	Baby feels cold	61	19.2
	Redness/discharge at cord	34	10.7
	Eyes red/swollen/discharge	20	6.3
	Yellow palms/soles/eyes	14	4.4
	Lethargy	21	6.6
	Unconscious	20	6.3

*** Mothers could give more than one responses**

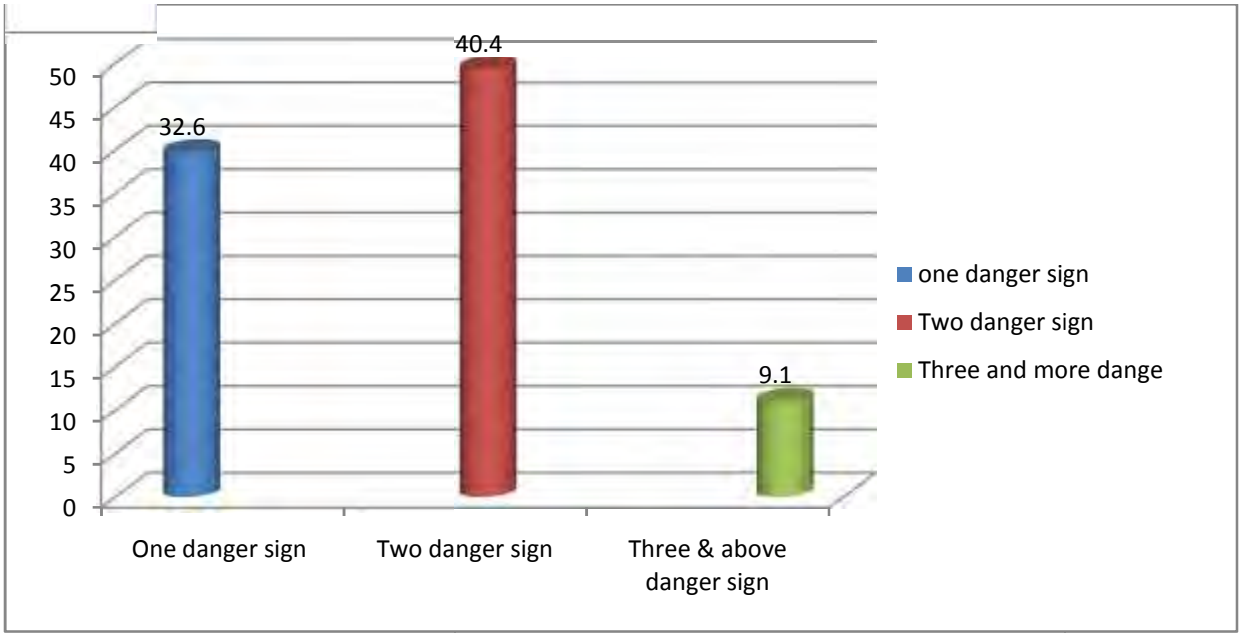


Figure 4- Number of newborn danger signs identified by recently delivered women in Fitche Town, 2015.

5.4.2. Over all knowledge on ENC

Questions regarding knowledge of breast feeding, cord care, eye care, immunization, thermal care and identification of danger sign measures for newborn care were scored and pulled together and the mean score was computed to determine the overall knowledge of respondents. The overall knowledge question composite showed that the mean knowledge score was 11.2 with SD 2.29 & median 11.The minimum knowledge score was 4 and maximum score was 19.

Respondents who scored above the mean score knowledge are considered as having good knowledge. In this case respondents who scored above mean value (11.2) were 179 (46.4%) and the rest 207 (53.6%) had poor knowledge (as show Finger 5)

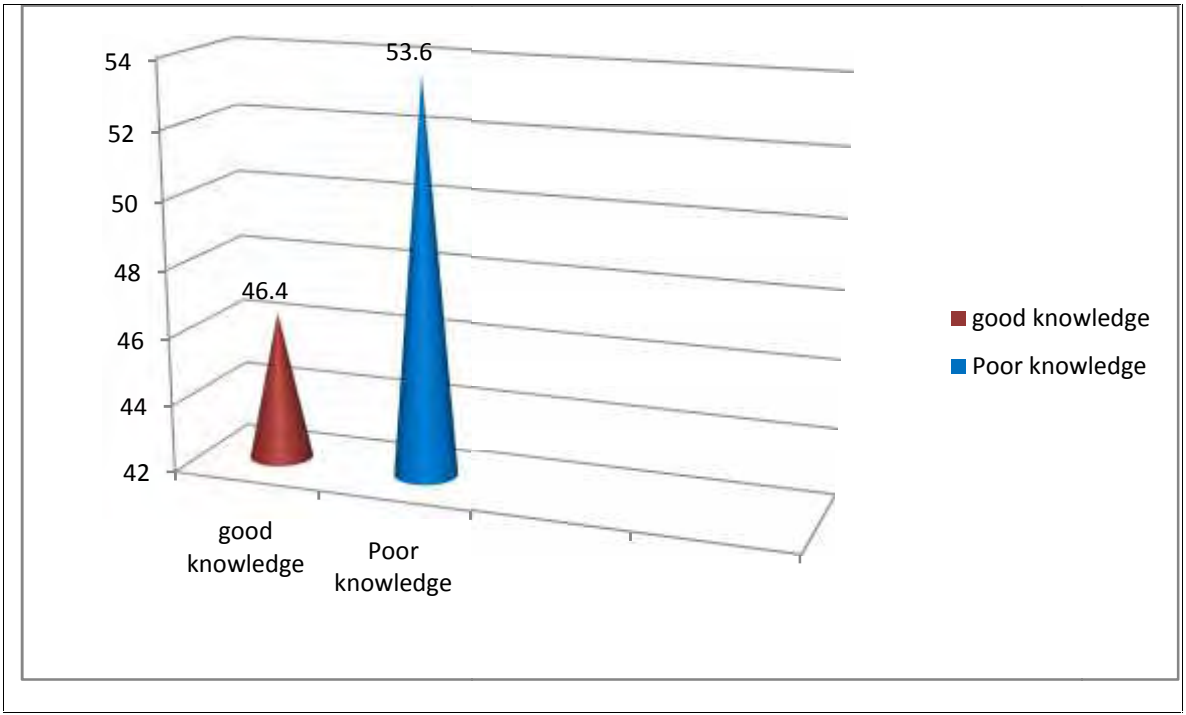


Figure 5: Overall knowledge on Essential Newborn Care among recently delivered women in Fitche Town, Oromia Region, Ethiopia, 2015. (n =386)

5.5. Practice of Essential Newborn Care

Table-6, shows that Essential Newborn Care practice as reported by mothers, out of the total sample,202 (52.3%) of mothers reported that they applied substance on newborn cord after cutting, commonest substances applied on the cord stump were butter 172 (85.1%) followed by Vaseline 25 (12.4%).

The most common immediate placement of newborn baby was on newborn bed/table 217 (56.2%) while, 52 (13.5%) were placed on mother's chest/belly. The first bath was given at least 24 hours after birth which is 218(56.5%).

Breastfeeding within one hour was carried out by 304 (78.8%) of mothers. Of the total respondents, 357 (92.5%) of them reported that they gave colostrum or first milk for their newborn. Nearly one fourth of mothers 101 (26.2%) fed their newborns food or liquid other than breast milk in the first three days. Among those newborns that were given other foods, the most commonly used were sugar water 35 (34.7), plain water 18 (17.8%), fresh butter 32 (31.7), and milk other than breast milk 11 (10.9%).

As far as vaccination was concerned, BCG and oral polio vaccine was given for 177(45.9%) and 183(47.4%) newborn respectively.

Table 6, Practice of Essential Newborn Care among recently delivered women in Fitche Town, N/ Shewa, Oromia Region, February to March, 2015. (n=386)

Q. no	Questions	Response	Numbers	Percent (%)
	Did they apply substances on the cord stump up to seven days except ordered medication?	Yes No	202 184	52.3 47.7
	Where did you place your newborn immediately after delivery?	On the floor On the mother's chest/belly Beside the mother With someone else On newborn bed/table	01 52 77 39 217	0.3 13.5 19.9 10.1 56.2
	How long after birth did your baby take bath for the first time?	Within one hour 2-23 hours At least 24 hours after birth Don't know	18 149 218 01	4.7 38.6 56.5 0.3
	Did you breast feed your last born child?	Yes No	386	100
	How long after birth your baby was breast fed?	Within one hour 2-24hours after birth After 24 hours Don't know.	304 53 28 1	78.8 13.7 7.3 0.3
	What was your newborn fed first?	Sugar water Fresh butter Plain water Milk (other than breast milk First milk / colostrum Don't know	17 5 1 2 357 4	4.4 1.3 0.3 0.5 92.5 1.0
	Have you given anything to drink other than breast milk in the first three days of birth?	Yes No	101 285	26.2 73.8
	If yes, what was given up to seven days? (multiple answers are possible)	Sugar water Fresh butter Plain water Milk (other than breast milk Other	35 32 18 11 5	34.7 31.7 17.8 10.7 5.0

Was your baby vaccinated immediate after birth for BCG on the right upper arm?	Yes	177	45.9
	No	209	54.1
Was your baby vaccinated immediate after birth for O.P.V 0 oral?	Yes	183	47.4
	No	203	52.6

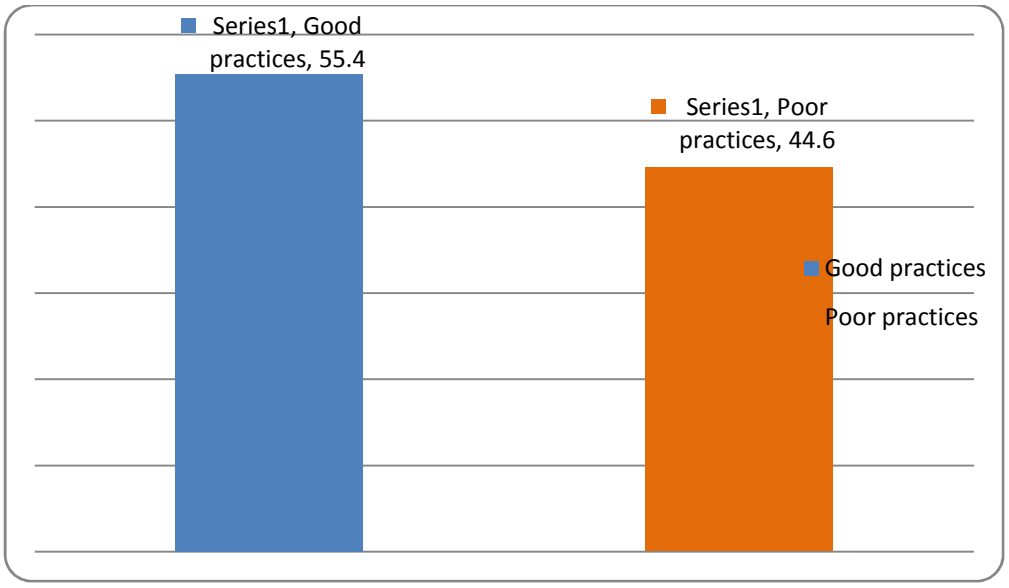


Table 7: Association of selected socio-demographic variables with women's knowledge on ENC in Fitche Town, North Shewa Zone, Oromia region, Ethiopia, 2015.(n =386)

Variables	Good Knowledge	Poor knowledge	COR(95%CI)	P value	AOR(95%CI)	P value
Age						
15-19	8(4.5%)	12(5.8%)	2.667(0.250-28.438)	0.417	2.872(0.178-46.411)	0.458
20-29	124(69.3%)	137(66.2%)	3.620(0.399-32.829)	0.253	3.232(0.264-39.498)	0.358
30-39	46(25.7%)	54(26.1%)	3.407(0.368-31.572)	0.280	4.534(0.367-56.068)	0.239
>40	1(0.6)	4(1.9%)	1.00		1.00	
Marital status						
Unmarried	6(2.9%)	6(3.4%)	1.17(0.370-3.703)	0.788	0.944(0.202-4.403)	0.941
Widowed/divorced	16(7.7)	15(8.4%)	1.098(0.526-2.291)	0.804	1.323(0.509-3.438)	0.565
Married	185(89.4%)	158(88.3%)	1.00		1.00	
Education status						
Illiterate	26(14.5%)	91(44.0%)	0.081(0.036-0.179)	0.001*	0.153(0.052-0.445)	0.001*
Read &write	3 (1.7%)	7(3.4%)	0.121(0.027-0.547)	0.006*	0.162(0.027-0.989)	0.049*
1-4	26(14.5%)	31(15.0%)	0.237(0.101-0.552)	0.001*	0.403(0.134-1.214)	0.106
5-8	44(24.6%)	27(13.0%)	0.460(0.202-1.047)	0.064	0.764(0.265-2.204)	0.618
9-10	41(22.9%)	40(19.3%)	0.289(0.130-0.642)	0.002*	0.372(0.141-0.982)	0.046*
Above grade 10	39(21.8%)	11(5.3%)	1.00		1.00	
Religion						
Muslim	4(2.2%)	2(1.0%)	2.45 (0.444-13.567)	0.303	1.481(0.140-15.628)	0.744
Protestant	12(6.7%)	5(2.4%)	2.94 (1.017-8.53)	0.047*	1.717(0.477-6.181)	0.408
Orthodox	163(91.1%)	200(96.6%)	1.00		1.00	
Ethnicity						
Amhara	55(30.7%)	101(48.8%)	0.476(0.312-0.725)	0.001*	0.618(0.359-1.064)	0.082
Others	5(2.8%)	2(1.0%)	2.185(0.415-11.500)	0.356	1.996(0.216-18-485)	0.543
Oromo	119(66.5%)	104(50.2%)	1.00		1.00	
Occupation						
Unemployed	145(81.0%)	196(94.7%)	0.239(0.117-0.488)	0.001*	0.560(0.205-1.526)	0.257
Employee	34(19.0%)	11(5.3%)	1.00		1.00	
Income						
151-650	56(31.3%)	88(42.5%)	0.212(0.102- 0.442)	0.001*	0.463(0.160-1.337)	0.154
651-1400	57(31.8%)	64(30.9%)	0.297(0.141-0 .625)	0.001*	0.411(0.150-1.128)	0.084
1401-2350	30(16.8%)	43(20.8%)	0.233(0.104-0 .519)	0.001*	0.311(0.113-0.858)	0.024*
Above 2350	36(20.1%)	12(5.8%)	1.00		1.00	
Child age						
<1 month	7(3.9%)	4(1.9%)	2.0(0.570-7.059)	0.279	12.161(0.744-198.758)	0.080
1-6 months	76(42.5%)	93(44.9%)	0.936(0.622-1.409)	0.752	0.842(0.498-1.423)	0.520
>6 months	96(53.6%)	110(53.1%)	1.00		1.00	
Child sex						
Female	83(46.4%)	107(51.7%)	0.808(0.541-1.206)	0.297	0.837(0.504-1.389)	0.490
Male	96(53.6%)	100(48.3%)	1.00		1.00	

***Adjusted for all significant variables p <0.05**

In order to identify factors associated with ENC knowledge, logistic regression with enter method was used with 95% CI and p value < 5%, all variables regardless of their significance entered to multiple-logistic regression and final independent predictor of ENC were identified.

From socio-demographic characteristics there is strong association b/n women educational status and household monthly income with women knowledge of ENC.

Educational status of the women was found as one of significant predictors for knowledge of ENC. Women who were illiterate were **0.153** times less likely knowledgeable about ENC compared to women who were above grade 10 educational level **[AOR (95%CI) 0.153(0.052-0.445)],** also women who were able to read and write were **0.162** times less likely knowledgeable about ENC than women who received above grade 10 education **[AOR (95%CI) 0.162(0.027-0.989)]** and also women who received grade 9-10 education were **0.372** times less likely knowledgeable about ENC compared to women who were above grade 10 educational level **[AOR (95%CI) 0.372(0.141-0.982)].**

Monthly house hold income was found to have association with women knowledge of ENC. Those women whose household income was from one thousand four hundred one to two thousand three hundred fifty ETB were **0.311** times less likely knowledgeable about Essential Newborn Care compared to women of house hold income greater than two thousand three hundred fifty Ethiopia birr **[AOR (95%CI) 0.311(0.113-0.858)]**

In crude analysis employment status of the women was found to have association with women knowledge about ENC. Women who were unemployed were less likely knowledgeable about ENC than women who were employed **[COR (95%CI) 0.239(0.117-0.488)]** respectively as shown in table 7. But, the association was insignificant after adjusting for possible confounder.

Table 8: Association of obstetrics factors and maternal health service variables with women's knowledge on ENC in Fitche Town, North Shewa Oromia region, 2015

Variables	Good Knowledge	poor knowledge	COR(95%CI	P value	AOR(95%CI	P value
No of birth (parity)						
1	70(39.1%)	66(31.9)	2.828(1.344-5.951)	0.006*	1.523(0.486-4.777)	0.470
2-3	97(54.2%)	109(52.7%)	2.373(1.158-4.864)	0.018*	1.329(0.467-3.783)	0.594
≥4	12(6.7%)	32(15.5%)	1.00		1.00	
ANC follow up						
No	3(1.7%)	16(7.7%)	0.203 (0.058-0.710)	0.013*	-	-
Yes	176 (98.3%)	191(92.3%)	1.00		-	-
Provider of ANC						
Health office	7(4.0%)	8(4.2%)	0.438(0.091-2.106)	0.303	0.855(0.110-6.671)	0.881
Nurse/midwife	161(91.5%)	179(93.7%)	0.450(0.133-1.522)	0.199	1.081(0.224-5.230)	0.923
Physician	8(4.5%)	4(2.1%)	1.00		1.00	
Time of ANC start						
≥ 16 weeks	75(42.6%)	115(60.2%)	0.491(0.324-0.744)	0.001*	0.535(0.311-0.921)	0.024*
< 16 week	101 (57.4%)	76(39.8%)	1.00		1.00	
No of ANC visits						
< 4	86 (48.0%)	95(45.9%)	0.966(0.641-1.454)	0.867	1.652(0.965-2.826)	0.067
≥4	90 (50.3%)	96(46.4%)	1.00		1.00	
Education on ANC						
No	41(22.9%)	63(30.4%)	0.679(0.430-1.073)	0.097	0.967(0.485-1.8926)	0.924
Yes	138(77.1%)	144(69.6%)	1.00		1.00	
TT vaccination						
None	20(11.2%)	41(19.8%)	0.533(0.295-0.960)	0.036*	0.804(0.327-1.977)	0.635
1	39(21.8%)	35(16.9%)	1.216(0.724-2.044)	0.460	1.037(0.542-1.983)	0.913
2 and above	120(67.0%)	131(63.3%)	1.00		1.00	
Delivery place						
Home and other	3(1.7%)	44 (21.3%)	0.063(0.019-0.206)	0.001*	0.446(0.008-26.244)	0.698
Health institution	176(98.3%)	163(78.7%)	1.00		1.00	
Delivery assisted						
Un SBA	2(1.1%)	42(20.3%)	0.044(0.011-0.186)	0.001*	0.101(0.001-7.634)	0.299
SBA	177(98.8%)	165(79.7%)	1.00		1.00	
Mode of delivery						
Operation	14(7.8%)	10(4.8%)	1.672(0.723-3.862)	0.229	1.307(0.398-4.294)	0.659
Vaginal	165(92.2%)	197(95.2%)	1.00		1.00	
Postnatal check						
No	144(80.4%)	175(84.5%)	0.752(0.444-1.275)	0.290	0.368(0.058-2.320)	0.287
Yes	35(19.6%)	32(15.5%)	1.00		1.00	

PNC provider Health officer Nurse/midwife Health ext. Physician	 2(5.7%) 10(28.6%) 6(17.1%) 17(48.6%)	 4(12.5%) 2(6.3%) 16(50%) 10(31.3%)	 0.294(0.045-1.905) 2.941(0.533-16.218) 0.221(0.065-0.748) 1.00	 0.199 0.216 0.015*	 - - -	 - - -
Counseling at PNC No Yes	 149 (83.2%) 30 (16.8%)	 178(86.0%) 29(14.0%)	 0.809(0.465-1.409) 1.00	 0.455	 2.740(0.406-18.492) 1.00	 0.301

***Adjusted for all significant variables p <0.05**

As indicated in table 8 above from the maternal health service factors receiving antenatal care was found to be significant factor for knowledge on ENC. Women who didn't have ANC visits were **0.203** less likely knowledgeable than women who had ANC visits [**COR (95%CI) 0.203(0.058-0.710)]** but, when adjusted to possible confounders no result was shown.

Time of ANC registration for antenatal care was also found to be significant factor for knowledge about ENC. Women who registered for ANC sixteen weeks and above of gestation were **0.535** times less likely knowledgeable about ENC than women who registered for ANC less than sixteen weeks **[AOR (95%CI) 0.535(0.311-0.921)]**.

Number of TT vaccination was found to be significant for knowledge about ENC. Women who didn't have TT vaccination were **0.533** less likely knowledgeable than women who had two and above vaccinations [**COR (95%CI) 0.533(0.295-0.960)]**, but have no association when adjusted to possible confounder.

Place of delivery was also found to be a factor. Women who delivered at home were **0.063** less likely knowledgeable than women who delivered at health facility [**COR (95%CI) 0.063(0.019-0.206)]** but when adjusted to possible confounders found to be statistically insignificant.

Person that assisted at delivery was found to be a factor for knowledge about ENC. Women who were assisted by non-skilled birth attendant were **0.044** less likely knowledgeable than women assisted by skilled birth attendant [**COR (95%CI) 0.044(0.011-0.186)]** but have no association when adjusted to possible confounder.

Providers at postnatal care were also found to be a factor for knowledge about ENC. Women who received postnatal services from health extension workers were **0.221** less likely knowledgeable than women received from physician [**COR (95%CI) 0.221(0.065-0.748)]** but have no association when adjusted to possible confounder.

Table.9- Association of sources of information variables with women's knowledge on ENC in Fitche Town, Shewa Oromia region, Ethiopia. 2015

Variable	Good Knowledge	Poor knowledge	COR(95%CI)	P value	AOR(95%CI)	P value
Mass media						
No	43(24%)	43(20.8)	1.206(0.746-1.949)	0.445	1.448(0.769-2.729)	0.252
Yes	136(76%)	164(79.2%)	1.00		1.00	
Health worker						
No	59(33.0%)	74(35.7%)	0.884(.580-1.347)	0.566	1.379(0.742-2.563)	0.310
Yes	120(67%)	133(64.3%)	1.00			
Health extension						
No	118(65.9%)	128(61.8%)	1.194(0.787-1.812)	0.405	0.999(0.561-1.779)	0.997
Yes	61(34.1%)	79(38.2%)	1.00			
Relative & friend						
No	133(74.3%)	149(72.0)	1.125(0.716-1.769)	0.608	1.855(0.968-3.558)	0.063
Yes	46(25.7%)	58(28%)	1.00			

Table 10: Association of selected socio-demographic variables with women's practice of ENC in Fitche Town, North Shewa Zone, Oromia region, Ethiopia, 2015

Variables	Good practices	Poor practices	COR(95%CI)	P value	AOR(95%CI)	P value
Age						
15-19	14(6.5%)	6(3.5%)	9.333(0.854-101.9)	0.067	142.7(5.249-3880)	0.003*
20-29	138(64.5%)	123(71.5%)	4.488(0.459-40.695)	0.182	6.372(0.468-86.744)	0.164
30-39	61(28.5%)	39(22.7%)	6.256(0.674-58.059)	0.107	11.825(0.889-157.332)	0.061
>40	1(0.5%)	4(2.3%)	1.00		1.00	
Marital status						
Unmarried	6(2.8%)	6(3.5%)	0.777(0.246-2.458)	0.668	0.455(0.087-2.370)	0.350
Widowed/divorced	15(7.0%)	16(9.3%)	0.729(0.349-1.521)	0.399	0.374(0.126-1.113)	0.077
Married	193(90.2%)	150(87.2%)	1.00		1.00	
Educational status						
Illiterate	54(25.2%)	63(36.6%)	0.482(0.244-0.954)	0.036*	1.466(0.476-4.510)	0.505
Read& write	5(2.3%)	5(2.9%)	0.563(0.143-2.208)	0.410	0.861(0.126-5.865)	0.878
1-4	36(16.8%)	21(12.2%)	0.964(0.438-2.123)	0.928	1.430(0.412-4.959)	0.573
5-8	39(18.2%)	32(18.6%)	0.686(0.326-1.441)	0.319	0.621(0.204-1.897)	0.403
9-10	48(22.4%)	33(19.2%)	0.818(0.395-1.694)	0.589	1.387(0.505-3.805)	0.526
Above grade 10	32(15.0%)	18(10.5%	1.00		1.00	
Religion						
Muslim	4(1.9%)	2(1.2%)	1.648(0.298-9.112)	0.567	0.289(0.017-4.799)	0.387
Protestant	11(5.1%)	6(3.5%)	1.511(0.547-4.173)	0.426	0.438(0.126-1.528)	0.195
Orthodox	199(93.0%)	164(95.3%	1.00		1.00	
Ethnicity						
Amhara	72(33.6%)	84(48.8%)	0.548(0.362-0.830)	0.004*	0.650(0.364-1.161)	0.146
Others	6(2.8%)	1(0.6%)	3.838(0.454-32.429)	0.217	6.260(0.273-143.503)	0.251
Oromo	136(63.6%)	87(50.6%)	1.00		1.00	
Occupation						
Unemployed	184(86.0%)	157(91.3%)	0.586(0.304-1.129)	0.110	0.986(0.360-2.701)	0.979
Employee	30(14.0%)	15(8.7%)	1.00		1.00	
Income						
151-650	78(36.4)	66(38.4%)	0.709(0.363-1.386)	0.315	0.998(0.329-3.024)	0.997
651-1400	67(31.1%)	54(31.4%)	0.744(0.375-1.478)	0.399	0.644(0.227-1.825)	0.408
1401-2350	39(18.2%)	34(19.8%)	0.688(0.327-1.448)	0.325	0.930(0.330-2.622)	0.890
Above 2350	30(14.0%)	18(10.5%)	1.00		1.00	
Infant Age						
<1 month	5(2.3%)	6(3.5%)	0.551(0.163-1.865)	0.338	0.494(0.070-3.468)	0.478
1-6 months	85(39.7%)	84(48.8%)	0.669(0.444-1.009)	0.055	0.577(0.327-1.017)	0.057
>6 months	124(57.9%)	82(47.7%)	1.00		1.00	
Infant sex						
Female	105(49.1%)	85(49.4%)	0.986(0.660-1.473)	0.945	1.048(0.607-1.807)	0.867
Male	109(50.9%)	87(50.6%)	1.00		1.00	

***Adjusted for all significant variables p <0.05**

Age of women was found to be associated with practice of ENC. Those women who were in the age group fifteen to nineteen were **142.7** times more likely practiced on ENC than women who were in the age group of forty and above **[AOR(95%CI)142.7(5.249-3880)].**

Educational status of women was found to have association with practice of ENC. Women who were illiterate were **0.482** less likely practiced on ENC compared to women who were above grade ten educational level [**COR (95%CI) 0.482(0.244-0.954)]** but when adjusting to possible confounders found to be statistically insignificant.

Table 11: Association of maternal health service variables and obstetrics factors with women's practice of ENC in Fitche Town, North Shewa Oromia region, Ethiopia, 2015.

Variable	**Good practices**	**Poor practices**	**COR(95%CI)**	**P value**	**AOR(95%CI)**	**P value**
No of birth(parity) 1 2-3 ≥4	 76(35.5%) 120(56.1%) 18(8.4%)	 60(34.9%) 86(50.0%) 26(15.1%)	 1.830(0.918-3.647) 2.016(1.040-3.906) 1.00	 0.086 0.038*	 0.992(0.305-3.227) 1.574(0.536-4.621) 1.00	 0.990 0.409
ANC attendance No Yes	 4(1.9%) 210(98.1%)	 15(7.7) 157(91.3%)	 0.199(0.065-0.612) 1.00	 0.005*	 -	 -
Provider at ANC Health office Nurse/midwife Physician	 7(3.3%) 197(93.8%) 6(2.9%)	 8(5.1%) 143(91.1%) 6(3.8%)	 0.875(0.191-3.999) 1.378(0.435-4.359) 1.00	 0.863 0.586	 1.050(0.146-7.559) 1.931(0.412-9.041) 1.00	 0.961 0.403
Time of ANC started ≥ 16 weeks < 16 weeks	 100(47.6%) 110(52.4%)	 90(57.3%) 67(42.7%).	 0.677(0.446-1.026) 1.00	 0.066	 1.232(0.686-2.212) 1.00	 0.485
No of ANC visits < 4 ≥ 4	 104(48.6%) 106(49.5%)	 77(44.8%) 80(46.5%)	 1.019(.674-1.542) 1.00	 0.928	 1.129(0.631-2.022) 1.00	 0.683
Education at pregnancy No Yes	 40(18.7%) 174(81.3%)	 64(37.2%) 108(62.8)	 0.388(0.244-0.616) 1.00	 0.001*	 0.492(0.245-0.987) 1.00	 0.046*

Table 11: Association of maternal health service variables and obstetrics factors with women's practice of Essential Newborn Care in Fitche Town, North Shewa Oromia region, 2015 (Cont.)

TT vaccination						
None	28(13.1%)	33(19.2%)	0.706(0.403-1.238)	0.224	1.753(0.678-4.534)	0.247
1	49(22.9%)	25(14.5%)	1.631(0.949-2.804)	0.077	1.687(0.824-3.453)	0.152
2 and above	137(64.0%)	114(66.3%)	1.00		1.00	
Delivery place						
Home and other	2(0.9%)	45(26.2%)	0.027(0.006-0.112)	0.001*	0.147(0.006-3.702)	0.244
Health institution	212(99.1%)	127(73.8%)	1.00		1.00	
Person assisted						
Un SBA	1(0.5%)	43(25.0%)	0.014(0.002-0.104)	0.001*	0.034(0.001-1.740)	0.092
SBA	213(99.5%)	129(75.0%)	1.00		1.00	
Mode of delivery						
Operation	12(5.6%)	12(7.0%)	0.792(0.347-1.810)	0.580	0.476(0.153-1.482)	0.200
Vaginal	202(94.4%)	160(93.0%)	1.00		1.00	
Post natal check						
No	176(82.2%)	143(83.1%)	0.939(0.552-1.598)	0.817	1.281(0.226-7.276)	0.780
Yes	38(17.8%)	29(16.9%)	1.00		1.00	
Health provider PNC						
Health officer	4(10.5%)	2(6.9%)	1.0(0.153-6.531)	1.000	-	-
Nurse/midwife	10(26.3%)	2(6.9%)	2.5(0.449-13.907)	0.295	-	-
Health extension	6(15.8%)	16(55.2%)	0.188(0.055-0.643)	0.008*	-	-
Physician	18(47.4%)	9(31.0%)	1.00			
Counseling at PNC						
No	181(84.6%)	146(84.9%)	0.977(0.559-1.707)	0.934	0.486(0.079-2.973)	0.435
Yes	33(15.4%)	26(15.1%)	1.00		1.00	
Knowledge						
Poor knowledge	75(35.0%)	132(76.7%)	0.164(0.104-0.257)	0.001*	0.158(0.085-0.293)	0.001*
Good knowledge	139(65.0%)	40(23.3%)	1.00		1.00	

As indicated in table11 above from the obstetrical factors women with parity two to three were **2.016** more likely practiced ENC when compared to women with parity four and above [**COR (95%CI) 2.016 (1.040-3.906)]** but have no association when adjusted to possible confounder.

Receiving antenatal care was found to be significant factor for practice on ENC. Women who didn't have ANC visits **0.199** less likely practiced than women who had ANC visits **[COR (95%CI) 0.199(0.065-0.612)]** but, when adjusted to possible confounders no result was shown.

Education during antenatal period was found to be significant factor for practice of ENC. Women who didn't have any education on ENC during pregnancy were **0.492** times less likely practiced

when compared to women who had education during pregnancy **[AOR (95%CI) 0.492(0.245-0.987)].**

Place of delivery was found to be a factor for practice of ENC. Women who delivered at home **0.027** less likely practiced than women who delivered at health facility [**COR (95%CI) 0.027(0.006-0.112]** but when adjusting to possible confounders found to be statistically insignificant.

Person assisted at delivery found to be a factor for practice about ENC. Women who were assisted by non-skilled birth attendant were **0.014** less likely practiced than women assisted by skilled birth attendant [**COR (95%CI) 0.014(0.002-0.104)]** but, have no association when adjusted to possible confounder.

Knowledge about ENC was found to be a factor for practice. Women who had poor knowledge on ENC were **0.158** times less likely practiced than those who had good knowledge [**AOR (95%CI) 0.158(0.085-0.293)]**

Table.12- Association of source of information variables with women's practice of Essential Newborn Care in Fitche Town, North Shewa Oromia region, 2015

Variables	**Good Practices**	**Poor Practice**	**COR(95%CI)**	**P value**	**AOR(95%CI)**	**P value**
Mass media						
No	51(23.8%)	35(20.3%)	1.225(0.753-1.992)	0.414	1.714(0.853-3.441)	0.130
Yes	163(76.2%)	137(79.7%)	1.00		1.00	
Health workers						
No	73(34.1%)	60(34.9%)	0.966(0.634-1.474)	0.874	1.770(0.895-3.500)	0.101
Yes	141(65.9%)	112(65.1%)	1.00		1.00	
HEWs						
No	139(65.0%)	107(62.2%)	1.126(0.742-1.708)	0.577	0.645(0.347-1.200)	0.166
Yes	75(35.0%)	65(37.8%)	1.00		1.00	
Relative & friend						0.232
No	155(72.4%)	127(73.8)	0.931(0.592-1.465)	0.757	1.509(0.769-2.961)	
Yes	59(27.6%)	45(26.2%)	1.00		1.00	

Qualitative results

In-depth interview

An in depth interview was carried out to assess the responses of community leaders, elderly women, religious leaders, health providers &programmers about the level of knowledge and practice on ENC. In this interview a total of 26 key informants have participated. Among the interviewees 5 community leaders (chair persons & managers of kebele & representative of Women and children Affairs office), 5 elderly women, 4 religious leaders from Orthodox & protestant churches , 8 health providers (those work at delivery, ANC, pediatrics and postnatal unit and urban health extension workers) and 4 health programmers (Head of town Administration Health office ,MCH head, Health Center heads) were involved until the ideas reached their saturation level. From the in depth interview themes were identified and content were analyzed.

Awareness about traditional practices on newborn care

More than half of the respondents confirmed that bottle feeding has a negative out come on the health of the new born. Also, giving plain /sugar water, water with common rue (tena adam) and fenugreek (abesh) immediate after birth up to 6 months would expose the newborn infant to infections, malnutrition & other health problems like diarrhea.

Majority of the respondents explained the harm of making the newborn to leak butter a few days after birth. An elderly woman's view contradicts the above opinion as illustrated by the following quote.

> *''Butter is given to an infant immediate after birth up to a few days once or twice a day so that the newborn's abdomen becomes soft and excrete his/her faeces easily or to avoid constipation."(IDI,)*

Half of the respondents were aware of bathing immediate after delivery up to a few hours with cold water can expose the new born to hypothermia, pneumonia and other health problems.

Almost all of the respondents were aware of cutting & tying the umbilical cord with unclean or unsterile materials can expose the new born to infection like HIV. Especially, the health professional explained that using unclean/ unsterile cutting/ tying materials can expose the newborn to neonatal tetanus.

One of the community leaders said, " Now a day our community has developed awareness on the need of clean tying and cutting the cord with new and boiled razor blade/scissors due to the fear of HIV transmission and other infections to the newborn."

More than half of the respondents were aware of applying butter, oily substances other than ordered medication by health worker, animal dung; different leaves on the cord stump can expose the new born to infection, neonatal tetanus and even extend to deaths.

"Before urban health extension program had started; we had the understanding of applying different leaves like 'astenagar in Amharic' on the umbilical cord believing that it helps to dry the wound. Now a day, we have quitted applying different leaves b/c we have understood that the umbilical cord must be kept dry and clean." (IDI, a religious man)

But, an elderly woman holds a different view as illustrated by the following quote.

"Butter or Vaseline is applied on the cord stump to moist, and reduce bleeding so that the cord can get off in a few days" (IDI, an elderly woman).

Majority of the interviewees especially the health workers told that giving first milk/ colostrum to the newborn could be considered as first immunization and not giving /discarding/colostrum would expose the newborn to infection and other health problems.

Traditional practices performed in the community

Respondents confirmed that there are practices in the community where a newborn child is made to sallow/ leak butter, give sugar /plain water, water with common rue, fenugreek (abesh), cow or formula milk to their new born. Health workers narrate the view of some mothers with the following quotes.

"At times when a newborn infant cries persistently, mothers think that their newborn has an abdominal cramp. To get relief from the pain, they give water with common rue (tena adam) to their newborn infant." (IDI)

"Some mothers gnaw and spit ginger /hops (geesho), to the new born if the child can't suck his mother's breast well while thinking that the child's throat is swollen." (IDI, a midwife and an urban health extension worker)

"Some mothers suck the colostrum from their breast and discard it expecting the colostrum is dirty and has no use." (IDI, health workers)

Respondents of health workers confirmed that when mothers deliver in health institutions, they provide the necessary thermal care procedures to the newborn & handover to the mother. They also advise to wash/ bath their newborn child at least after 24 hours. But, some mothers that delivered at home bath/wash the newborn child immediate after birth with cold water. The following quotes assert the practice.

"When a child is born at home care givers immediately wash/ bath with cold water. After drying up the child, they warp with cloth and give back to his mother."(IDI, an urban health extension worker & an elderly woman)

"When a daughter is born, she is bathed/ washed with cold water immediately but, if the newborn is male, he is washed / bathed on the seventh day with the anticipation that he will be brave." (IDI, an elderly woman)

Majority of the interviewees narrated that some mothers in the community applied butter or Vaseline on the umbilical cord stump up to seven days of birth to avoid bleeding and help fast healing.

Consequences on the health of the newborn

Majority of the interviewees told that making the newborn swallow / leak butter causes infection because the digestion system of the newborn is not well developed and besides the butter might not be clean enough, as a consequence the newborn can develop diarrhea, vomiting and other health problems.

"*making various oral feedings like fenogreek & common rue water apart from the mothers breast is not timely because at this stage the newborn cannot digest these things and thus can expose the new born to infections". (IDI)*

"When a child is unable to suck his mother's breast, mothers think that their newborn's throat has swollen. To treat this, they spit ginger or hops to the newborn's throat. But,

during this practice various germs can enter to the newborn's body which in turn exposes the child to various infections." (IDI, health workers)

Interviewees told that in bottle feeding, the cleanness of the feeding material might be unclean and can expose the new born to diarrhea, vomit & other infections.

Respondents agreed that applying animal dung, butter, different leaves and Vaseline can make the child's umbilicus to moisten and exposes that part of the body to various germs and this can again cause infection to the newborn.

"Especially, applying the animal dung can bring tetanus to the child even leading to death." (IDI, health experts)

Most of respondents especially the health experts agreed that discarding the first milk exposes the newborn to various diseases. These respondents affirmed that Colostrum is like the first vaccine for the child and the denial of giving this milk would mean weak immune system and thus, exposes the child to various health problems.

Interviewees agree that bathing the new born immediately after birth with cold water can expose the child to coldness as the body of the child can't resist the chill and this can lead to pneumonia and other infections.

Interventions made to eliminate traditional practices

Respondents told that Health Care Providers give successive health education to mothers about newborn care during prenatal, delivery & postnatal periods at health facilities.

"Health extension workers also provide health education about newborn care to the mothers, family and community using different occasion."(IDI)

Respondents told that community leaders, health care providers, NGO and other stakeholders integrated together give health education to mothers and the community to minimize the various malpractices that are performed in the community.

"Electronic Medias like Radio & TV provide health education on newborn care. This media education has created good opportunities to alleviate the knowledge of mothers on newborn care for those who have the access to these Medias." (IDI, An elderly woman)

Most interviewees agreed that the services like ANC, delivery & PNC service facilitation are made available to the community and this encourages mothers to get the services when they need them.

"The motto of Ministry of Health that says ' Every mother must deliver in health facilities' has increased the number of mothers that deliver in health facilities and this on other hand increased the number of new born getting the Essential Newborn Care." (IDI)

Interventions needed to practice ENC

- Successive awareness creation work must be given to the community about ENC in an integrated manner through health professionals, health extension workers, NGO and other stakeholders to alleviate the knowledge of the community to bring behavioral change.
- The ANC & PNC services must be availed to the service seekers which in turn will encourage mothers to use the services.
- Mothers must be made to believe that the delivery, PNC & ANC services are free from payment.
- The ambulance services must be availed at any time so that mothers must deliver in their nearby health facilities. This and other services will curve down the mother & neonatal infant mortality and alleviate the Essential Newborn Care.

5 –Discussion

In this study, nearly 179(46.4%) of the respondents have good overall knowledge about Essential Newborn Care. This knowledge level report is lower when compared to the reports of the studies conducted in India, tertiary care hospital, Udupi district (26), JJR Maternity centre Bangalore, Karnataka (27), maternity centers of Madurai Corporation (28) and Bangladesh, Dhaka Shishu Hospital (30), which shows 76.7%, 52%, 65% and 55.3% respectively.

The suggested reason of this difference could be, due to different socio-demographic characteristics like educational back ground of the study participants. As shown in Studies (26, 27, 31, and 36) educational background affects mothers' knowledge on ENC. In this study 66.1% of the study participants had educational back ground up to primary level. On the other hand, Studies conducted in India, Udupi district (26), JJR Maternity centre Bangalore, Karnataka (27), maternity centers of Madurai Corporation (28) showed that the educational back ground of participants up to primary level accounted to 46.7%, 26% &56% respectively. This clearly shows that study participants in India had better educational level than participants in our study. This educational level difference might be one reason of the difference in knowledge level of ENC.

The other reason might be due to study method difference: this study is conducted at the community level where as the above mentioned four studies in India and Bangladesh were conducted at health facilities. Study participants of the health facilities could have better health services seeking behavior that gave them opportunity to have better awareness/ knowledge about ENC than the community level study participants.

Besides, in the qualitative study of in-depth interview, Interviewees forwarded suggestions that support the low level of knowledge about ENC as follows:

> *''Butter is given to an infant immediate after birth up to a few days once or twice a day so that the newborn's abdomen becomes soft and excrete his/her faeces easily or to avoid constipation."(IDI,)*

> *"Butter or Vaseline is applied on the cord stump to moist, and reduce bleeding so that the cord can get off in a few days" (IDI, an elderly woman*).

This knowledge level report is higher when compared to the reports of the studies conducted in Bangladesh (31) which shows about 19 % of respondents had moderate and good awareness on newborn care. Another study in this same country showed that, the level of adequate knowledge regarding new-born care was only 15% (32). The suggested reason of this difference could be, due to different socio-demographic characteristics of the study participants and the other possible explanation could be newborn health and maternal health are given due attention by the Government of Ethiopia, FMOH, NGO and other stakeholder.

Further more in the qualitative study of in-depth interview, Interviewees forwarded suggestions that support the high level of knowledge about ENC as follows:

> *"Before urban health extension program had started; we had the understanding of applying different leaves like 'astenagar in Amharic' on the umbilical cord believing that it helps to dry the wound. Now a day, we have quitted applying different leaves b/c we have understood that the umbilical cord must be kept dry and clean." (IDI, a religious man)*

> *One of the community leaders said, " Now a day our community has developed awareness on the need of clean tying and cutting the cord with new and boiled razor blade/scissors due to the fear of HIV transmission and other infections to the newborn."*

In this study, educational status of the women was found as one of significant predictors for knowledge about ENC. Women who were illiterate were **0.153** times, able to read and write were **0.162** times and grade 9-10 were **0.372** times less likely knowledgeable compared to women who were above grade ten educational levels. Other studies have shown comparable results with this finding. Studies conducted in Gondar town, Ethiopia (36), India (27, 28), Bangladesh (30) and Kenya (34) revealed that women's education was statistically related to knowledge about ENC. These studies assert that women who have higher level of education were likely to have better knowledge about ENC than their counterparts which is similar to this finding. The possible explanation could be, educated women are expected to have knowledge and awareness on the advantages of ENC. They are more likely to seek modern health care than those who are not. Education is likely to improve the general status of women and help them to build up confidence to make decisions about their own and child health. Educated women could have better access to

information through reading and following media about maternal and child health care and they could have better knowledge on the advantages of newborn health care.

In this study, monthly house hold income was found as one of significant predictors for knowledge about ENC. Those women whose household income from one thousand four hundred one to two thousand three hundred fifty ETB were **0.311** times less likely knowledgeable about ENC compared to women of house hold income greater than two thousand three hundred fifty ETB. Other studies have shown comparable results with this finding**.** Study conducted in India, West Bengal showed that women who had better socio economic status had good knowledge about breast feeding and timely (43).Other study in India (27) also have similar finding with this study. Those women who have better house hold income are expected to have better health care information and health care access. They are more likely to seek modern health care than those who had no better household income. This helps to have better knowledge on ENC than who are not.

In this study, time of ANC registration was also found to be significant factors for knowledge about ENC. Women who registered for ANC sixteen weeks and above of gestation were **0.535** times less likely knowledgeable about ENC than women who registered less than sixteen weeks of gestation. Studies conducted in Sir-Lank & Ghana have shown comparable results with this finding. On the same studies, mothers registered for antenatal care after 14 weeks of gestation were more likely to have poor knowledge (15, 35). Late registered women are expected to have less frequency of exposure or contact to health provider during pregnancy. They are less likely to get education or counseling message about newborn care than those who registered early. This help to acquire better understanding and awareness about ENC than those late registered. They could have less knowledge about the advantages of newborn health care.

In this study, nearly 214(55.4%) of the respondents had good overall practice about ENC. This practice level report is lower when compared to the report of the study conducted in India, JJR Maternity centre Bangalore, Karnataka which shows 75% of the sample with satisfactory or higher level of practice (27). This practice level report is lower when compared to the study in India, Udupi district which showed good & excellent practices of newborn care accounted 100% (good practice 53.33% and excellent Practices 46.67%) (26). Again another study in India, maternity centers of Madurai Corporation, revealed that almost 100% of respondent have high & moderate level practice (28)

The suggested reason of this difference could be, due to the difference in socio- cultural characteristics of the participants and it is supported by IDI qualitative study as quoted below.

> *"At times when a newborn infant cries persistently, mothers think that their newborn has an abdominal cramp. To get relief from the pain, they give water with common rue (tena adam) to their newborn infant." (IDI)*

> *"When a child is born at home care givers immediately wash/ bath with cold water. After drying up the child, they warp with cloth and give back to his mother."(IDI, an urban health extension worker & an elderly woman)*

This practice level report is higher when compared to the report of the studies conducted in Awabel district, East Gojjam, Amhara region, Ethiopia, (40) and Mandura district, Metekel zone, Benishangul Gumuz region (41) which shows 23.1% and (40.6%) respectively. The possible explanation could be the above two studies were conducted in rural areas where as this study was conducted comparatively in urban area which makes a difference in health information. This leads to awareness/knowledge difference on ENC.

In this study age was found to be associated with practice of ENC. Women who were in the age group fifteen to nineteen were 143 times more likely practiced on ENC as compared to women who were at and above forty years age. The finding appeared to be inconsistent with other study done in Uganda (38). The difference may be due to different socio demographic and socio- cultural characteristics of the study participants. The possible explanation for this finding could be practices of ENC among women with early age implies that those women might have better understanding about the advantages of Essential Newborn Care practice. On the other hand, older women may belong to more traditional cohorts and thus be less likely to practice than young women.

In this study, counseling / education provided during antenatal period was found to be associated with practice of ENC. Women who had no education on antenatal were **0.153** times less likely practiced ENC when compared to women who had. The finding appeared to be consistent with other study done in Ethiopia, Awabel district, East Gojjam, Amhara region (40). The possible explanation for this finding could be educated women could have better understanding & knowledge about ENC. This might lead the women to have better confidence and good practice.

Knowledge about ENC was found to be a factor for practices. Women who had poor knowledge on ENC **0.492** times less likely practiced than those who had good knowledge. Other studies have

shown comparable results with this finding. Studies conducted in Mandura district, Metekel zone, Benishangul Gumuz region, Ethiopia (41), Bangladesh (30) and Chitwan district, Nepal (47) revealed that women's knowledge about ENC was statistically related to practice. Women who had good knowledge about ENC more likely practiced when compared with women who had poor knowledge. The possible explanation could be women who have good knowledge and awareness about ENC, are willing to perform the practices and demand the services of ENC from health facility.

In general in this study the practice level of the participants is a bit higher than their knowledge. This might be the majority of the respondents that delivered in the health facilities could be positively influenced by health providers.

Strength and limitation of the study

Strength of the study

- The study was supplemented by in-depth interview which was very helpful in finding out the details of the problems. Thus, it will help to find a way for improvement in the Essential Newborn services.
- The findings of this study provide valuable information for improving the quality of programs to educate mothers on ENC practices. This is possible by enabling the identification of knowledge gaps towards newborn care.
- As this study is conducted at community level, it has the opportunity to collect the opinion of participants at grass root level and device mechanism to improve the services to the satisfaction of the community.

Limitation of the study

- Recall bias may be a problem for women to memorize events in responding for questions like knowledge and practices about newborn care.
- Lack of universal consensus on definition of good knowledge or poor knowledge and good or poor practices posed a challenge in the study. Similar studies have used the mean as cut off level to distinguish b/n good knowledge or poor knowledge which is applied in this study.
- The study was based on reported rather than observed knowledge and practices towards newborn care. Therefore, there was a risk that mothers may report what was expected of them but their actual practices may be different.

Conclusions

In this study, nearly 179 (46.4%) of the respondents have good overall knowledge about ENC. The components of ENC that mothers' have good knowledge on breastfeeding, cord care (except umbilical cord should be clean & dry) and thermal care (except delay bathing at least 24 hrs and newborn placement immediate after birth). Knowledge gaps exist with regards to eye care, immunization and danger sign identification. Most maternal education on ENC was received in the pregnancy period. Provision of information on ENC to recently delivered mothers was unsatisfactory in the study area with regards to thermal care, cord care and danger sign. Besides, there is no information dissemination on eye care and low birth weight. Educational status of mothers, monthly house hold income and time of ANC start were found significant predictors on level of knowledge about ENC.

In this study, nearly 214 (55.4%) of the respondents have overall good practice about ENC. From the components of ENC mothers practiced most on breast feeding. We can conclude practice gap exist in thermal care especially, immediate placement of the newborn. Mothers Knowledge, age group, and education during antenatal about ENC were found significant predictors on level of practice.

There are traditional practices performed in the community which are: application of substances on cord stump, giving food and fluid soon after birth and immediate bathing especially for home delivery and so on.

Recommendation

At Zonal Health Office, Woreda Health Office and Health Institution

1. Strengthen and continue the previous services such as:

- Antenatal, Delivery and Postnatal care services.

The above mentioned health offices collaborating with government and non –government bodies should design mechanisms that can strength the existing services.

Some of the possible mechanisms that could strength the existing services are:

- Assigning health workers in their respective responsibility and initiate them.
- Strengthen the existing network between the health facility and community
- Provide the technical support for health extension workers and health development army.
- Provide logistic support timely.
- Provide short and long- term training.
- The ambulance services must be availed at any time.

2. Intensify, coordinate and target information education communication program, to change behavior of mothers to:

- Avoid applying substances on the cord stump
- Giving food and fluid immediate after birth up to 6 months of the newborn
- Immediate bathing of the newborn especially for home delivery
- Discarding of colostrum etc.

3. To improve mother's knowledge in all components of ENC.

   For the accomplishment of the above two recommendations, successive awareness creation work must be given to the community about ENC in an integrated manner through Government & non-government bodies, health professionals, health extension workers and other stakeholders to further alleviate the knowledge of the community to bring behavioral change & avoid mal-practices.

4. Provide refresher training on ENC for health workers and urban health extension workers and initiate their commitment.

   All the concerned bodies and the hierarchy of the health sector should avail budget and logistics to far more empower health providers. This training initiation will enable health workers to fill the existing information gap in the community.

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ANNEX 1

English version questionnaires and consent form

1. Information sheet

Greeting Good morning / afternoon

Hell my name is_____. I am a data collector for master of public health student project in Addis Ababa University. I am conducting a survey with the aim of identifying the level of knowledge and practice and factors associated with Essential Newborn Care among recently delivered woman in your town. The information I collect will help to your town and government at large to plan health services. Now you are randomly selected for the survey. The questions usually take about 20 to 25 minutes.

The objective of the study: To assess level of knowledge and practice about Essential Newborn Care among women who delivered in previous 12 months of the date of the study in Fitche town, in the state of Oromiya Region, Ethiopia.

The benefit of the study: there is no direct benefit of the participant of the study. However the results of this study will help in identifying the obstacles of good knowledge& practices about Essential Newborn Care and contributes on input in considering a convenient programmatic approach to solve the problem. The result of the study will be disseminated to concerned bodies, including to Fitche town administrative Health office.

The risk of the study: Participating in this study will not have any risk or harm.

Right of participants: you have full right either to participate or decline participation in this study as a participant. You may respond to all the questions or you may not answer to the questions you don't want and you may end the interview at any time you want. You can ask any questions which is not clean for you.

Confidentiality: any information forwarded will be kept confidential and names will not be written or specified.

II. Informed consent

As to the information given ahead, participating in this study has no any risk. Your name will not be written on this form and the information you give will never be shared to others. You may not answer any questions that you don't want to answer and you may end this interview at anytime you want. Now I would like to tell you that you are selected randomly to be participant of this study, your genuine response to interviews will be very important for the purpose of the study. At the same time we would like to appreciate your voluntary participation in the survey after a thorough understanding of the information given to you.

I have read this form or it has been read to me in the language I comprehend and understand all condition stated above.

Are you willing to participate in this study?

1. No (say think you) 2. Yes (continue interviewing

Name of the principal investigator: Yeshiwork Eshetu

Cell phone No- 0911546697. E mail – Yeshetu2@ yahoo.com

Name of interviewer_____

Data of interviewer (Ethiopia calendar)____/_____/

Result of interview: 1. Complete 2. Refused 3. Partial completed 4. Respondent not available

Cheeked by supervisor

Name_____ . Signature _____ . Data_____

8.3 English version questionnaire

Instruction: circle the response from the alternative and write the answer for open ended on the space provided.

Part One: Socio Demographic information

S. No	Questions	Choice of response	Code	SKIP
101	How old were you at your last birth day?	_____ Age in complete year		
102	What is your current marital status?	1.Married 2.Single 3. Divorce 4. Widowed 5. Other (specify)----------		
103	Can you read and write simple sentence in any language you speak?	1. Yes 2. No		
104	What is the highest level of education you attained?	No formal education = 00 circle _____ write in grade.		
105	What is your religion? .:	1.Orthodox 2.Muslim 3.Protestant 4.Other		
106	To which ethnic group do you belong?	1. Oromo 2. Amhara 3. Tigre 4. Gurage 5.other(specify)-------		
107	What is your main occupation?	1.Governmental employee		

		2. private employee 3.house wife 4.Farmer 5.Daily laborer 6.Merchant 7.Student 8.others		
108	What is your household total monthly income	_____(write the amount in Birr)		
109	What is your recent child age?	_____		
110	What is your recent child sex?	_____		

Part Two: Obstetrics and maternal health services information

S no	Questions	Choices of response	Code	Skip
201	How many births did you have?	_____		
202	Did you attend ANC during your recent pregnancy?	1.Yes 2.No		
203	If yes, whom did you see during your recent ANC visit?	1.Physician 2.Health officer 3.Nurse/mid wife 4.HEWS 5. Others(specify) _____		
204	At how many weeks did you start ANC?	_____weeks		
205	How many times have you attended ANC in your recent pregnancy?	_____		
206	Did you receive any counseling	1.Yes		

	during your recent antenatal period about newborn care?	2.No		
207	If yes, in which area of newborn care? (Multiple answers possible)	A. Cord care B. Kept the newborn warm. C. Immunization D. Breast feeding and nutrition. E .Eye care F. Early recognition of illness in newborn G. Care of low birth weight		
208	Did you receive TT vaccine in your recent pregnancy?	1.Yes 2.No		
209	How times did you take TT vaccine in your recent pregnancy?	_____in number		
210	Where did you deliver your recent baby?	1. Government hospital 2. Government health center 3. Health post 4.private health institution 5.Home 6.Other(specify)_____		
211	Who assisted you during your recent delivery?	1.Health profession (Physician, Health officer &Nurse/midwife) 2.HEWs 3. TBA 4.TTBA 5.Relative and friend 6. No one		

212	How long does it take from your home to the nearest health facility?	1. <30 min 2. 30 min ─ < 1hour 3. 1 hr. ─ <2hrs. 4. ≥2 hrs.		
213	What was your mode delivery?	1. Spontaneous vaginal delivery. 2.Instrumental delivery 3.C/S		
214	Were you seen by health workers within 7days delivery?	1.Yes 2.No		
215	If yes, who did you seen?	1.Physician 2.Health officer 3.Nurse/mid wife 4.HEWS 5. Others(specify)		
216	Did you receive any counseling within seven days delivery about newborn care?	1.Yes 2.No		
217	If yes, in which area of newborn care? (Multiple answers are possible).	A. Cord care B. Kept the newborn warm. C .Immunization D. Breast feeding and nutrition. E .Eye care F. Early recognition of illness in newborn G. Care of low birth weight		

Section3: Knowledge on Essential Newborn Care questions.

S. no	Questions	Choices of response	Code	Skip
301	What is the age of new born child?	_____		
302	Do you have information on newborn care?	1. Yes 2. No		303
303	What kind of instrument should be used to cut the cord?	1.New razor blade 2.Boiled razor blade/scissors 2.Previously used razor blade 3. Any Scissors 4.Other(Specify)_____ 5.Don't know		
304	What kind of materials should be used to tie the cord?	1. New string/thread 2. String/thread 3. Fiber from ensete plant 4. Cord not tied 5. Don't know 6. other		
305	What substance should be applied to the cord immediately after cut up to 7 days except ordered medication?	1.Nothing applied 2.Butter applied 3. Vaseline 4. Other (specify)_____ 5. Don't Know		
306	How should the umbilical cord be handled after cut?	1. With dressing/cover 2 .Without dressing 3. Don't know 4. Other(Specify)_____		
308	When should be the new born wrapped after birth?	1.Before delivery of placenta 2. After delivery of placenta 3. Don't know		
309	How should the new born be put immediately after birth?	1. On the floor 2. On the mother's chest/belly 3 .Beside the mother		

		4. With someone else 5. On newborn bed/table 6 .Other (Specify)_____ 7. Don't know		
310	How long after birth should the newborn be washed / bathed for the first time?	1.Within one hour 2.2- 24 hours 3.After 24 hours 4.Don't know		
311	How should the eyes of the new born be kept so that it is clean enough?	1.cleans the eyes separately with sterile swab 2.Clean eye with clean cloth 3. Clean with fingers 4.Other(Specify)_____ 5.Don't know		
312	Applying eye ointment within one hour of birth prevents conjunctivitis.	1.Yes 2.No		
313	How long after birth the newborn should be breast fed?	1. 1 hour after birth. 2. 24 hours after birth. 3 .48 hours after birth. 4. Within one hour		
314	What should a mother feed her new born baby first?	1.Sugar water 2.Fresh butter 3.Breast milk / colostrum 4.Plain water 5.Milk (other than breast milk) 6.Other (Specify)_____ 7. Don't know		

315	How many times a day should a mother feed the new baby?	_____		
316	How long should a mother exclusively breast feed her child?	_____/Months		
317	When should the newborn be immunized with B.C.G. vaccine on the right upper arm??	_____		
318	When should the newborn be immunized OPV Zero?	_____		
319	Do you know about newborn danger sign?	1. Yes 2. No		
320	If yes could you mention all the danger sign you know (Multiple answers are possible)	a. Convulsions b. Fever c. Poor feeding/suckling d. Difficult/fast breathing e. Baby feels cold f. Baby too small/born too early g. Redness/discharge at cord h. Eyes red/swollen/discharge i. Yellow palms/soles/eyes j. Lethargy k. Unconscious		
Section 4; Source of information on Essential Newborn Care				
401	What were the sources of information about newborn care?(multiple answers are possible)	1.Health extension workers during home visit 2. Health professional during Antenatal clinic. 3. Mass media (TV, Radio, Magazine, newspaper etc.) 4.Relative and friends 5.Others(specify) _____		

Section 5: Practices of Essential Newborn Care questions.

S. no	Questions	Choices of response	Code	Skip
501	Did they apply anything on the stump after the baby's cord was cut up to seven days except ordered medication?	1.Yes → 504 2.No		

502	If yes, what did they apply? (multiple answers are possible)	1. Butter 2. Alcohol 3. Other (Specify)_____ 4. Don' t know		
503	Where did you put your newborn immediately after delivery?	1. On the floor 2. On the mother's chest/belly 3. Beside the mother 4. With someone else 5. On newborn bed/table 6. Other 7. Don't know		
504	How long after birth did your baby take bath for the first time?	1. Within one hour 2. 2-23 hours 3. After 24 hours 4. Don't know		
505	Did you breast feed your last born child?	1.yes → 2.No		510
506	How long after birth your baby was breast fed?	1. Within one hour 2. 2-24hours after birth 3. After 24 hours 4. Don't know.		
507	What was your newborn fed first?	1. Sugar water 2. Fresh butter 3. Plain water 4. Milk (other than breast milk 5. Breast milk / colostrum 6. Other (specify)_____ 7. Don't know		
508	Three days after birth have you given anything to drink other than	1. Yes		

	breast milk?	2. No		
509	If yes, what was given up to seven days? (multiple answers are possible)	1.Sugar water 2. Fresh butter 3.Plain water 4.Milk (other than breast milk 5.Other (Specify)_____		
510	Was your baby vaccinated immediate after birth for BCG on the right upper arm?	1.Yes 2.No		
511	Was your baby Vaccinated immediate after birth for polio0 oral?	1.Yes 2.No		

ANNEX 2

Gafiilee hikka Afaan Orommottin

Qajeelchaa- Gafiilee filannoo qabaniif filnoo kee ratti geengoo goodhi. Akkasumas gafiilee deebi bareefama barbadaniif idoo qopha'eerratti deebii kee bareefaman keenii.

Kutaa Tokko: Ooddeefanno ' Sooshiyoo Dimoogerafii '

Lak.	Gafii	Filanno deebii	Koodi	Irradarbii
101	Dahumsii isa dhihookeetti umriin kee meeqa turee?	Umriin koo_____turee (Wagga guutudhan bareesii)		
102	Yeroo amma halii maatii kee maal fakkataa?	1. Heerumee Jira 2. Hin heeruumnee 3. Addan baheerra Abban Mana kiya booqatee jira 4. Kan biro (Ibsii) ----------		

103	Afaan dubaatuun bareesuufi dubiisuu ni dandeesa?	1. Eeyeeni 2. Lakki		
104	Sadarkaa barnoota isaa guddan atti xumurtee, meeqaa?	Barnootaa idilee hin xumrtee tanan = 0 irratti geengoo godhii Yookin kutaa xumrtee bareesii _____		
105	Amaanta kee maali?	1. Ortoodoksii 2. Muusliima 3. Prooteestaanti 4. Kan Biroo		
106	Sabaaf sablamin kee maal?	1.Oromoo 2. Amaraa 3. Tiigiree 4. Guuragee 5. Kan biro (Ibsii)----------		
107	Hojjin kee maali?	1. Hoojataa Mootummaa 2. Hojji dhunfa 3. Hadha Mana 4.Gabaree(Qootee bulaa) 5.Dafqee Bulaa 6. Daldalaa 7. Barataa 8. Kan Biroo(ibsii)---------		
108	Gallin dimshasha maatii keeti ji'atti meeqa?	Qarshii_____		
109	Da'immnii kee isa amma uumriin			

	isa meeqa?	----------		
110	Saalii da'immaa kee isa amma maali?	_____		

Kutaa Lamaafaa: Oodeefannoo Fayyadamaa tajaajila fi 'Obstiriiksii'

Lak.	Gafilee	Filanno deebii	Koodii	Irradarbii
201	Hanga ammatti da'umsa meeqa gootee jirta?	_____		
202	Uulfaa isaa dhihoo keerratti tajaajila kunuunsa da'umsaa (ANC) argatee jirta?	1. Eeyeeni 2. Lakki		
203	Deebiin kee eeyeeni yoo ta'e ogeesa akkami argatee?	1. Hakiima 2. Qondaala fayya 3. Narsii/Deesisstuu 4. Hoojatuu Aksteenshiin 5. Kan biroo (Ibsii)-------		
204	Da'umsa duraa, torban meeqa booda tajajila ' ANC' argate?	torbaa nf		
205	Da'umsaa kee isa dhihoo irratti yeroo meeqa tajajilaa 'ANC" argatee?	----------		
206	Uulfaa kee isa dhihoo irratti tajajilaa 'ANC' keerratti kunuunsa da'imaa reefuu dhalattan ilaalchisee gorsaa argatee jirta?	1. Eeyeeni 2. Lakki		
207	Deebiin kee eeyeeni yoo ta'e goorsii kunuunsa da'imaanii irratti sikeenamee maal turee?	1.Da'umsaa kunuunsa koordi 2.Da'imaa reefu dhalatee akka nafnii o'uu goodhu		

		3.Talaichiisuu 4.Harmaa hoosisuu fi nyaataa barbachiisa latuu 5.Kunuunsa Ijaa 6.Dhukubsachuu akka danda'an dursaa hubachisuu 7.Kunuunsa ulfattini isaani xiqaa ta'e		
208	Uulfaa kee isa dhihoo irratti tajajilaa talalii 'TT' argatee jirta?	1. Eeyeeni 2. Lakki		
209	Uulfaa kee isa dhihoo kee keessaatti talalii yeroo meeqaa talalaamttee?	_____		
210	Da'umsaa kee isaa dhiihoo essatti deechee?	1. Hoospitalaa Mootummaa keessaatti 2. Buffataa Fayya Mootummaa kees saatti 3. Poostti fayya keessaatti 4. Dhabbataa dhunfaa keessatti 5. Manatti 6. Kan biro (Ibsii)------		
211	Da'umsaa kee isaa dhiihoorratti eenyuutuu sii gargaree?	1. Oggeesaa Fayya (Hakiimi /Dooktaraa/, Qoonddalaa Fayyaa, Naarsii/Deessiistuu 2. Aksteenshiin Fayyaa 3. Deessiistuu Aadda /TBA/ 4. Deessiituu Aadda kan hin leenjiinee / UTBA/ 5. Fiiraa fi Hirri'a 6. Eeynumtuu naa hin gargaaree		
212	Akkattan da'umsaa keetti isaa ma'yii maal fakkatta?	1. Da'umsaa uummaam turee/ Viginal delivery/ 2. Deegarsaa meeshaattin turee 3.' CS'/ baqaasuun turee /		

213	Deesee guyyaa torba keessaatti ogeesaa fayyattin ilaalamttee turttee?	1. Eeyeeni 2. Lakki		
214	Deebbin kee eeyeeni yoo ta'e eenyuutuu si lalee?	1.Hakiimi /Dooktaraa/ 2.Qoonddalaa Fayyaa 3. Naarsii/Deessiistuu 4. Aksteenshiin Fayyaa 5. Kan biro (ibsii) ----------		
215	Deesee guyyaa torbakeessaatti kunuunsaa da'immaan reefuu dhalataan ilaalechisee gorsaa ooggeesa fayyaa argateerrtta?	1. Eeyeeni 2. Lakki		
216	Deebbin kee eeyeeni yoo ta'e kunuunsaa da'immanii ilaalchisee maal irratti si gorsaan?	1. kunuunsa koordi 2. Da'imaa reefu dhalatee akka nafnii o'uu goodhu 3. Talaichiisuu 4. Harmaa hoosisuu fi nyaataa barbachiisa latuu 5. Kunuunsa Ijaa 6. Dhukubsachuu akka danda'an dursaa hubachuu 7. Kunuunsa ulfattini isaani xiqaa ta'e		

Kutaa 3: Gafiilee Beekkumtti kunnunsaa da'immani reefuu dhalataan

Lakk.	Gafiilee	Filannoo	Koodii	Irradarbii
301	Da'imaan reefuu dhalatee ummriin isa hangam ta'u qaba?	----------		
302	Kunuunsaa da'immaan reefuu dhalateerratti oodeefannoo qabda?	1. Eeyeeni 2. Lakki		
303	Meeshaan koordin ittin muraamu maal ta'u qaba?	1. Miilacii hara'a 2. Miilacii ykn maqasii affeelamee 3. Miilacii kanan duraa		

		fayeedarra olees ni ta'a 4. Maqsii kamiiyuu 5. Kan Biroo (Ibsii)--- 6. Hin beekuu		
304	Meeshaan handhurii ittin hidhamuu kan akkamii ta'u qaba?	1. Kirri hara'a 2. Kirumaa argamee 3. Kirri baalaa warqeeraa argamee 4. Koordin siiruma hiidhamuu hin qabu 5. Kan biroo		
305	Koordiin muramee guyyaa torbaa keessaatti maal deebamu qaba?	1. Hooma hin diibamu 2. Dhadhaa 3. Vaaziliini 4. Kan biro (ibsii) ---- 5. Hin beekuu		
306	Hundhurii erga muramee booda akkatta kamiin qabamu qaba?	1.Ni maramaa 2.Hin maramuu 3.Hin beekuu 4.Kan biro (ibsii) ---		
307	Da'immiini reefuu dhalatee dhalattee battaalumaan akkatta akkamiittin naafnii isa googuu qaba?	1.Dhalaattee obbattin osso hin bahin 2. Dhalaattee obbattin ergaa bahee booda 3.Hin beekuu		
308	Da'immni reefuu dhalatee maraamuu kan qabu yoomi?	1. Bataluuman akkuma dhalateen osoo obaattin hin bahin 2.Erga obaattin bahee booda 3.Hin beekuu		
309	Da'immni reefuu dhalatee akkataa akkamitiin qabaman?	1. Lafarraa ka'u 2. Garaa /laphee hadharraa ka'u 3. Hadha bira ciibsuu 4. Nama biraa bira ka'u 5. Siireeraa ciibsuu 6. Kan biro(ibsii)-----		

		7. Hin beekuu		
310	Da'immni reefuu dhalatee saa'atii meeqa booda dhiqamuu qaba?	1.saa'atii tokkoo keessaatti 2.Saa'atii 2-24 keessaatti 3. Saa'atii 24 booda 4. Hin beekuu		
311	Ijii da'imaa reefuu dhalatee Akkatta kamiin akka qulqulla'u goodhama?	1.Haxooftuu istelayezidii ta'en qulqulla'u qaba 2. Carqumaa argameen qulqulla'u danda'a 3.Qubaan haxawamuu danda'a 4. Kan biroo 5. Hin beekuu		
312	Dhalatee saa'atti tokko keessatti coobduu ija yoo keenameef dhukuba koonjeetaytivsii irraa bararama.	1. Eeynii 2. Lakki		
313	Da'immni reefuu dhalatee yeroo meeqa booda harmaa hoodhu qaba?	1. Saa'atti tokko keessaati 2. Saa'atti tokko booda 3. Saa'atti 24 keessaati 4. Saa'atti 48 booda		
314	Da'immni reefuu dhalatee yeroo duraf maaltuu keenamuufi qaba?	1.Hrama/ silga 2. Bishaan sukkara qabu 3. Dhadhaa hara'a 4. Biishaan laga 5. Aanaan hadhaan ala 6. Kan biroo 7. Hin beekuu		
315	Da'immaa reefu dhalatee guyyaatti haatti yeroo meeqa harmaa hoosisuu qabdii?	----------		
316	Da'immni reefuu dhalatee harmaa hadhaa qofa yeroo hangamiif argachhu qaba?	----------/ ji'af		
317	Da'immni reefuu dhalatee talalii "BCG' yoom argachuu qaba?	----------		
318	Da'immni reefuu dhalatee talalii "O.P. V.' yoom argachuu qaba?	----------		
319	Da'immni reefuu dhalatee balaa keessaa jirachuu isaaf mallatoon maal akka ta'e ni beektaa?	1. Eeyeni 2. Lakkii		
320	Deebiin kee eyyee yoo ta'e mallattoo balaa hundaa ibsi. (Filannoon ni danda'ama	1. Hoolchuu qama/Konvolushinse/		

		2. Fiivar/ Oinsaa nafaa 3. Feedhi Nyataa dhabuu 4. Daddafani afuura basuu 5. Qorraa qama 6. Da'imaa xiiqishi dhaluu/yeroo duraa dhalachuu 7. Hundhura irrati diimachuu 8. Ija diimachuu/dhita'u 9. Harkii/ Miilii/ iji keeloo ta'u 10. Humna dhabuu /'Leetarji' Off iraafachu		

Kutaa Afuur:- Oodeefannoo Qunnaamtti Ilaalchisee

401	Da'immaa reefuu dhalatee ilaalechisee Oodeefannoo esaa argatee?	1.Akstteenshiini fayyarraa yeroo daawii mana 2. Oogeesaa fayya kiliinikaa irratti yeroo tajaajiluu 3. Maas midiyaarraa (TV, raadiyoo,Gaazeexaa..)		

Kutaa Shaanaffaa: Oodeefannoo goocha kunnunsaa da'immani reefuu dhalataan

501	Haadhunuuraa irra erga koordiin kutamee booda waanti diibamee ni jira?	1.Eeyeeni 2. Lakki		
502	Deebiin kee eeyenii yoo ta'e maaltuu dibamee?	1. Dhadhaa 2. Vazelina 3. Kan biro (IBSI)---- 4. Hin beekuu		
503	Da'immni reefuu dhalatee akkataa akkamitiin qabamee?	1.Lafarraa ka'amee 2.Garaa /laphee hadharraa ka'amee 3.Hadha biraa ciisee 4.Nama biraa bira ka'amee 5.Siireeraa ciisee 6.Kan biro(ibsii)----- 7.Hin beekuu		
504	Da'imnii kee dhaltee Yeroo meeqa booda naafin yeroo duraaf dhiqamee?	1.Saa'atumaa tokko keessaati 2. Saa'atii 2-24 keessaati 3. Saa'ati 24 booda 4. hin beekuu		

505	Muccaa kee isaa ma'yii harmee hoosisttee turttee?	1.Eeyeeni 2. Lakki		
506	Daa'immin kee yeroo meqaa booda harmee hoodhee?	1.Saa'atumaa tokko keessaati 2. Saa'atii 2-24 keessaati 3. Saa'ati 24 booda 4. hin beekuu		
507	Da'immni reefuu dhalateef yeroo duraf maal keeniitee?	1.Hrama/ silga 2. Bishaan sukkara qabu 3. Dhadhaa hara'a 4. Biishaan laga 5. Aanaan hadhaan ala 6. Kan biroo 7. Hin beekuu		
508	Da'immni kee dhalatee saa'atti saadii booda harmee kee ala waanta hin biraa argatee jira?	1.Eeyeeni 2. Lakki		
509	Deebiin kee eeyenii yoo ta'e hanga guyya a torbaatti maal keeniteef?	1. Biishaan qulquluu 2. Biishaan laga 3. Aanaan hadhaan alaa 4.Biishaan sukaara qabu 6. Kan biroo		
510	Muccaan kee dhalatee batalumaan talalii 'BCG'argatee jira?	1. Eeyenii 2. Lakki		
511	Muccaan kee dhalatee batalumaan talalii 'Pooliyoo'argatee jira?	3. Eeyenii 4. Lakki		

ANNEX 3

Questions for the qualitative method in-depth interview

A Checklist with question areas/ issues and specific probing questions for the key informants in the community to collect their suggestion

1. Are you aware that newborn children could get infection due to malpractices?

2. If yes how?

3. Can you pleases describe cultural practices performed on the newborn in his community?

4. How do these cultural practices affect the health system of the newborn?

5. What interventions were done to inhibit malpractices related to the newborn care? (Leaders (Community/ Religion), Health care provider, Community)

6. What do you need to practices essential newborn care?

Annex 4

Gaafiif Deebii Gadii fageenyaa

1. Goochaa badaa ta'en da'mmni reefuu dhalatee 'infeekshiinif' akka saaxiilamuu ni beektaa?
2. Deebiin kee Eeynii yoo ta'e akkamitti?
3. Da'immaa reefuu dhalatee ilaalchisee goochootaa badaa ta'ani hawaasaa keessaatti hojataaman ibsu ni dandeesa?
4. Da'iimmaan reefuu dhalaatan ilaalchisee goochoota badaa ta'an Kun hangam caasaa fayya hubaan?
5. Da'iimmaan reefuu dhalaatan ilaalchisee goochoota badaa ta'an kana xiiqqesuuf tarkaanfiin akkami fuudhatamuu qaba? (Itti waamamamtoota Hawaasaa jeechuun gaggeesoota Ganda, abba Amaanta), dhimamatoota Kuunuunsaa Fayyaa, Hawaasaa n) deebii'a.
6. Da'iimmaan reefuu dhalataanif Kuunuunsaa barbachisaa ta'ee hojirraa olchuuf maaltuu barbaachisaa?

ANNEX 5

DECLARATION

I THE UNDER SIGNED DECLARE THAT THIS THESIS IN MY ORIGINAL WORK HAS NOT BEEN PRESENTED FOR A DEGREE IN ANY OTHER UNIVERSITYAND ALL THE SOURCE OF THE MATERIALS USED FOR THIS THESIS WORK AND ALL PEOPLE AND INSTITUTIONS WHO GIVE SUPPORT FOR THIS WORK ARE FULLY ACKNOWLEDGED

NAME OF THE STUDENT---------- ----------

SIGNATURE ----------

PLACE OF SUBMISSION-ADDIS ABABA UNIVERSITY COLLAGE OF HEALTH SCIENCE SCHOOL OF GRADUATE STUDY CENTRALIZED SCHOOL OF PUBLIC HEALTH

DATE OF SUBMISSION----------

THIS THESIS WORK HAS BEEN SUBMITTED FOR FINAL WITH MY APPROVAL AS UNIVERSITY ADVISOR

NAME OF THE ADVISOR---------- ----------

SIGNATURE----------