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KNOWLEDGE AND UTILIZATION OF PARTOGRAPH AMONG OBSTETRIC CARE GIVERS IN PUBLIC HEALTH INSTITUTIONS OF ADDIS ABABA, ETHIOPIA, IN 2012.

BY

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Table of Contents

Acknowledgments I
Table of Contents II
List of Tables V
List of figures VI
List of Acronyms VII
Abstract VIII
1. INTRODUCTION 1
1.1. Background 1
1.2. Statement of the problem 5
1.3. Significance of the study 8
2. LITERATURE REVIEW 9
CONCEPTUAL FRAMEWORK 23
3. OBJECTIVES 24
3.1. General Objective 24
3.2. Specific Objectives 24
4. METHODS AND MATERIALS 25
4.1. Study Area and Period 25
4.2. Study design 26
4.3. Source Population 26
4.3.1 Source population for Professionals interview 26
4.3.2 Source population for record reviews 26
4.4. Study Subjects 26
4.4.1 Study subjects for professionals interview 26
4.4.2 Study subjects for record reviews 26
4.5. Inclusion and Exclusion Criteria 27
4.5.1 Inclusion and Exclusion criteria for professionals interview 27
4.5.2 Inclusion and Exclusion criteria for record reviews 27
4.6 Sampling technique 28
4.6.1. Sample size determination for professionals interview 28
4.6.2. Sample size determination for record reviews 29
4.7 Sampling techniques and procedures 30

4.7.1. Sampling techniques and procedures for professional's interview. 30
4.7.2. Sampling techniques and procedures for record reviews. 32
4.8 Methods of Data Collection 34
4.8.1 Methods of Data Collection for professionals interview 34
4.8.2. Methods of Data Collection for record reviews 35
4.8.3. Data collection procedure (technique) 36
4.9. Variables 37
4.9.1. Dependent variable (outcome) 37
4.9.2. Independent variables 37
4.10. Operational definitions 38
4.11. Data Quality Control 39
4.12. Methods Data Analysis 40
4.13. Ethical Considerations 40
4.14. Dissemination of the Study 41
5. RESULTS 42
5.1 Results for professional Interviews 42
5.1.1 Characteristics of the interviewed obstetric care givers 42
5.1.2 Awareness and knowledge of the partograph among obstetric care givers 44
5.1.3 Perception and attitude of the partograph among obstetric care givers 49
5.1.4 Utilization of partograph among obstetric care givers in public health institutions 51
5.1.5 Factors affecting utilization of the partograph among obstetric care givers in public health institutions 52
5.2 Results for Partograph Record reviews to assess partograph use during labour among obstetric care givers in public health institutions 56
6. DISCUSSION 61
7. STRENGTHS AND LIMITATIONS OF THE STUDY 67
7.1 Strengths of the study 67
7.2 limitations of the study 68
8. CONCLUSIONS AND RECOMMENDATIONS 69
8.1 Conclusions 69
8.2 Recommendations 70
REFERENCES 71

ANNEXES I
Annex I I
Information Sheet I
Annex II. III
Consent III
Annex III IV
Questionnaire IV
Annex IV XI
Partograph review/record review checklist XI
Annex V XIII
Sampling procedures using probability proportional to size of health center and hospitals XIII
Annex VI XIV
Criteria for the partograph knowledge score XIV
Annex VII XV
Partograph XV
Annex VIII XVIII
DECLARATION XVIII

List of Tables

Table 1. Characteristics of the interviewed obstetric care givers in public health institutions of Addis Ababa, Ethiopia, May 2012. 43
Table 2. Knowledge of obstetric care givers about assessment of labor with the partograph in public health institutions of Addis Ababa, May 2012. 45
Table 3: Bivariate and multivariate logistic regeression analysis of Selected professional Characteristics and Other Variables among obstetric care givers about knowledge on partograph, Addis Ababa, May, 2012. 48
Table 4. Perception of obstetric caregivers about the value of partograph in public health institutions of Addis Ababa, Ethiopia, May 2012. 49
Table 5: The attitude of respondents to the partograph among obstetric care givers in public health institutions of Addis Ababa, Ethiopia May, 2012. 50
Table 6: The practice of partograph and where training was obtained among obstetric care givers in public health institutions of Addis Ababa, Ethiopia, May 2012. 51
Table 7: Bivariate and Multivariate Logistic Regression Analysis of the association of partograph utilization with professional Characteristics and Other Variables among obstetric care givers in Public health institutions of Addis Ababa, May, 2012. 55
Table 8: The different selected public health facilities Participated in the survey in Addis Ababa, May, 2012. 56
Table 9: Proportions of partograph with records of parameters of fetal well-being at selected public health institutions of Addis Ababa, Ethiopia May, 2012. 57
Table 10: Numbers of Partographs with records of parameter of maternal condition and fetal conditions in public health institutions of Addis Ababa, May, 2012 58
Table 11: Numbers and percentages of partographs with records of blood pressure monitoring and conditions of the baby after birth in selected public health institutions of Addis Ababa, May 2012. 59

List of figures

Figure 1. Conceptual frame work of knowledge and utilization of partograph among obstetric care givers. 23
Figure 2. Schematic presentation of sampling procedures 31
Figure 3. Schematic Presentation of Sampling Procedure (Multistage sampling) 33
Figure 4: Reasons for not using partograph in public health institutions of Addis Ababa, Ethiopia, May 2012. 53
Figure 5: The proportions of standard monitoring of parameters of labour in selected public health institutions of Addis Ababa, Ethiopia, May 2012 60
Figure 6. Original WHO partograph XV
Figure 7.simplified WHO paragraph XVI
Figure 8. WHO Partograph for health centers use. XVII

List of Acronyms

AMDD	Averting Maternal Death and Disability Program
AARHB	Addis Ababa Regional Health Bureau
CHEWS	Community Health Extension Workers
FMC	Federal Medical Center
HIV	Human immune-deficiency virus
IUFD	Intrauterine fetal death
LSS	Life Saving Skill
MMR	Maternal Mortality Rate
MOH	Ministry of Health
NGOs	Non-governmental Organizations
NDUTH	the Niger Delta University Teaching Hospital
PPH	Post-Partum Hemorrhage
PPS	Probability Proportional to Size
OR	Odds Ratio
SS	Systematic Sampling
UNFPA	United Nations Population fund
UNICEF	United Nations Children's Fund
USA	United State of America
WHO	World Health Organizations

Abstract

Background. Globally, there was an estimated of 358,000 maternal deaths. Of which developing countries accounted for 99 % (355,000). Nearly three fifths of the maternal deaths (204,000) occurred in sub-Saharan Africa region alone. More than 70% of all maternal deaths are due to major complications of hemorrhage, infection, unsafe abortion, hypertensive disorders of pregnancy, and obstructed labor. A number of cases of obstructed labour do happen in health facilities, thus reflecting poor quality of intrapartum care. Use of the partograph is well known best practice for quality monitoring of labour and subsequent prevention of obstructed and prolonged labour.

Objective: To assess knowledge and utilization of partograph among Obstetric care givers in public health institutions of Addis Ababa, Ethiopia from September 2011 to May 2012.

Methods: A cross sectional quantitative study, supplemented by record reviews of 420 partographs, assessed knowledge and utilization of partograph in public health institutions of Addis Ababa, Ethiopia using a structured interviewer administered questionnaire and observational checklists. The collected data was analyzed using SPSS version 16.0. Logistic regression was used to control confounding variables

Results: Knowledge about the partograph was fair: 189 (96.6%) of all the respondents correctly mentioned at least one component of the partograph, 104 (53.3%) correctly explained the function of alert line and 161(82.6%) correctly explained the function of action line. The study has shown that 112 (57.3%) of the obstetric care givers at public health institutions reportedly used partograph to monitor mother in labour. But partograph record reviews showed only 32.9%, 30.70% and 20.70% of the fetal heart rate, cervical dilation and uterine contraction were

recorded according to the standard for monitoring of these three labour parameters. There was statistically significant association between utilization of the partograph and working in the health center level of care compared with Hospital level of care [67.9% vs 34.4% Adjusted OR=21.2 (6.6, 68.6)].

Conclusions and recommendations; A significant percentage of obstetric care givers had fair knowledge of partograph and why it is necessary to use it in the management of labour. In spite of fair knowledge of the partograph by obstetric care givers in this study, a large number of the partograph cards reviewed were not recorded or poorly filled. Training of obstetric care givers on use of the partograph with periodic workshops and seminars and mandatory health facility policy are recommended and vital to safety of women in labour in Addis Ababa, Ethiopia.

1. INTRODUCTION

1.1. Background

Globally, there were an estimated 358,000 maternal deaths or a maternal mortality ratio (MMR) of 260 maternal deaths per 100,000 live births. Of estimated total of 358,000 maternal deaths worldwide, developing countries accounted for 99 % (355,000). Nearly three fifths of the maternal deaths (204,000) occurred in sub-Saharan Africa region alone, followed by south Asia (109,000) (1). More than 70% of all maternal deaths are due to five major complications: hemorrhage, infection, unsafe abortion, hypertensive disorders of pregnancy, and obstructed labor. The majority of maternal deaths (61%) occur in the postpartum period, and more than half of these take place within a day of delivery (1,2). Maternal mortality ratio continues to be the major index of the widening discrepancy in the level of care and the outcome of reproductive health between the advanced and developing countries (2). This observation is supported by the global maternal mortality pattern in which annual losses of more than 515,000 maternal deaths from complications of pregnancy and childbirth, occur in developing countries (2). Among those who survive childbirth, at least 8 million develop serious morbidities and a further 50 million suffer minor complications (2).

The maternal mortality in Ethiopia is high despite the recognition of maternal mortality as a major public health issue (1). In Ethiopia, maternal mortality ratio is estimated at 676/100,000 live births. Only 5.3% of mothers had been attended at a health facility during delivery, pointing to possibility of a high maternal death ratio and disability (3). It is also indicated in this study that the maternal mortality rate, which is the annual number of maternal deaths per 1000 women age 15-49, for the period 1994-2000 in Ethiopia 1.34. Maternal deaths accounted for 21% of all

deaths to women age 15-49. Avoidable mortality and morbidity remains formidable challenge in many developing countries like Ethiopia. Pregnancy related complications cannot be reliably predicted and it is necessary to design strategies to overcome those problems when they arise. The most recent studies point to socioeconomic and cultural factors as leading causes of prenatal deaths. Even though antibiotics, better obstetric procedures like use of partograph indicate that as many as half of all deaths from pregnancy complications could be prevents if women had better access to health care, received better quality care and made positive changes in their health and life style habits (4). It is also mentioned that a women's race, ethnicity, country of birth and age can be associated with her risk of dying of pregnancy complications. These same factors may affect her ability to avoid unintended pregnancy, have access to adequate medical care, or learn and successfully practice healthy behaviors (4).

The majority of the deaths and complications could be prevented by cost-effective and affordable health interventions like the use of partograph and indeed the same measures that would prevent maternal deaths would also prevent morbidity and improve neonatal outcome (5). A partograph is one of the valuable appropriate technologies in use for improved monitoring of labour progress, maternal and fetal wellbeing. It is an important tool for managing labor. This is through enabling midwives, Nurses and doctors to record their examination findings on a standardized form, which generates a pictorial overview of labour progress, and maternal and foetal condition, which allows for early identification and diagnosis of pathological labour. Its use is critical in preventing maternal and perinatal morbidity and mortality and therefore has applicability in developed and developing world settings (2).

Most partographs have three distinct sections where observations related to maternal condition, fetal condition and labour progress are recorded (6). A partograph has clear demarcations which, if arrived at or exceeded clearly indicate the need to address existing or imminent complications like prolonged labour, fetal distress, and in the worst cases of obstructed labour, ruptured uterus. Early detection of prolonged labour greatly contributes to prevention of obstructed labor and other related complications such as postpartum hemorrhage (PPH), ruptured uterus, puerperal sepsis and obstetric fistula (7).

The partograph provides health professionals with a pictorial overview of the labour to allow early identification and diagnosis of the pathological labour (8). The World Health Organization recommends using the partogram to follow labour and delivery, with the objectives to improve health care and reduce maternal and fetal morbidity and death (5). The partograph is a graphic representation of labour and is an excellent visual resource to analyze fetal condition and maternal response in relation to time.

Success of partographs has been well established in the research literature. A meta-analysis in the Cochrane database shows that the use of partograph in the intrapartum period has been shown to reduce early neonatal deaths by 40%. Therefore the prevention of obstructed labour is a key intervention in reduction of maternal and perinatal morbidity and mortality (5). WHO evaluated the impact of partograph through a multicenter trial on labor management and outcomes. Findings indicated that use of the partograph led to a 3% reduction in duration of labor, 11% reduction in augmentation of labor, 5% reduction of sepsis in postpartum women and 2% increase in women having spontaneous delivery and 0.9% decrease in number of needing assisted delivery (3). Therefore, Proper use of a partograph in an environment where referral and timely intervention are possible would greatly contribute to reduction of maternal mortality and

morbidity in the region. Little is known about the knowledge of providers and utilization of parthograph, understanding this will be important to inform policies and strategies in provision of maternity care services. Therefore the rationale of this study was to find out the knowledge and use of the partograph in the public health institution of Addis Ababa, Ethiopia.

1.2. Statement of the problem

Each year, more than 200 million women become pregnant and about 500,000 will die as a result of the complications of pregnancy or childbirth (5). In 1987, WHO launched the Safe Motherhood Initiative, which aimed to reduce maternal morbidity and mortality by 50% by the year 2000. The initiative did not succeed and maternal health has always been a major focus of WHO effort. The current WHO initiative (5) is to reduce maternal mortality to 75% of the 1990 level by 2015. If this is to be successful, the problem of obstructed labour will need to be addressed effectively.

Prolonged and obstructed labor accounts for about 8% of direct maternal deaths in developing countries (9). The most likely reason for this problem is that a women's pelvis is not large enough for her baby's head to pass through or if a women's uterus does not contract sufficiently. If a woman with prolonged labor and /or obstructed labor does not receive timely and effective management, she may die from rupture of the uterus or infection or sepsis. Furthermore, obstructed labor may lead to severe disabilities such as obstetric fistulae (10).

According to some estimates, more than a million women in Africa alone survive prolonged or obstructed labor only to suffer obstetric fistula, a condition causing incontinence which often leads to a women's rejection by her partner's family and society leaving her destitute and ashamed (10).

In addition, there are potential harms to the infant. Some of them are asphyxia, brain damage, infection and /or death. Fetal deaths are common if prompt treatment for obstructed labor is not dealt with and if the fetus lives, there is the likely risk of developmental difficulties in later life, related to above complications (11).

Although the partograph is a simple and inexpensive tool which prevents maternal deaths and complications due to obstructed or prolonged labour, it is not as widely implemented, as it should be. Studies from Nigeria did report that only 25% to 33% of caregivers surveyed were using partograph for routine monitoring (5). Use of the partograph was more in tertiary level facilities and less at primary and secondary levels whereas ideally it should have been perhaps more important in the later. Caregivers may resist using the tool if they have insufficient knowledge and do not fully understand why they have been asked to use the tool. Non-availability of preprinted partographs has also been reported as a cause for non-utilization (5). Filling the partograph is also seen as an additional chore for a busy health worker in such a situation and may not be motivated to complete the partograph. However, the challenges to the implementation of the partograph, including insufficient knowledge, non-availability of preprinted partographs and workload pressure, can all be addressed with further education on the purpose of the partograph and local managerial support (5).

During home delivery almost all health extension workers in Ethiopia did not use the patograph for monitoring the progress of labor and also there is not complete delivery recording for every woman who delivers the baby. Although health professionals worldwide had been instructed to use partograph, during practice none of them used it regularly with compiling many details to complete it (13). They help the mothers to deliver her baby based on their experience that they have got as long as their job. Therefore, they did not know how many women that undergone delivery complications were referred to hospital in late condition threatening the women's life. With this setting different studies proposed that a refresher course for the midwives on WHO partograph use which followed by advocacy and supervision by obstetrician would reduce delayed referral and its complications (13,14).

To the best of our knowledge, there is no published article with respect to the knowledge and use of the partograph among health personnel working at maternity units in Addis Ababa public health institutions. Therefore, this study was conducted to evaluate the knowledge and use of this important and simple obstetric tool among the obstetric care providers at public health institutions in Addis Ababa, Ethiopia.

1.3. Significance of the study

This study will be important for different stakeholders addressing the issues related to maternal and perinatal morbidity and mortality. Firstly, the study was designed with the specific focus of assessing the level of knowledge of the partograph by obstetric care givers, and the attitudes and utilization of the partograph to monitor labour in public health institutions of Addis Ababa. Findings from the study will provide information for the policy makers to develop strategies and guidelines or standards for scaling up the utilization of partograph as an important tool in addressing problems associated with maternal morbidity and mortality. Secondly, this study will provide evidence of the gaps in health professionals' knowledge about partographs. These findings can therefore be incorporated into planning education programs for health professionals working in maternity units which will initiate changes in the appropriate use of partographs. With changes in knowledge, attitudes may also change, and together, changes in knowledge, attitudes, and practice can result in a reduction in maternal mortality in Ethiopia. Thirdly, the findings of this study used to improve nursing and midwifery education regarding partograph, particularly maternal and reproductive health nursing. Curricular content regarding partograph, such as its purpose, how to fill and how and when to use it, may be integrated masters level midwifery and nursing courses. Information from this study may also be used for designing training of nurses in the clinical area as well. Finally, the study results may also inform solutions for the problem of maternal morbidity and mortality at the health facility level.

2. LITERATURE REVIEW

Partograph is a simple reliable tool for graphically recording the progress of labor and monitoring the health of the mother and the fetus. It also serves as an early warning system and assists in early decision making on intervention in labor. Advantage of the partogram is saving the writing time of the maternity nurses and midwives with their hand. It gives all the necessary information on a single sheet of paper and easier to keep rather than making detailed notes at intervals. Records are straight and objective both nursing and medical staff can see at a glance the progress of the labor in each patient. This facilitates hand over formalities when staff changes duties. It has a predictive value. It is possible to estimate the expected time of delivery in case everything is normal. It also plays vital role of reducing perinatal and maternal mortality and morbidity.

The partograph is a tool that enables midwives and obstetricians to record maternal and fetal observations simply and pictorially. Friedman was the first obstetrician to describe the progress of labour graphically (8). He reported the change in cervical dilatation occurring in labour. The progress was recorded in centimeters of dilatation per hour. The resulting graph was an S-shaped curve. Philpott subsequently used this information to develop a tool initially referred to as cervicograph (12). He used this tool in Zimbabwe (then Rhodesia) in an attempt to utilize midwives efficiently in the health services where doctors were in short supply. From this original cervicograph, Philpott developed a partograph, a practical tool for recording all intrapartum details, not just cervical dilatation (12). This provided a tool for recording all intrapartum details, not just cervical dilatation. An ‘alert line’ was added following the results of a prospective study of 624 women (13), which was a modification of the mean rate of cervical dilatation of the slowest 10% of primigravid women who were in the active phase of labour. This line represented

a progress rate of 1 cm per hour. The next stage of partogram development was the introduction of an ‘action line’, four hours to the right of the alert line (13). This line was developed on the premise that correction of primary inefficient uterine action would lead to a vaginal birth.

Despite the fact that the patograph has been described and available since early 1970s, it is still not used worldwide effectively. One primary reason for this is a lack of conviction about its usefulness by some decision makers and leaders in the health care. Another main obstacle to the wide spread use is the existence of so many varieties of the patograph; the potential new user is at loss as to which set of conflicting guidelines to follow (14).

As a result of all this, a considerable number of women suffer complications resulting from labour and childbirth and some of these complications result in maternal or infant mortality. While this problem can be significantly reduced through the use of the Partograph to monitor labour, it is uncertain whether midwives in most of the hospitals are knowledgeable about its use to monitor labour. A study to examine the factors that mediate the utilization of the Partograph in monitoring labour in the Federal Medical Centre (FMC) and the Niger Delta University Teaching Hospital (NDUTH), both in Bayelsa State Nigeria (15) revealed that majority of respondents 84 percent knew what the Partograph is and 92.7 per cent of respondents indicated that the use of the Partograph reduces maternal and child mortality. About 50.6 per cent respondents in FMC and 98.8 percent in NDUTH indicated that the Partograph is routinely utilized in their centers. Assessment of utilized Partograph charts revealed that 18 (37.5%) out 48 in FMC and 17 (32.6%) out of 52 in NDUTH were properly filled. The study also revealed some hindering factors in the utilization of the Partograph which are:-Non-availability of the Partograph 30.3%, shortage of staff 19.4%, little or no knowledge in the use of the Partograph 22.2%, and 8.6 percent indicated it is time consuming. A significant relationship existed between

knowledge of the Partograph and its utilization of the Partograph $\chi^2 = 32.298$; Df = 1; P <0.01), and between midwives years of experience and utilization of Partograph (15). In conclusion, the study unveiled that despite midwives good knowledge of the Partograph, there existed poor utilization to monitor women in Labour in both centers. Training of midwives on Partograph, as well as periodic workshops and seminars should be seen as vital to the saving of lives especially on the safety of women undergoing Labour (15).

WHO partographs are the best known in most countries. Since the 1990, WHO has published 3 different types of the partograph. The first of these partographs (6) also called as the composite partograph includes a latent phase of 8 hours and an active phase starting at 3 cm cervical dilatation. It has an alert line with a slope of 1 cm per hour which commences at 3 cm dilatation and the action line is 4 hours to the right of and parallel to the alert line. It also provides space for recording descent of the fetal head, indicators of maternal and fetal well-being and medications administered. This partograph has been tested successfully in an international study of over 35,000 women in South East Asia (6).

WHO modified the partograph for use in hospitals in 2000 (16). The latent phase was excluded in this partograph. The active phase commences at 4 cm dilatation. The other features are the same as the composite WHO partograph. The reason for excluding the latent phase were that interventions are more likely if the latent phase is included and because staff reported difficulties in transferring from latent to active phase. The choice of 4 cm was made to reduce the risk of interventions in multiparous women with patulous cervixes who were not yet in labour. A study of the modified WHO partograph in Ethiopia concluded that labour could be managed without the latent phase being plotted on a partograph (5). WHO further modified the paragraph for the third time, this time for use by skilled attendants in health centers (5). This simplified partograph

is colour coded. The area to the left of the alert line in the cervicograph is colored green, representing normal progress. The area to the right of the action line is colored red, indicating dangerously slow progress in labour. The area in between the alert and action line is colored amber, indicating the need for greater vigilance (5).

The WHO claimed that the use of the partograph reduces the caesarean section rate; however, the paper shows that this was not a significant result. Only reductions in prolonged labour, augmented labours and post-partum sepsis reached statistical significance. The authors reported that the proportion of labours requiring oxytocin augmentation was reduced by 54%—from 20.7 to 9.1% (5). It is difficult to come to any conclusion except that the previous rate of augmentation was probably unnecessarily high. If this be so, then the partograph is simply correcting a poor standard of care, rather than making childbirth safer as such. But that itself is no small feat achieved. It must be understood that the majority of trials of partography have taken place in hospital settings where most maternal deaths occur among women admitted with severe complications and often neglected labour (5).

A study about the role of partograph in the prevention of prolonged labour by Seizer AR Bailvey SM, pointed out that obstructed labour continues to be an important cause of maternal and perinatal mortality and morbidity. The partograph graphically represents key events in labour and provides an early warning system. He suggested that, when used with defined management protocols, this inexpensive tool can effectively monitor labour and prevent obstructed labour (17).

A prospective multicenter composite study was done in 2009 in the South East Asia to test WHO partograph on 35,484 women. The study was conducted using an agreed management protocol on actions to be taken based on partograph findings. This composite intervention reduced prolonged labour from 6.4% to 3.4% and the proportion of augmented labour from 20.7% to 9.1%. Emergency Caesarean births decreased from 9.9% to 8.3% and intrapartum stillbirths from 0.5% to 0.3%. Among singleton low risk pregnancies, caesarean births fell from 6.2% to 4.5%. The use of this partograph in breech presentations reduced prolonged labour and caesarean births (among multiparas), and improved perinatal outcomes (7).

A cross-sectional study was conducted to assess knowledge about the partograph and its utilization among maternity care providers in primary health care in south west Nigeria (18). Results indicated about a quarter of the respondents 75 (27.3%) had received prior training on the partograph. Only 25(9.1%) reported that the partograph available in their labour wards. Knowledge about the partograph was poor; only 18(16.0%) of all the respondents correctly mentioned at least one component part of the partograph, 21(7.6%) correctly explained the function of the alert line and 30(10.9%) correctly explained function of the action line. Prior training significantly influenced knowledge about the partograph ($\chi^2 = 49.2$ $p < 0.05$)(18).

A study was conducted in Nigeria regarding knowledge and use of the partograph among health care professionals. Sample was collected from 396 maternal care providers. Among this 39 (9.8%) of all the personnel routinely employed the partograph for labor management. Remaining 365 (90.2%) of the individual had a poor knowledge. So the study is suggested that effort should take to training of care providers at peripheral delivery units (19).

A complete audit cycle of all the primary caesarean sections performed in the maternity unit of Aga Khan University was conducted. New labour management guidelines like maintaining partographs and checking cord blood for fetal pH were implemented after the first audit. The rates of caesarean section, induction of labour, failed induction, and maternal and fetal outcomes were compared before and after the implementation of the guidelines. They found that the primary emergency caesarean section rate decreased from 16% to 12%. A reduction in primary caesarean sections was noted in the induced cases. There were no significant adverse maternal and perinatal outcomes. They concluded that the implementation of standard labour management strategies like maintaining partographs and checking cord blood for fetal pH can reduce primary caesarean section rate without compromising maternal and fetal safety (20).

A cross-sectional study involving observations, record reviews and interviewing of staff in 8 health facilities in Rujumbura, Uganda was conducted from May 23rd to 27th June 2008 (21). The result showed the partogram was used in 69.9% of deliveries. The partographs that fulfilled the standard monitoring of foetal heart rate were only 2%. There were few trained health workers and lack of guidelines on partogram use. A good Apgar score was associated with standard foetal monitoring and was statistically significant ($P < 0.001$). There was poor use of partograms during labour mainly affected by health input factors. So the study recommended training of health workers on partogram use, provision of guidelines and adequate resources.

The same study done in Uganda on Use of the partogram conducted record reviews of 1170 partographs out of estimated 1674 partographs (representing the total actual deliveries during the period) that had been used for labour management during the period of this study and were accessible to the study team. This was only 69.9% of the total 1674 expected partographs (21).

They noted that there were 1674 deliveries across all the health units but only 735 of the cervical dilation and 396 uterine contractions were plotted on the partograms to recommended standard. Action lines crossed were in 13 partographs (21).

Retrospective study to determine the extent and quality of partograph use in public health facilities in Kenya on 1198 partograph records of women who delivered in the month of June 2008 from the ten public health facilities in Kenya were reviewed to assess the use of partograph (22). Quality of partograph use was determined by inspection for documentation of the fetal wellbeing, progress of labour and maternal wellbeing. Analysis was done to determine if they conformed to the internationally recommended methods of plotting partographs. Results indicated 1057(88.2%) of the records had a partograph available in the file. A partograph was used correctly in only 252/1057 (23.8%). The quality of record keeping in the intrapartum period overall was poor. Coast province general hospital (OR 2.5 CI 1.37-4.49), Machakos general hospital (OR 3.24 CI 1.62-6.50) and Kenyatta national hospital (2.6 CI 1.49 - 4.52) were three main hospitals where a pregnant woman was in labour was more likely to be monitored using a partograph. The study concluded although partographs are frequently found in mothers' files the extent of partograph use and quality of labour monitoring using the partograph is very low (24%) (22).

A descriptive cross sectional study to determine the utilization of the partograph in the management of labour in selected health facilities in Kenya conducted in Nine health facilities - ranging from a tertiary hospital to health center, including public, private and faith based facilities in four provinces in Kenya. Results indicated all facilities apart from Pumwani Maternity Hospital and one health centre were using the partograph (23). The correct use was low, the knowledge on the use of the tool was average and there was minimal formal training being provided. Staff shortage was listed as the most common cause of not using the tool. Contractions were recorded 30-80%, foetal heart rate 53-90% and cervical dilatation 70-97%. Documentation of state of the liquor, moulding and descent as well as maternal parameters such as pulse and blood pressure and urinalysis were minimally recorded. Supplies for monitoring labour such as fetoscopes and blood pressure machines were in short supply and sometimes not functional. Overall, the poor usage was contributed to staff shortages, lack of knowledge especially on interpretation of findings, negative attitudes, conflict between providers as to their roles in filling the partograph, and senior staff themselves not acting as role models with regards to the use, advocacy and implementation of the partograph. The study concluded that the partograph was available in most units. However, accurate recording of parameters to monitor the foetus, the mother and progress of labour as recommended was mostly not done. Shortage of staff, lack of knowledge, lack of team work, lack of supplies and negative attitude among healthcare providers were some of the obstacles noted to hamper partograph use (23).

The cross sectional study assessed knowledge and utilization of partograph among obstetric care providers in southwestern Nigeria (2). Respondents were selected by multi-stage sampling method from primary, secondary and tertiary health centers. 719 respondents comprising of community health extension workers (CHEWS) - 110 (15.3%), Auxiliary Nurses - 148 (20.6%), Nurse/Midwives – 365 (50.6%), Physicians – 96 (13.4%) were selected from primary (38.2%), secondary (39.1%) and tertiary levels (22.7%). Only 32.3% used the partograph to monitor women in labour. Partograph use was reported significantly more frequently by respondents in tertiary level compared with respondents from primary/secondary levels of care (82.4% vs. 19.3%; $\chi^2 = 214.6$, $p < 0.0001$). Only 37.3% of respondents who were predominantly from the tertiary level of care could correctly mention at least one component of the partograph ($\chi^2 = 139.1$, $p < 0.0001$). The partograph is utilized mainly in tertiary health facilities; knowledge about the partograph is poor. Though affordable, the partograph is commonly not used to monitor the Nigerian woman in labour (2).

A study done in India to compare two World Health Organization (WHO) partographs – a composite Partograph including latent phase with a simplified one without the latent phase involving eighteen physicians participated trial reveals most participants (84%) experienced difficulty “sometimes” with the composite Partograph, but no participant reported difficulty with the simplified Partograph. They concluded that the simplified WHO Partograph was more user- friendly, was more to be completed than the composite Partograph, and was associated with better labour outcomes (24).

A total of 216 out of 396 (54.5%) respondents were aware of the partograph, while 180 out of the 396 (45.5%) were not even aware of it in the survey conducted among the personnel working in the peripheral maternity units in Ogun State, Nigeria from December 2004 to January 2005(19). Of those who were aware of the partograph, 180 of the 216 (83.3%) respondents knew its correct definition while 36 (16.7%) of them did not. Those who knew the correct definition also correctly identified the benefit of using the partograph for labour management. More than half of them had fair knowledge of the partograph, while less than one-third had good knowledge of it. No junior CHEW had a good level of knowledge, while the majorities (61.7%) of the matrons were rated as having a fair level of knowledge. Life Saving Skill (LSS) training workshop was reported as the primary source of knowledge by one-third of those aware of the partograph and these individuals generally had fair and good levels of knowledge. Respondents whose main source of knowledge was the place of work/clinic were more likely to have poor knowledge. Although less than half of the previously trained respondents had a good level of knowledge, they were less likely to have a poor level of knowledge compared with personnel who had never been formally trained (12.1% vs 23.8%, OR: 0.44; CI: 0.20 – 0.97) (19).

Only 39 (18.5%) of those who were aware of the partograph employed it routinely in labour management but the level of knowledge was poor in 19 (48.7%) of these individuals in the study conducted among the personnel working in the peripheral maternity units in Ogun State, Nigeria from December 2004 to January 2005(19). Overall, only 9.8% of the participants routinely used the partograph. The proportion of those with poor level of knowledge was significantly higher among those who used the partograph routinely compared with those who never used it at all (48.7% vs 9.5%; $\chi^2 = 34.6$ $p<0.0001$). Among the participants who were

aware of the partograph but never engaged it in monitoring labour, reasons for not routinely using it were cited as little or no knowledge of the partograph (17.1%), non-availability of the partograph (67.6%) and lack of adequate number of personnel (44.9%). A total of 204 (94.4%) of those who were aware of the partograph desired training in its use, while 12 (5.6%) of them were not interested (19).

A retrospective study to assess the quality of partograms used to monitor labor in Dar es Salaam hospitals, Tanzania (25). The study team reviewed the records of the parameters of labor, and maternal and fetal conditions in 367 partograms, and interviewed 20 midwives. Results from the study indicated all midwives interviewed had been previously trained to use the partogram. Of all partograms reviewed, although cervical dilation and fetal heart rates were recorded in 97% and 94% of the partograms respectively, 63% and 91% of these were judged to be substandard. Substandard monitoring of fetal heart rates was strongly associated with poor fetal outcome. Blood pressure, temperature, and pulse rates were not recorded in 47%–76% of partograms. These findings reflect poor management of labor and indicate urgent in-service training to address the importance of documentation and regular partogram audit in order to reduce maternal and perinatal deaths (25).

Another study aimed to assess the effectiveness of promoting use of the modified WHO partograph by midwives conducting childbirth in maternity homes in Medan, Indonesia (7). This cluster randomized trial included 20 midwives who regularly conducted births. Midwives in the intervention group were trained in the use of the partograph and advised to use it while providing care in labour. There were 304 parturient women in the intervention group and 322 in the control group. Referral rate in the partograph group increased (adjusted OR 4.2; 95% CI 2.1-8.7) and there were decreases in vaginal examinations performed

(adjusted OR 0.24; 95% CI 0.12-0.48), augmented (adjusted OR 0.21; 95% CI 0.12-0.36) and obstructed labour (adjusted OR 0.38; 95% CI 0.15-0.96). There were fewer caesarean births and neonatal resuscitation in the partograph group but the differences were not statistically significant (7).

A Cross sectional study, competency based workshops were conducted at Hamdard university hospital and attended by 85 graduating final year students, 10 house officers and 5 labour room nurses, where 100 trainees were evaluated for improvement in knowledge and skills after workshops on "labour and partograph" showed that eighty percent of the trainees strongly agreed that workshop had improved their knowledge and skills and appreciated the hands on practice session (26). In assessment of improvement in knowledge by pre and post-test questionnaire it was found that only 14.9% scored >80% in pretest whereas in post-test 87.8% scored >80%. In, overall, assessment of skills only 3.6% trainees scored >80% in pre-training assessment while in post training assessment almost 98.2% scored > 80%. The overall results showed significant improvement in both knowledge and skills of the trainee after the workshop. Objectivity in teaching, learning and assessment gives good outcomes. The study also feel that such training workshops should be done on a larger scale to train the staff in order to achieve the targets set under millennium development goals (26).

A study was conducted in Asia regarding control of the quality of care offering by midwives (27). In that report reveals, 59% of the maternal death happened due to ineffective use of partograph. In Iran and Tehran maternal mortality rate 37 and 61/100000 respectively. The study concluded that midwives must monitor the partograph during labor to protect the laboring mothers from complication (27).

A case controlled, prospective and interventional study was conducted in obstetric unit of Jinnah post graduate medical centre, Karachi, in Pakistan regarding role of partograph to prevent prolonged labor (28). Result was given by them, that labor process finished shorter than 12 hours in 80.8% of the primigravida, 18.4% had labor shorter than 24 hours and only 0.8% had labor happen longer than 24 hours. Study concluded that by using partograph , prolonged labor rate was reduced (28).

A base line assessment done in Ethiopia by MOH, UNICEF, UNFPA, WHO and AMDD on emergency obstetric and newborn care showed partographs are not widely used in Ethiopia; completed partographs were found in 30% of hospitals and 25% of health centers (29). Even fewer facilities had management protocols that are needed to guide the management of labor. Most partographs were not completed correctly -- only 45% had the first cervical dilatation charted on the alert line. Key components on the partograph to assess progress of labor and fetal well-being include the recordings of maternal temperature, blood pressure, pulse, contractions, fetal heart beat, progress of cervical dilatation and descent of presenting part. Recordings on the partograph and interpretation of findings and management need improvement (29).

This literature review indicates that there are few controlled or quasi-controlled studies examining the impact of partograph use on labor or on cesarean section rates and that evidence of positive impact from these studies is limited. Other, non-controlled studies, however, provide supporting evidence of a positive impact on maternal and perinatal outcomes. Reported rates of partograph use vary from study to study. Additionally, while some studies report on general rates of use, others report on rates of "correct" usage, which differ greatly. Findings most often indicate rare or incorrect use of the partograph. Low rates of use and of correct use of the partograph are most frequently seen in health care settings where labor management practices are generally poor. Many studies had a larger scope and addressed the partograph as one of several indicators to assess overall labor monitoring or management skills and practices, and thus they report only on rates of use, with little in-depth background or qualitative data to round out these findings.

CONCEPTUAL FRAMEWORK

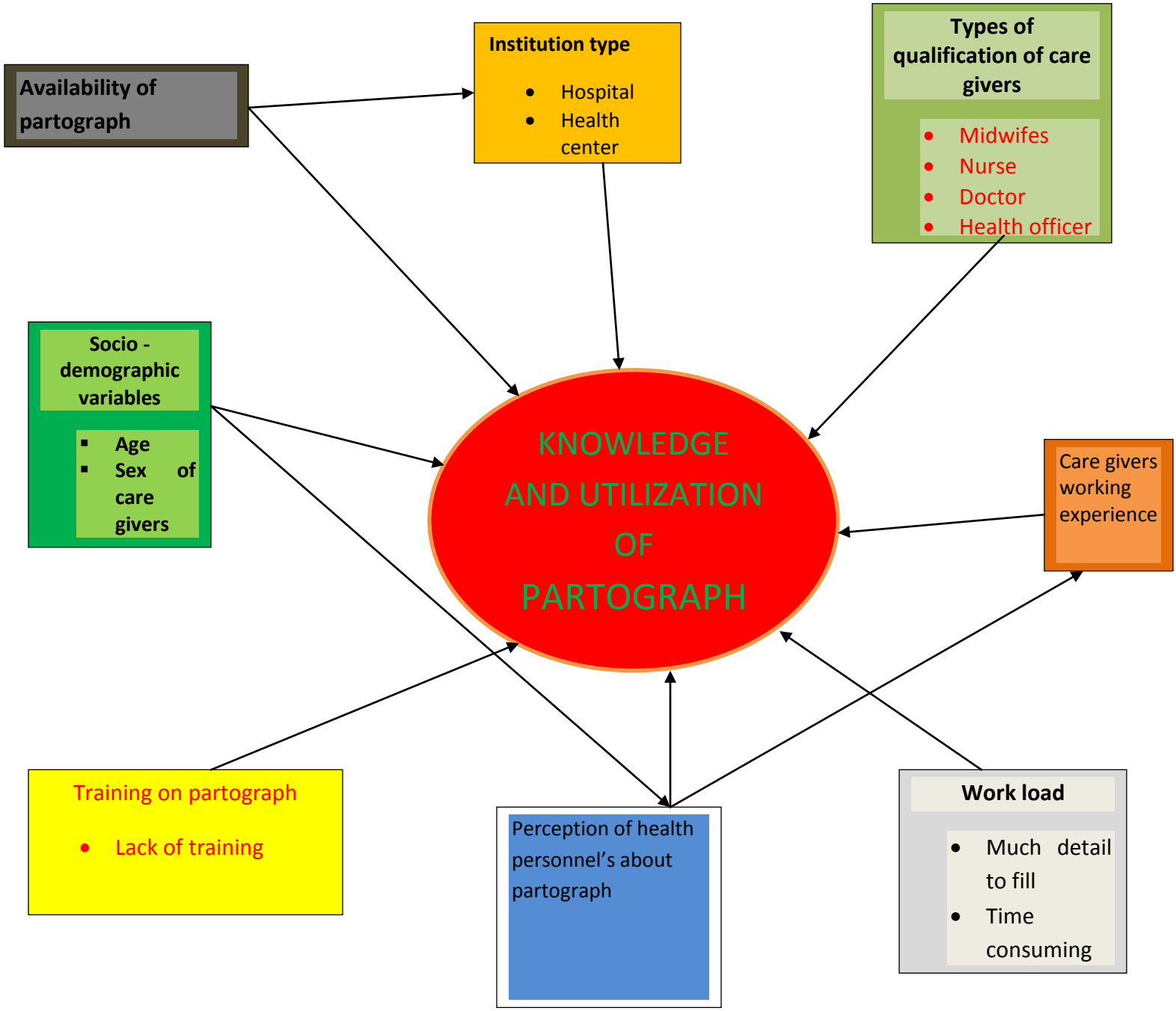


Figure 1. Conceptual frame work of knowledge and utilization of partograph among obstetric care givers.

Source: Developed by principal investigator after reviewing literatures.

3. OBJECTIVES

3.1. General Objective

To assess knowledge and utilization of partograph among obstetric care givers in public health institutions of Addis Ababa, Ethiopia from September 2011 to May 2012.

3.2. Specific Objectives

1. To determine the level of knowledge of partograph among obstetric care givers in public health institutions.
2. To assess the practice of partograph use among obstetric care givers in public health institutions.
3. To determine factors affecting utilization of patograph among obstetric care givers in public health institutions.
4. To assess appropriate use of partograph during labour in selected public health institutions by partograph record reviews.

4. METHODS AND MATERIALS

4.1. Study Area and Period

This study was conducted in Addis Ababa which is the capital city of Ethiopia and seat of African Union & Economic Commission for Africa. Addis Ababa has a population size of over 3 million (3,038,096) with annual growth rate of 2.1(data obtained from central statistical agency of Ethiopia). The city is divided into ten sub cities and 100 Kebeles (Lowest level administrative unit in the city). Addis Ababa is located between 8055° and 9005° North Latitude and between 38040° and 38050° East Longitude and the total Land area is 54,000 hectares. It is established on November, 1887 by Emperor Menelik II and Empress Taitu. Its average elevation is 2,500 meters above sea level, and hence has a fairly favorable climate and moderate weather conditions. Availability of health and educational services i.e. public and private clinics, health centers and hospitals; and private kindergartens, primary and secondary schools; and colleges and universities of adequate standard made the city very attractive.

The city has 48 hospitals. Thirteen are public hospitals. Of which, 5 are under Addis Ababa Regional Health Bureau (AARHB) and 5 are specialized referral (central) Hospitals. Two are defense forces (military) referral hospitals and one hospital under army force. Furthermore the city has 27 health centers ruled by the Addis Ababa health bureau and 5 newly opened health centers.

There are two hospitals, three health centers and 31 different level clinics established by non-government organizations (NGOs). The city also has 33 private hospitals and more than 700 different level private clinics (This relevant data obtained from AARHB and central statistical agency of Ethiopia documents through communication).

This study was conducted in public health institutions of Addis Ababa which have been providing obstetric care services from September 2011 to May 2012.

4.2. Study design

This study was a cross- sectional quantitative study that examines knowledge and Utilization of partograph among obstetric care givers, to study utilization the study was supplemented by partograph record reviews, in Public health institutions of Addis Ababa, Ethiopia from September 2011 to May 2012.

4.3. Source Population

4.3.1 Source population for Professionals interview

The source population was all health professionals working in maternity units in Addis Ababa public health institutions. This included Midwives, Nurses, Doctors and public health officers.

4.3.2 Source population for record reviews

The source population comprised of all partographs in public health institutions of Addis Ababa.

4.4. Study Subjects

4.4.1 Study subjects for professionals interview

The study subjects were sampled health personnel who give obstetric care in public health institutions of Addis Ababa city.

4.4.2 Study subjects for record reviews

The study subjects for record reviews were comprised of selected partographs in sampled public health institutions of Addis Ababa.

4.5. Inclusion and Exclusion Criteria

4.5.1 Inclusion and Exclusion criteria for professionals interview

This study included midwives, nurses, doctors and health officers who attend to labour cases in the selected Hospitals and health centers and who consented to participate in the study and this study excluded those health professionals who do not attend labour cases in selected Hospitals and health centers.

4.5.2 Inclusion and Exclusion criteria for record reviews

This study included all partographs (modified WHO partograph for the second time) with complete and partially complete information from the selected public health institutions and excluded those partographs which had no information recorded or documented on it. Such as: partograph sheets on which only delivery summary is recorded but no written evidence of fully dilatation of cervix or records of mothers who were admitted in second stage of labour and delivered just before reaching the labour wards were excluded. In addition to this, mothers file with the information of prolonged labour plus latent phase of labour, sever oligohydraminous, IUFD, previous caesarean section plus breach presentation; HIV plus breech presentation, preeclampsia plus closed cervix and elective caesarean section were also excluded.

4.6 Sampling technique

4.6.1. Sample size determination for professionals interview

The sample size in this cross sectional survey was determined using a single Proportion formula.

$$n = \frac{z^2_{\alpha/2}\, p(1-p)}{w^2}$$

The minimum sample size required for the study was estimated to be **334** using the above formula where n is the sample size, Z is the standard normal deviate, set at 1.96 (for 95% confidence level), w is the desired degree of accuracy (taken as 0.05) and p, is the estimate of the proportion of our target population who use partograph (assumed to be 32.3% as obtained from study done in the south west Nigeria on knowledge and utilization of the partograph among obstetric care givers) (2). This outcome variable (Utilization of partograph) was selected because it has higher result when compared to the other variable knowledge in the study done in the south west Nigeria on knowledge and utilization of partograph among obstetric care givers.

Correction formula was used as the total number of health professionals working in the maternity units of public institution is less than 10,000.

$$nf = \frac{no}{1+\frac{no}{N}}$$

Therefore, the corrected sample size was 183. Where n_f is final sample size, n_o is the initial sample size and N is the total Number of obstetric care givers in Addis Ababa public health institutions. Adjustment for a 10% rate of non-responses and incorrect responses yielded a final sample size of **202**

4.6.2. Sample size determination for record reviews

The sample size in this cross sectional survey was determined using a single Proportion formula.

$$n = \frac{z_{\alpha/2}^2 p(1-p)}{w^2}$$

The sample size required for record reviews study was estimated to be **420** partograph cards using the above formula where n is the sample size, **Z** is the standard normal deviate, set at 1.96 (for 95% confidence level), **w** is the desired degree of accuracy (taken as 0.05) and **p**, is the estimate of the proportion of our target population (assumed to be 24% as obtained from a retrospective study in Nigeria on "The use of partographs in public health facilities in Kenya" (22). Due to multistage nature of the study a design effect **1.5** was considered.

$n = [1.96^2 \times 0.24(0.76)/0.05^2] \times 1.5 = 420$

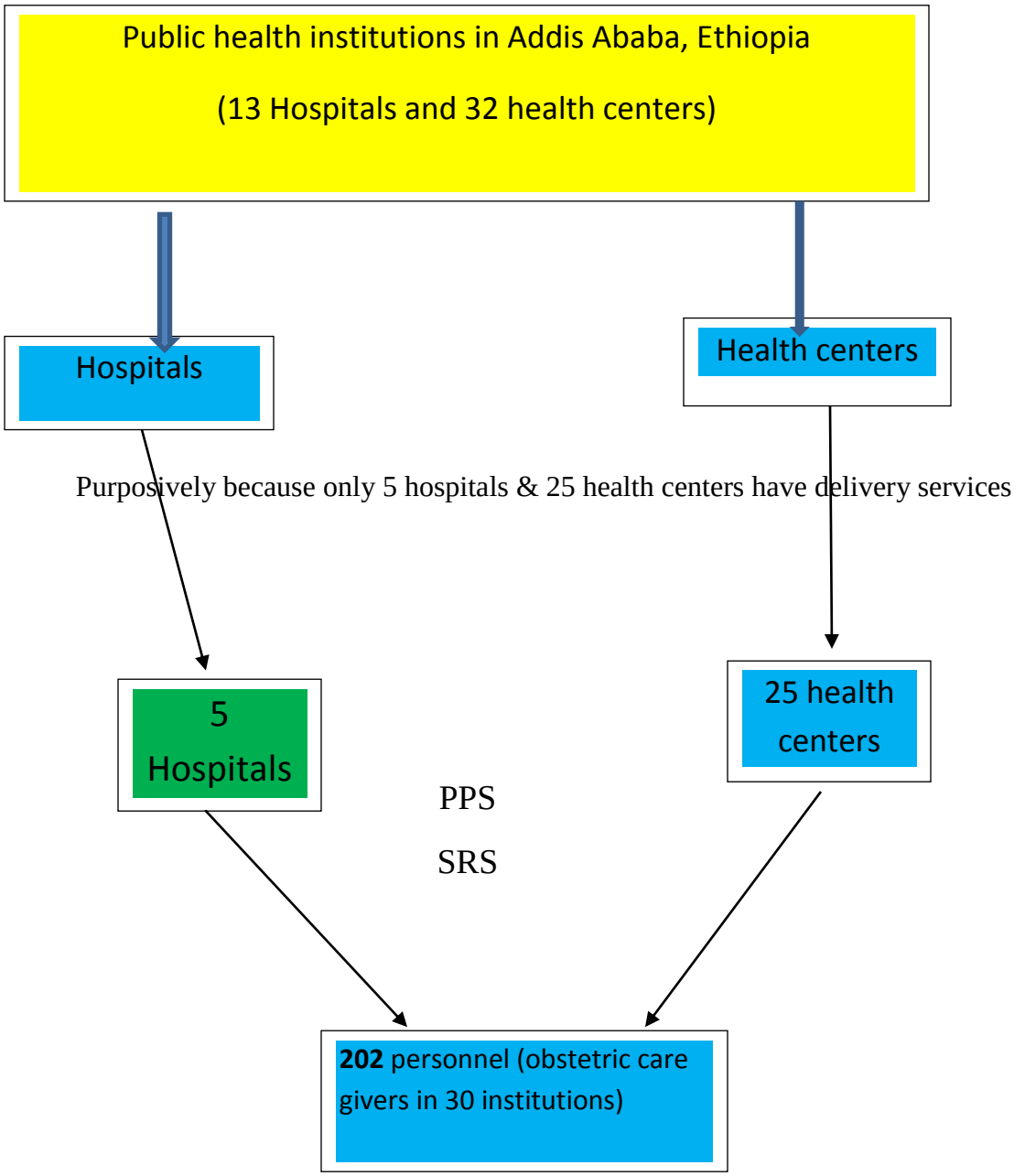
Accordingly, the final sample size was **420** partograph cards.

4.7 Sampling techniques and procedures

4.7.1. Sampling techniques and procedures for professional's interview.

The total numbers of public institutions in Addis Ababa are **45** (**13** Hospitals and **32** health center of which 5 are newly opened health centers). From these institutions 25 health centers provide obstetric care services while only 5 public hospitals give obstetric care services which give a total of 30 public health institution. The total health personnel who have been providing obstetric care in this 30 institutions are **403** (Data obtained from each institution by the principal investigator via preliminary survey). All institutions were included in the study purposely since the total population in the study area is small.

The probability proportional to size sampling technique (PPS) was used. First, the list of public health institutions and measure of size of obstetric care givers was recorded (see table I). Starting from the top of the list, cumulative measure of size was calculated. At each study center; simple random sampling was employed to select the sample to be interviewed ensuring adequate representation of for doctors, midwives and nurses. Probability Proportional to Size (PPS) method of sampling is different from Proportional Allocation (PA). PPS is a sampling technique for use with surveys or mini-surveys in which the probability of selecting a sampling unit (e.g., in this study hospitals and health center) is proportional to the size of its population. It gives a probability (i.e., random, representative) sample. So it can be combined with simple random sampling to drawn study subjects for this study **(See Annex V for sampling procedure).**



KEY

PPS- probability proportional to size sampling technique (to allocate professionals to each institution).

SRS- Simple random sampling technique

Figure 2. Schematic presentation of sampling procedures

4.7.2. Sampling techniques and procedures for record reviews.

A multi-stage sampling technique was employed. From all maternity service provider public health institutions two hospitals and three health centers were selected by simple random sampling technique. Three consecutive months of the year 2011 and 2012, namely December 2011, January 2012 and February 2012 was purposively selected for record reviews because of the fact that they provide adequate and latest information about partograph in these selected institutions for this study. The 420 partographs used during labour for these three consecutive months were reviewed. Proportional to sample size calculation technique was used to know the number of cards/ partographs included from sampled hospitals and health centers using monthly records of number of deliveries. The total number of deliveries during this three months in each study centers was divided by the desired proportional sample size to determine the sampling interval **(K=7)** and at each study center systematic sampling was employed to select the proportionally distributed samples (partograph cards) from the delivery logbook starting from the latest month backwards until the required sample size was reached.

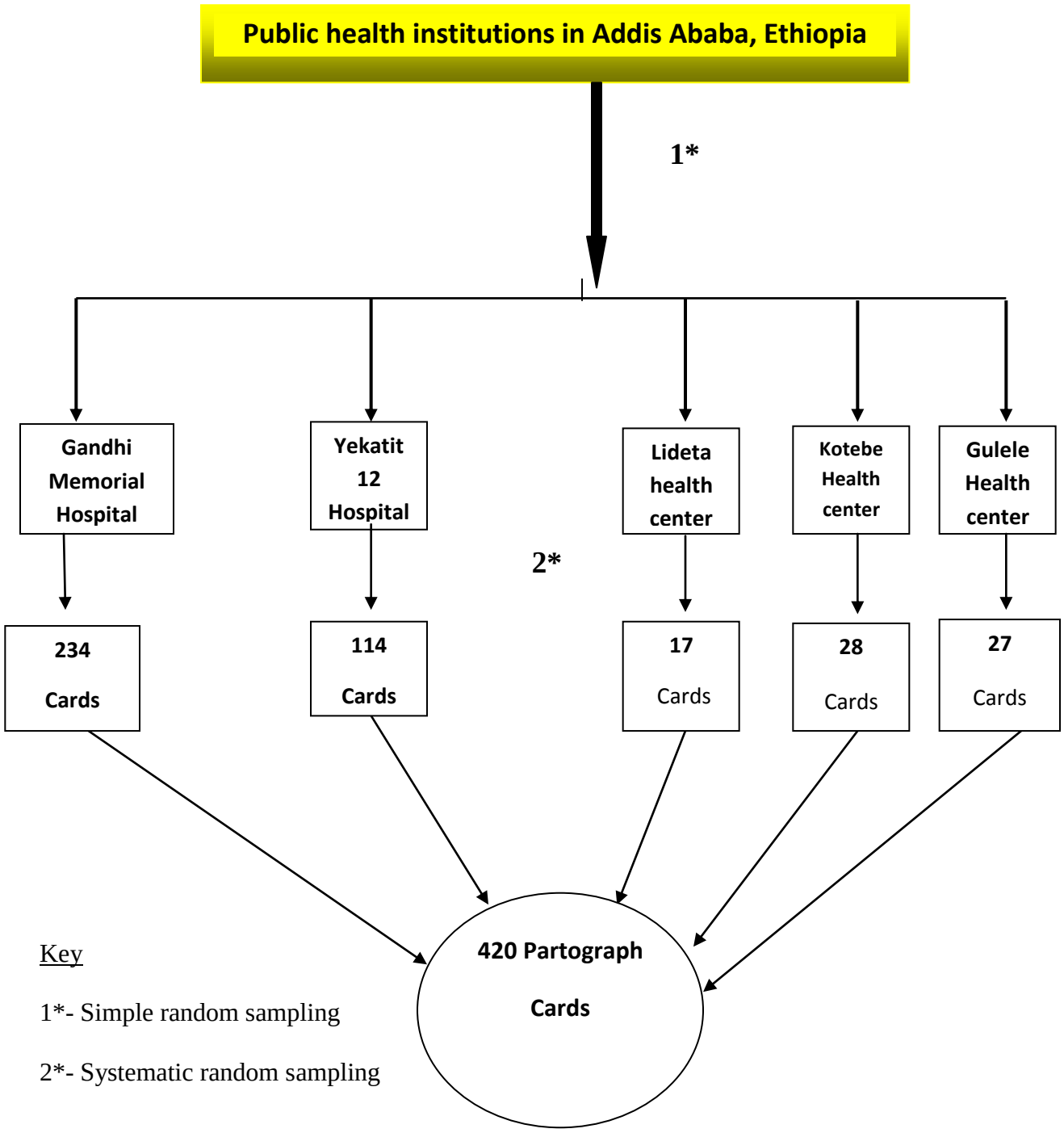


Figure 3. Schematic Presentation of Sampling Procedure (Multistage sampling)

4.8 Methods of Data Collection

4.8.1 Methods of Data Collection for professionals interview

4.8.1.1 Instrument

A pre-tested and structured, interview administered questionnaire was adapted from previous study and reviewing relevant literature to the problem under study to include all the possible variables that address the objective of the study (2). The questionnaire will contain a combination of open-ended and closed ended questions. The questionnaire was designed to obtain information on the professional characteristics of the obstetric care givers, awareness of the partograph, main source of knowledge of the partograph, its benefit and whether or not they routinely employ it in labour management. There were also questions that assessed the depth of their knowledge of the partograph and their interest in being trained in its use. In order to produce a more objective assessment of knowledge of the partograph, a scoring method was devised and a 'knowledge score' for each of the personnel will be obtained by adding up the scores for correct answers given to selected questions in the questionnaire. Minimum score: 0; Maximum score: 30. Scores, 0 – 10, poor level of knowledge; 11 – 20, fair level of knowledge; 21 – 30: good level of knowledge **(See Annex VI for scoring criteria)** (Adopted from study in Nigeria on knowledge and utilization of partograph among obstetric care givers (19)).

Based on the overall knowledge scores, the respondents' level of knowledge of the partograph was rated as poor (0 – 10), fair (11 – 20) and good (21 – 30). These knowledge ratings were based on obtainable scores by the respondents, which we believed portrayed increasing understanding of the partograph. A score of at least 10 was obtainable by having a basic knowledge of the partograph; awareness of the partograph **(2**), knowledge of its correct

definition **(3),** its benefits (**2),** and cervical dilatation as an observation on the partograph **(3**). A score of 11 – 20 will be obtainable if the respondents had this basic knowledge in addition to knowing the important observations on the partograph such as fetal heart rate **(2**), uterine contractions **(2),** descent of the presenting part **(2),** maternal pulse **(2)** and maternal blood pressure **(2**). A score of more than 20 will be obtainable if the respondents knew almost/all of the observations recorded on the partograph in addition to having its basic knowledge (19).

4.8.2. Methods of Data Collection for record reviews

The research team systematically reviewed all the partographs and documented the required information using developed check list questionnaires for the assessment of partograph use. The checklist was designed to obtain information on the main outcome measures included in the partograph. In complete filling of the partographs, we checked for cervical dilatation, uterine contractions, fetal heart rate, action line crossed/ not crossed, pulse and blood pressure, moulding, descent of fetal head, state of membranes.

The parameters were assessed to determine whether they had been monitored according to standard protocol. Standard protocols will be defined based on the time interval as follows (25) :- (1) cervical dilatation, moulding, descent of head and blood pressure monitored every four hour; (2) fetal heart rate, maternal pulse and uterine contractions monitored every 30 minutes. (3) Condition of the baby after the birth should always be recorded on the card. Records not meeting the protocol standards and part of the record misplaced/ missing or inadequate will be judged as **substandard**, or **not recorded** if no information is documented on the partograph/ completely absent from the file and **standard** if the criteria are met. And also the condition of the baby should have been recorded in appropriate section of the delivery to include the Apgar score (7 will be considered good in this study (21)).

4.8.3. Data collection procedure (technique)

The data collectors (interviewers) were eight masters' students and the supervisors were two Masters Students. Training was given for supervisors, card reviewers and interviewers for two days. Orientation was given to the supervisors separately on how to supervise the data collectors and how to check for the completed questionnaire, such as inconsistencies of responses. The supervisors were responsible for supervising the data collectors, check for completed questionnaire; and correct any mistake or problem encountered.

4.9. Variables

4.9.1. Dependent variable (outcome)

Knowledge and utilization of partograph among obstetric care givers

4.9.2. Independent variables

- Availability of partograph
- Training on partograph
- Perception of health personnel's towards partograph
- Type of qualification of obstetric care givers.
- Educational level of obstetric care givers
- Institution type (health center vs. hospital)
- Work load
- Sex of care giver
- Age
- Years of working experience

4.10. Operational definitions

Partograph- is a simple reliable tool for graphically recording of the progress of labor and monitoring the health of the mother and the fetus.

Poor level of knowledge – If health care provide knowledge score is 0-10 for questions on recordable part of partograph.

Fair level of knowledge – If health care provide knowledge score is 11-20 on recordable part of partograph.

Good level of knowledge – If health care provide knowledge score is more 20 for questions recordable part of paragraph.

Obstetric care givers- Health personnel who are working in labour ward/unit of public health institutions of Addis Ababa.

Utilization- The practice of partograph use in labour ward by obstetric care givers in public health institutions.

Monitored /recorded to standard: If protocol criteria for labour parameters are met for WHO partographs.

Substandard: recordings of labour parameter not meeting the WHO protocol standards of the labour parameters or records not meeting the protocol standards and part of the record misplaced/ missing or inadequate will be judged as substandard.

Not recorded: If no information had been documented on the partographs or completely absent from the partographs.

Appropriateness of partograph use- The proper use of the partograph during labour by obstetric care givers which was confirmed by observational record reviews.

Awareness of the partograph- was measured when an obstetric care giver heard, saw and knew of the partograph.

4.11. Data Quality Control

The questionnaire was adopted from previous study and reviewing relevant literature to the problem under study to include all possible variables that address the objective of the study. The questionnaire was prepared in English. Since the study was done on health professionals, the language of data collection is English. The questionnaire was pretested in 10% of the sample population in Bishoftu hospital where it was assumed to have similar professional characteristics of the respondents. Pre-test for the checklist record reviews was also done in health centers and Hospitals that had not been sampled for the study (Teklehymanot health center and Tikur Anbessa specialized hospital) in public health institutions of Addis Ababa.

The checklist for record reviews was prepared in English language and training was given to the data collectors for two days. The trained supervisor performed the supervisions of data collection procedure daily. Then they checked each and every completed form. Additionally, the researcher gave technical assistance and guidance during data collection. Any ambiguities were explained by the researcher to the data collectors.

4.12. Methods Data Analysis

Data entry and analysis were performed using Epi Info Version 3.5.1 software and SPSS version 16. The data was entered and checked for its consistency. Data cleaning and coding was done. Frequencies and cross tabulations were used for variables of the study. The relationship between selected independent variables and the respondents' utilization of partograph and level of knowledge were explored using bivariate and multivariate analysis. Categorical variables were compared using the odds ratio (OR) with 95% CI. Observed differences between samples were considered statistically significant where the confidence limits did not embrace unity or $p< 0.05$**.**

4.13. Ethical Considerations

Permission was obtained from the ethical clearance committee of Addis Ababa University College of health sciences, department of nursing and midwifery. Protection of the rights of individuals were ensured by giving due freedom to participate in the study or not to participate. Privacy and confidentiality were maintained during interview.

At each of the selected study sites, the matron/ medical officer in-charge was contacted for consent and necessary information before the commencement of the study. The purpose, general content and nature of the investigation were explained to each respondent to obtain a verbal and written consent before inclusion into the study.

4.14. Dissemination of the Study

This study would serve as resource material for researchers, managers, policy makers, etc. To achieve these targets, the finalized copy of this study will be distributed to Department of nursing and midwifery, Addis Ababa University, AARHB, MOH and NGOS working around reproductive and maternal health in the city. This study will also be disseminated through the available forums of publishing and workshops.

5. RESULTS

5.1 Results for professional Interviews

5.1.1 Characteristics of the interviewed obstetric care givers

Out of the 202 questionnaires that were administered, total of 195 questionnaires were correctly completed making the response rate of 96.5%. The respondents comprised of 88 midwives (45.1%), 76 Nurses (39.0%), 12 health officers (6.2%) and 19 physicians (9.7%). The distribution of respondents by the type of institutions was Hospital 61(31.3%) and Health centers 134(68.7%). Most of the respondents were midwives while the least respondents, health officers, constituted one-sixteenth of the respondents. The mean age of the respondents was 29.14 years and the median age was 27 years (range: 21- 57 years). The duration of practice ranged between 1 and 34 years with the mean and median duration of 7 and 5 years respectively. A total of 115(59.0%) of the participants had been practicing for < 5 years, while 43 (22.1%), 21(10.8%) and 4 (2.1%) of them had been in practice for 6-10, 11-15 and 16-20 years respectively. Some 12 participants (6.2%) had been in practice for over 21 years (**See Table 1).**

Table 1. Characteristics of the interviewed obstetric care givers in public health institutions of Addis Ababa, Ethiopia, May 2012.

Variable	Hospital		Health center		Total	
	N	%	N	%	n	%
Professional qualification(n=195)						
Midwife	35	39.6	53	60.2	88	100.0
Nurse	5	6.6	71	93.4	76	100.0
Health officer	2	16.7	10	83.3	12	100.0
Medical doctor	19	100.0	0	0.0	19	100.0
Sex(n=195)						
Male	21	34.4	40	65.6	61	100.0
Female	40	29.9	94	70.1	134	100.0
Level of Education						
Diploma	17	16.7	85	83.3	102	100.0
Bachelor of science	25	33.8	49	66.2	74	100.0
Medical doctor	8	100.0	0	0.0	8	100.0
Medical doctor plus specialization	11	100.0	0	0.0	11	100.0
Professional tenure						
Less than 5 years	45	39.1	70	60.9	115	100.0
5-10 years	9	20.9	34	79.1	43	100.0
11-15 years	4	19.0	17	81.0	21	100.0
16-20 years	1	25.0	3	75.0	4	100.0
21 or more years	2	16.7	10	83.3	12	100.0
Total	61	31.3	134	68.7	195	100.0

5.1.2 Awareness and knowledge of the partograph among obstetric care givers

All of the 195(100%) respondents knew what a partograph was. Of those who know what a partograph is, 119(61.0%) respondents knew its correct definition, 56(28.7%) respondents reported incorrect definition of the partograph and 20(10.3%) respondents don't know the correct definition of the partograph at all. Those who know correct definition of partograph and also those who reported incorrect definition of the partograph knew the benefit of using the partograph for labour management.

Knowledge of the function of both alert line compared with action lines was poor. Only 104 respondents (53.3%) could explain the function of alert line while 53 (27.2%) respondents and 38 (19.5%) respondents give incorrect explanation and don't know the correct function of alert line at all respectively. Only 161 respondents (82.6%) could explain the function of action while 16(8.5%) respondents do not correctly explained the function of action line and 18 respondents (9.2%) even do not know the function of action line at all. One hundred eighty nine (96.6%) respondents could correctly mention at least one component of the partograph. There is no statistical difference between respondents from hospital or health center about correctly mentioning at least one component of the partograph [OR (95% CI) =2.3 (0.44, 11.5)]. More respondents 54(88.5%) from hospitals level of care could explain the function of action line compared with respondents 107 (79.9%) at health center level of care but more respondents 131 (97.8%) at health center could correctly mention at least one component of the partograph compared with respondents 69 (51.5%) at hospital level of care.

Knowledge of obstetric care givers about assessment of labour with the partograph was also investigated **(Table 2).** More respondents 191(97.9%) at public health institutions reported as they can make diagnosis of prolonged labour using partograph while only 123(63.1%) respondents had knowledge about dehydration in mother as an assessments that could be inferred from the partograph during labour. Generally, most respondents had better knowledge about assessments that could be inferred from the partograph during labour.

Table 2. Knowledge of obstetric care givers about assessment of labor with the partograph in public health institutions of Addis Ababa, May 2012.

Knowledge of assessment of Labour with partograph	**Frequency (n= 195)**	**%**
Prolonged labour	191	97.9
Obstructed labour	149	76.4
Poor progress of labour	186	95.4
Inefficient uterine contraction	173	88.7
Suspected fetal distress	173	88.7
Abnormal fetal heart rate	179	91.8
Satisfactory progress of labour	176	90.3
Need for augmentation of labour	170	87.2
Need for caesarean section	148	75.9
Dehydration in mother	123	63.1

About 117(60.0%) of the respondents agreed that the action line of the partograph plot falls on the left of alert line, 49 (25.1%) disagreed while 29(14.9%) do not know. The result further indicate that out of 195 respondents, 129(66.2%) agreed that it would fall on the alert line, 35(17.9%) disagreed while 31(15.9%) did not know. Moreover, 67(34.4%) respondents agree with the view that graph would plot on the right of alert line, 96(49.2%) disagreed while 32(16.4%) did not know.

The level of knowledge among who were aware of the partograph according to professional rank, main source of knowledge of the partograph, how often it is used for labour management and history of previous training in its use was also investigated. More than half of respondents 102 (52.3%) had fair knowledge of partograph, while less than half 79 **(**39.0%) of them had good knowledge of it and 17(8.7%) had poor knowledge of partograph. Only one-fourth of the health officers had good level of knowledge while the majorities (53.3%) of the midwives were rated as having good level of knowledge and the majority of the nurses (68.4%) were rated as having fair level of knowledge.

University/ college were reported as a primary source of knowledge by the majority 92 (53.2%) of those who aware of the partograph and these individuals almost all had fair and good level of knowledge.

Respondents whose main source of knowledge was the Reproductive health seminar were not likely to have knowledge **[OR= 2.148 (.0467, 9.877)].**

Ninety (80.4%) of those who aware of the partograph employed it routinely in labour management but the level of knowledge was good in 49 (54.4%) of this individuals.

Table 3: shows the association of some selected professional characteristics and other variables on knowledge of obstetric care givers about partograph. The proportion of those with good level of knowledge was significantly associated higher among those who used partograph routinely compared with those who used sometimes [54.4% vs 16.7%; Crude OR=5.9(1.2, 28.8)] on crude analysis. The influence of previous training in the use of the partogrph on the level of knowledge is also shown in (Table 3 below). More than half of the previously trained respondents had a good level of knowledge and were more likely to have a good level of knowledge compared with personnel who had never been formally trained [62.5% vs 34.4%; Crude OR=3.2(1.452, 6.984)] on crude analysis but when adjusted to other variables there was no significant association between previous training and knowledge of obstetric care givers about the partograph **[**Adjusted OR=1.863(0.621, 5.586)].

On crude analysis, the factors found to be significantly associated with the knowledge of partograph were: working in Hospital, being nurse and health officer, having previous training on the partograph and frequency of use of partogrpah. Analysis of knowledge of partograph with respect to other variables showed that the sex, age, experience, perception of obstetric care providers about partograph had no effect in this study. However, after adjustment through logistic regression model only being nurse was statistically significant [Adjusted OR= 0.1(0.004, 0.843)]. **(See Table 3)**

Table 3: Bivariate and multivariate logistic regeression analysis of Selected professional Characteristics and Other Variables among obstetric care givers about knowledge on partograph, Addis Ababa, May, 2012.

Characteristics	Overall Knowledge			
	Poor n (%)	Good n(%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Sex				
Male	34(55.7)	27(44.3)	1.4(0.7,2.5)	1.058(0.377, 2.973)
Female	85(63.4)	49(36.6)	1	1
Types of institution				
Hospital	30(49.2)	31(50.8)	**2.0(1.1,3.9) ***	1.966(0.404, 9.558)
Health center	89(66.4)	45(33.6)	1	1
Profession				
Midwife	41(46.6)	47(53.4)	0.5(0.2,1.5)	0.269(0.19,3.726)
Nurse	63(82.9)	13(17.1)	**0.1(0.031,0.97) ***	**0.53(0.003, 0.886) ***
Health officer	9(75.0)	3(25.0)	**0.2(0.03,0.782) ***	0.194(0.007, 5.207)
Doctor	6(31.6)	13(68.4)	1	1
Experience				
5 and less than five years	70(60.9)	45(39.1)	1.6(0.6,1.8)	1.027(0.95, 1.111)
Over 5 years	49(61.2)	31(38.8)	1	1
Previous training				
Yes	12(37.5)	20(62.5)	**3.2(1.452,6.984) ***	1.863(0.621, 5.586)
No	107(65.6)	56(34.4)	1	1
How often do you use?				
Routinely	41(45.6)	49(54.4)	**5.9(1.2,28.8) ***	3.727(0.646, 21.485)
Occasionally	5(50.0)	5(50.0)	5.0(0.7,35.1)	1.469(0.148, 14.591)
Sometimes	10(83.3)	2(16.7)	1	1

Note * statistically significant at 95% CI, P< 0.05

1= reference

5.1.3 Perception and attitude of the partograph among obstetric care givers

The respondent's knowledge about the value of partograph was also investigated **(Table 4).** More respondents (96.9%) at public health institutions rated the partograph highly regarding its potential for reducing maternal and neonatal mortality. The result further indicated that out of 195 respondents 187(95.9%) rated the partograph as it increases the efficiency of maternity staff for better quality of care in labour. Moreover, 188 (96.4%) of the respondents agreed with partograph being mandatory to improve quality of care in labour.

Table 4. Perception of obstetric caregivers about the value of partograph in public health institutions of Addis Ababa, Ethiopia, May 2012.

Perception of care givers	**Frequency (n=195)**	**%**
Reduce maternal deaths	189	96.9
Reduce maternal morbidity	157	80.5
Reduce new born morbidity	189	96.9
Reduce new born death	149	76.4
Increase efficiency of maternity staff	187	95.9
Is mandatory to improve quality of care in labour	188	96.4

The attitude of respondents to the Partograph was also assessed **(Table 5).** Eighty three (45.6%), 73(40.1%), 11(6.0%) and 15(8.2%) of the Midwives, Nurses, Health officers and Doctors would like to use the partograph daily while 5(38.5%), 3(23.1%), 1(7.7%) and 4(30.8%) of the Midwives, Nurses, Health officers and Doctors don't like routine use of the partograph. Generally, Midwives and nurses would like to use partograph daily compared to Doctors and health officers. Sixty eight (43.9%), 66(42.6%), 10(6.5%) and 11(7.1%) of the Midwives, Nurses, Health officers and Doctors desired further training on the partograph.

Table 5: The attitude of respondents to the partograph among obstetric care givers in public health institutions of Addis Ababa, Ethiopia May, 2012.

	Midwife		**Nurse**		**Health officer**		**Medical doctors**		**Total**	
	n	%	n	%	n	%	n	%	n	%
Would you like to use partograph in your daily practice (n= 195)										
Yes	83	45.6	73	40.1	11	6.0	15	8.2	182	100.0
No	5	38.5	3	23.1	1	7.7	4	30.8	13	100.0
Do you desire training on the partograph (n= 163)										
Yes	68	43.9	66	42.6	10	6.5	11	7.1	155	100.0
No	1	12.5	2	25.0	0	0.0	5	62.5	8	100.0
Total	69	42.3	68	41.7	10	6.1	16	9.8	163	100.0

5.1.4 Utilization of partograph among obstetric care givers in public health institutions

Only 112(57.4%) respondents used the partograph to monitor women in labour in public health institutions of Addis Ababa, Ethiopia while 83(42.6%) not used the partograph to monitor women in labour. The use of partograph was reported significantly more frequently by respondents in the health center compared with the respondents from Hospitals **(67.9% vs. 34.4 %; (χ^2 = 19.2, df =1, p< 0.01).** Among who used partograph 90(80.4%) used it routinely while 10(8.9%) and 129(10.7%) of respondents used it occasionally and sometimes respectively.

Table 6: The practice of partograph and where training was obtained among obstetric care givers in public health institutions of Addis Ababa, Ethiopia, May 2012.

Variables	Frequency	%
Do you use partograph(n=195)		
Yes	112	57.4
No	83	42.6
How often do you use?(n=112)		
Routinely	90	80.4
Sometimes	10	8.9
Occasionally	12	10.7
Total	112	100.0

5.1.5 Factors affecting utilization of the partograph among obstetric care givers in public health institutions

Among participants who aware of the partograph but never engaged it in monitoring labour, reasons for not routinely using it were cited as little or no knowledge of the partograph (30.66 %), much detail to fill (10.48%), Time consuming (28.23%), lack of adequate number of personnel(shortage of staff) (6%), doctors do that (16.13%), and lack of training (8.06%). A total of 155(95.1%) of those who aware of the partograph desired training in its use while 8(4.9%) of them were not interested. Figure 5 shows reasons for not using partograph in public health institutions of Addis Ababa.

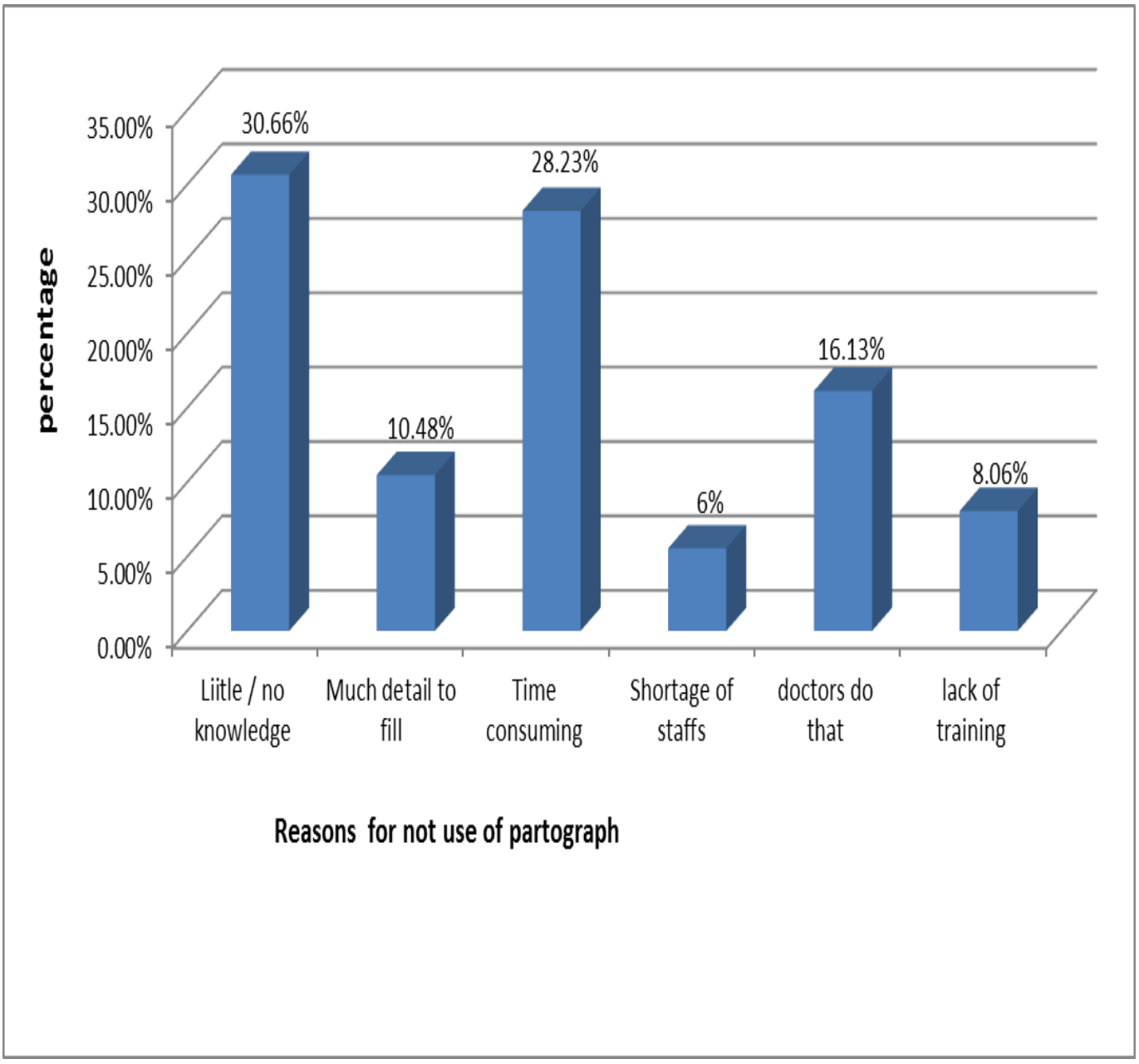


Figure 4: Reasons for not using partograph in public health institutions of Addis Ababa, Ethiopia, May 2012.

On crude analysis significant association was found between overall utilization of partograph and working at hospital **[**Crude OR= 4.0(2.1, 7.7)] compared with working at health center level of care; level of training i.e. being Medical doctor [Crude OR= 13.5(1.5, 123.7)] compared with medical doctor plus specializations, previous training of obstetric care givers compared with those never had previous training [Crude OR= 0.4(0.2, 0.9)] and perception of obstetric care givers about the partograph compared with those who lack positive perception about partograph [Crude OR= 0.1(0.007, 0.419)].

In addition to this, the multivariate analysis also showed statistically significant associations between types of institutions **[**Adjusted OR= 21.2(6.6, 68.6)], level of training and professional qualifications of obstetric care givers; and perceptions of obstetric care givers [Adjusted OR= 0.1(0.004, 0.821)] on the use of partograph **(Table7).**

Table 7: Bivariate and Multivariate Logistic Regression Analysis of the association of partograph utilization with professional Characteristics and Other Variables among obstetric care givers in Public health institutions of Addis Ababa, May, 2012.

Characteristics	Overall Utilization			
	Utilized n(%)	Not utilized n(%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Sex				
Male	35(57.4)	26(42.6)	1(0.5,1.8)	1.4(0.6,3.1)
Female	77(57.5)	57(42.5)	1	1
Age				
20-29	75(58.6)	53(44.1)	0.2(0.019,1.628)	0.2(0.016,2.9)
30-39	28(58.3)	20(41.7)	0.179(0.019,1.720)	0.3(0.017,2.729)
40-49	8(57.1)	6(42.9)	0.188(0.016,2.137)	0.4(0.022,5.534)
50^{+}	1(20.0)	4(80.0)	1	1
Types of institution				
Health center	91(67.9)	43(32.1)	**4.0(2.1,7.7) ***	**21.2(6.6,68.6) ***
Hospital	21(34.4)	40(65.6)	1	1
Level of training				
Diploma	60(58.8)	42(41.2)	3(0.6,15.3)	**1.4(60.9,33820) ***
Bachelor of science	41(55.4)	33(44.6)	3.6(0.7,17.9)	631.4(34.641,11510) *
Medical doctor	2(25.0)	6(75.0)	**13.5(1.5,123.7) ***	**31.9(1.9,531.6) ***
Medical doctor plus Specialization	9(81.8)	2(18.2)	1	1
Profession				
Midwife	56(63.6)	32(36.4)	0.8(0.3,2.2)	**0.1(0.008,0.267) ***
Nurse	41(53.9)	35(46.1)	1.2(0.4,3.2)	0.214(0.044,1.052)
Health officer	4(33.3)	8(66.7)	2.8(0.6,12.4)	-
Doctor	11(57.9)	8(42.9)	1	1
Experience				
5 and less than five years	62(53.9)	53(46.1)	1.4(0.8,2.6)	1.7(0.7,4.7)
Over 5 years	50(62.5)	30(37.5)	1	1
Previous training				
Yes	24(75.0)	8(25.0)	**0.4(0.2,0.9) ***	0.4(0.1,1.1)
No	88(54.0)	75(46.0)	1	1
Do you like partograph?				
Yes	111(61.0)	71(39.0)	**0.1(0.007,0.419) ***	**0.1(0.004,0.821) ***
No	1(7.7)	12(92.3)	1	1

Note * statistically significant at 95% CI, P< 0.05

1= reference

5.2 Results for Partograph Record reviews to assess partograph use during labour among obstetric care givers in public health institutions

We conducted record review of 420 partographs that had been used for labour management during the period of this study. The number of deliveries in December 2011 to February 2012(Record review months) ranged 87 at lideta Health center to 1660 at Gandhi memorial hospital. There were no written guidelines on how to use the partograph for recording and management of labor in any of the labour wards.

Table 8 shows the five health facilities from which the data was extracted from 420 partograph files in the questionnaire on labour parameters following the partographs record reviews.

Table 8: The different selected public health facilities Participated in the survey in Addis Ababa, May, 2012.

Types of institutions	Name of institutions	n	%
	Gandhi Memorial Hospital	234	55.7
Hospitals	Yekatit 12 hospital	114	27.1
	Gulele health center	27	6.4
Health centers	Kotebe health center	28	6.7
	Lideta health center	17	4.0
Total		420	100.0

From the following tables (Table 9, 10 & 11) below it can be noted that there were 420 deliveries across all the health units but only 138 of cervical dilation, 129 fetal heart rate, 30 mounding, 29 descent of fetal head, 87 uterine contraction and 78 maternal blood pressure were plotted on the partograph to the recommended standard. Action lines crossed were in only 15 partographs.

Table 9: Proportions of partograph with records of parameters of fetal well-being at selected public health institutions of Addis Ababa, Ethiopia May, 2012.

Parameters of labour	**Frequency (n=420)**	**%**
Fetal heart rate		
Not recorded	174	41.4
Substandard	117	27.9
Monitored to Standard	129	30.7
Moulding		
Not recorded	364	86.7
Substandard	26	6.2
Monitored to Standard	30	7.1
Was the status membranes recorded?		
Yes	113	26.9
No	307	73.1

Fetal heart rate was not recorded in 41.1% of the partograph reviewed and was judged to be standard in 27.9% while monitored into standard in 30.7% of the partographs reviewed.(Table 9).

Measurement of cervical dilatation was recorded in 248(59.1%) of the partographs but almost half 44.4 % of these were judged to be substandard while cervical dilatation is not recorded in 172(41.4%) of the partographs. Uterine contractions were not recorded 189(45.0%) of the partograph reviewed. Of those recorded 231(55.0%), 144 (62.3%) more than half were judged to be substandard. The action line of the cervical graph was crossed in 15(10.9%) of the recorded partographs(**Table 10).**

Table 10: Numbers of Partographs with records of parameter of maternal condition and fetal conditions in public health institutions of Addis Ababa, May, 2012.

Parameters of labour	**Frequency (n=420)**	**%**
Descent of the head		
Not recorded	353	84.0
Substandard	38	9.0
Monitored to Standard	29	6.9
Cervical dilatation		
Not recorded	172	41.0
Substandard	110	26.2
Monitored to Standard	138	32.9
Uterine contraction		
Not recorded	189	45.0
Substandard	144	34.3
Monitored to Standard	87	20.7
Action line crossed (n=138)		
Yes	15	10.9
No	123	89.1

Two hundred seventeen (51.7%) deliveries during the period of study had their blood pressure monitored. Of which 18.6% were monitored to standard. Condition of the baby after birth was assessed using Apgar score system. Apgar score was not recorded in 17 (4.1%) of the studied partographs. In 79.3% of the partographs where the condition of the new born had been recorded, live babies were born in good condition (Apgar 7-10) (see **Table 11**).

Table 11: Numbers and percentages of partographs with records of blood pressure monitoring and conditions of the baby after birth in selected public health institutions of Addis Ababa, May 2012.

Parameters of labour	**Frequency (n=420)**	**(%)**
Blood pressure		
Not recorded	203	48.3
Substandard	139	33.1
Monitored to Standard	78	18.6
Condition of the baby after birth		
Not recorded	17	4.0
Recorded		
Good (Apgar7- 10)	333	79.3
Not good (Apgar 1-6)	57	13.6
Still birth	13	3.1

From figure 5 below it could be noted that cervical dilation was better monitored at 32.90%. The least standard monitored parameter was 6.90% for descent of fetal head.

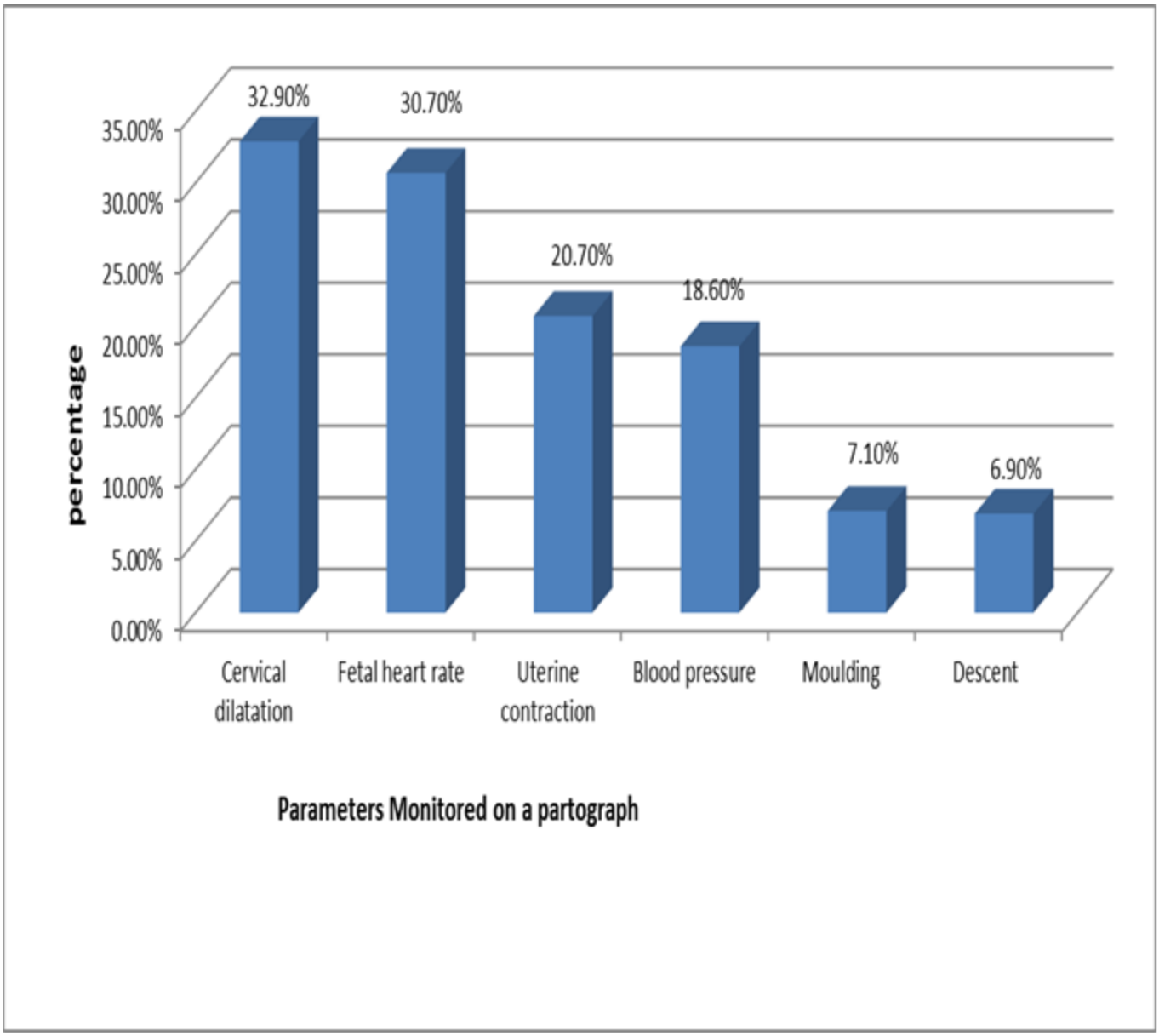


Figure 5: The proportions of standard monitoring of parameters of labour in selected public health institutions of Addis Ababa, Ethiopia, May 2012

6. DISCUSSION

This study was focused on obstetric care givers at public health institutions of Addis Ababa, Ethiopia, specifically, at delivery units to gain insight in to labour management at health facility level as their contribution is crucial in achieving the goals of safe motherhood programme. In this study, the respondents comprised of 88 midwives (45.1%), 76 Nurses (39.0%), 12 health officers (6.2%) and 19 physicians (9.7%). Most of the respondents were midwives. This seems similar to the same study done in Nigeria on knowledge and utilization of the partograph where most of the respondents were nurse/midwives (2).

In this study, all of the 195(100%) respondents knew what a partograph is and more than half of the respondents 102(52.3%) had fair knowledge of the partograph while only 79(39.0%) of them had good knowledge of it. This seems somewhat comparable with the same study done in Nigeria (19) in which more than half of the respondents had fair knowledge of the partograph, while less than one-third of them had a good knowledge of it. Moreover university/ college were reported as a primary source of knowledge by the majority (53.2%) of those who aware of the partograph in this study but life-saving skill training workshop was reported as the primary source of knowledge by one-third of those who aware of the partograph in a study done in Nigeria(19). This is might justify the reason why the majority (83.6%) of the respondents in this study did not received training in public health institutions of Addis Ababa, Ethiopia.

Knowledge of the function of alert line compared with action line was poor. Only 104 (53.3%) respondents could explain the function of alert line while 161(82.6%) of the respondents could explain the function of action line. This result shows higher figure compared with a study done in Nigeria **(2)** about 119(16.6%) of the respondents could explain the function of alert line while 175(24.3%) could explain the function of action line. This could be due to most respondents in this study were midwives and partograph is better used in Ethiopia compared with study done in Nigeria (2).

This study showed that obstetric care givers knowledge about the partograph is a significant factor in its utilization in monitoring of mothers in labour. Despite the fair knowledge (52.3%) of the partograph in this study, there was poor utilization in labour monitoring considering the WHO recommendation for partograph use in public health institutions (6, 7). Several similar studies confirmed the low utilization of the partograph (2, 15, 21, 25). In adequate knowledge and utilization of partograph could be part of the reasons for high maternal mortality in Ethiopia and other developing countries (3).

This study result also showed that only 79(39.0%) of the respondents had good knowledge of the partograph and its utilization for labour management could be poor among the study population. A wide gap also exists between knowledge of the partogrpah and its integration in to labour ward practice. These findings are unexpected considering the effort made by WHO to promote the use of partograph worldwide for many years. Though the reasons for this could be uncertain, it is probable that the majority of the personnel had undergone their professional training many years (as Average years professional experience was 7 years) before the wide spread use of the partogrph and had not had the opportunity to update their knowledge by in-service training. Moreover, from the partograph card reviews we found that all health units had partographs but

were not used it. This could be due to the gaps in the health system support function or gaps in the health workers knowledge as they do not know how to use it. This was similar to findings of a study done at eight health facilities in Rukungiri distric Uganda (21).

The proportion of those with good level of knowledge was significantly higher among those who used partograph routinely compared with those who used sometimes [54.4% vs 16.7% OR=5.9(1.2, 28.8)] in this study which suggests good knowledge of partograph should be an integral part for the utilization of the partograph. This finding seems the contrary of the finding from a similar study done in Nigeria (19) which found that a proportion of those with a poor knowledge of the partograph demonstrated routine use of partograph compared with those not using it at all (48.7% vs 9.5 χ^2 =34.6, p<0.0001) in their conduct of labour. This may be due to the fact that the partograph is better utilized in public health institutions of Addis Ababa, Ethiopia (57.4%), even though partograph record reviews showed below 40% utilization, compared to a study done in Ogun state, Nigeria (19) which is only 9.8% of all personnel routinely employed the partograph; as the good level of knowledge is expected to improve the routine use of the partograph.

All health units had partographs available in their labour wards. The study has shown that 112 (57.3%) of the obstetric care givers at public health institutions of Addis Ababa reportedly used partograph to monitor mother in labour. But partograph record reviews showed low utilization of the partograph. Only 32.9%, 30.70% and 20.70% of the fetal heart rate, cervical dilation and uterine contraction were recorded according to the standard for monitoring of these three labour parameters. This could be due to social desirability bias which may overestimate the findings from the professional interviews. This result was however higher than the 32.4% utilization of partograph in similar study done in Nigeria on knowledge and utilization of obstetric care givers (2).

The high frequency (32.90%) of recording of cervical dilation according to the standard for monitoring cervical dilation in this study compared to other parameters such as uterine contraction(20.70%) and fetal heart rate (30.70%) was similar to the findings in Uganda and Dareselaam, Tanzania (21, 25) which shows low utilization of partograph among obstetric care givers in public health institutions.

This study revealed that reasons reported more frequently for not routinely using partograph were: little or no knowledge of the partograph (30.66 %) and Time consuming (28.23%). But a similar study done in Ogun state, Nigeria (19), found lack of adequate number of personnel (44.9%) and little or no knowledge of the partograph (17.1%) as frequently reported reasons for not using partograph. Moreover, this study found that though obstetric care givers find the partograph to be of practical use and advantageous, its status within some labour wards is restricted in terms of utilization. Similar study which was done in Ogun state, Nigeria (19) identified shortage of staff as one of the biggest constraints in most health institutions. The obstetric care givers on a duty are faced with so much responsibilities on a shift that some

important aspect of midwifery care are haphazardly done or not done at all. This could be one of the reasons why a large number of the partograph cards reviewed in the selected study settings were not recorded or poorly filled.

This analysis showed that there is indeed a significant association on a crude analysis between good knowledge of obstetric care givers and routine use of the partograph. [Crude OR=5.9(1.2, 28.8)]. This falls in line with the findings in a study done elsewhere in Africa (2, 15, 21, 25). But when this variable was adjusted to other variables there was no associations with the use of the partograph in this study [Adjusted OR=3.5(0.7, 19.3)]. This may be due to the small sample size of the respondents and possible confounding factors that exists among the variables.

This study also revealed statistically significant association between utilization of the partograph and working in the health center level of care compared with Hospital level of care [67.9% vs 34.4% Adjusted OR=21.2 (6.6, 68.6)]. This is in line with study done in Ogun state Nigeria (19) where the tool is not uniformly utilized in the settings where it is most needed at secondary health hospitals and private health institutions (19). This may be due to the fact that at health center level of care there is lower patient flow and at hospital level of care there are much more patient flows than health centers as well as most of the hospitals in study settings are referral hospitals where only referrals cares are investigated which undermines the use of the partogrpah.

There was no significant relationship between the years of experience of Obstetric care givers and their use of the partograph (AOR=1.7(0.7, 4.7). This may be due to the small sample size of the respondents and possible confounding factors that exists among the variable. The introduction of the partograph and its use should be an organizational policy (health facilities) that has to be carried out regardless of obstetric care givers years of experience.

This study has further revealed that the majority of the obstetric are givers had no skills on the use of the partograph as all of the labour parameters were monitored to the standard by below 40%. This findings is slightly lower than the findings from Dare salaam Tanzania (25) where only two labour parameters were monitored by over 40% (25). As a result of this, for the partograph to be useful all parameters should be measured and information used for monitoring maternal and fetal wellbeing should be correctly documented. This undermines the critical importance of having skilled health workers to deliver quality health care services.

This study also revealed that only 32(16.4%) respondents received training on the partograph and among respondents who received previous training on the partograph, more than half of them utilized partograph in monitoring of women in labour. This finding is the contrary of the study done in Dareselaam,Tanzania (25)where all midwives interviewed had been previously trained to use partograph. All respondents mentioned in our study had formal education while they were at school either colleges or universities. However, 95.1% of the respondents required in-service training which is critical in monitoring partograph to the standard.

This study also revealed that majority respondents (97.9%) admitted that partogarph could prevent prolonged labour and facilitate early referral to specialized health facilities. This falls in line with the findings that the partograph has been shown to be an efficacious for monitoring labour and identifying women in need of an obstetric intervention (25). WHO in safe motherhood programme showed the partograph to be effective in reducing prolonged labaour, in reducing rate of labour augmentation, in reducing rate of caesarean sections and also in reducing the number of still births(6).

7. STRENGTHS AND LIMITATIONS OF THE STUDY

7.1 Strengths of the study

This study had the following strengths in addressing the objectives and validity of the study findings related to knowledge and utilization of the partograph.

- The study has included both quantitative professionals' interview and observational partograph card reviews in order to improve the outcome of research findings as the partograph record reviews supplemented the result of partograph utilization obtained through professional interviews.
- The study has also used structured questionnaire adapted from standard questionnaire after the necessary modification and pre-test was made. In addition to this, the study has utilized highly qualified master level; a profession oriented data collectors which has increased the quality of the data collected and made the result more valid.
- The use of statistical methods to control possible confounding factors was also considered as the strength of the study.

7.2 limitations of the study

This study had the following limitations in addressing the objectives and validity of the study findings related to knowledge and utilization of the partograph.

- Social desirability bias which may occur as a result of obstetric care givers systematically provided a socially acceptable response during interview even though confidentiality and privacy was kept.
- The small sample size of obstetric care givers in which it was difficult to make statistical association among variables as a result of this which may introduce loss of precision of estimates.
- Difficult to make proper supplementation of the result of the record review with professional interviews as one obstetric care givers could complete more than one partograph cards as well as one partograph cards may be filled by more than one obstetric care givers.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

More than half (53.3%) of obstetric care givers in public health institutions of Addis Ababa have fair knowledge of partograph and why it is necessary to use it in the management of labour. In spite of fair knowledge of the partograph by obstetric care givers in this study, a large number of the partograph cards reviewed were not recorded or poorly filled. This may show poor utilization of the partograph to monitor women in labour considering the WHO recommendation on the use of partograph. Use of the partogarph during labour is affected by input factors like lack of knowledge, training of obstetric care givers on its use, lack of adequate personnel, lack of practice guideline of partograph and obstetric care givers having a positive attitude on the use of the patograph. Working in the health center level of care was significantly related to the utilization of the partograph. Obstetric care givers professional experience was not significantly related to their utilization of the partograph.

Level of Education of obstetric care givers, being midwifes compared with doctors or other professions and obstetric care givers positive attitude on use of the partograph did show significant influence on the utilization of the partograph by obstetric care givers in monitoring women in labour. Moreover, a significant percentage of the respondents thought that using the partograph would improve the maternal and neonatal mortality and morbidity situation in the country.

8.2 Recommendations

Based on the findings of this study, the followings are recommended for the Ministry of health, regional health offices, different NGO's working on health and other stakeholders.

- Training of obstetric care givers in the partographic labour monitoring should be mandatory.
- Periodic workshops and seminars should be organized for obstetric care givers on the use of partograph.
- Develop a mentoring system for the health facilities that monitors the routine use of the partographs. Supervisors should be trained in partograph and supervision checklist should be included as an indicator of use of the partograph.
- The health facilities management in consultation with MOH should put in place a practice guideline on the use of the partograph and also make sure that the partograph charts are provided in all labour and maternity units.
- Further investigations should be made to establish low utilization of partograph in public health institutions of the country as well as in private health facilities.
- Implementation priority should be given to health facilities with particularly low use of the partograph (e.g. Hospitals)

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ANNEXES

Annex I

Information Sheet

ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE SCHOOL OF MEDICINE DEPARTMENT OF NURSING AND MIDWIFERY

Here, I the undersigned, at Addis Ababa University College of Health Sciences school medicine Department of Nursing and Midwifery Graduate studies Program, currently I will be undertaking research on a topic entitled Knowledge and utilization of partograph among obstetric care givers in public health institutions of Addis Ababa, Ethiopia.

For this study, you will be selected as a participant and before getting your consent or permission of your participation, you need to know all necessary information related to the study. Thus, this information will be detailed as;

- **Objective**: to assess knowledge and utilization of partograph among obstetric care givers in public health institutions of Addis Ababa, Ethiopia.
- **Significance of the study**: There is no research done on this topic in the study area. So it is believed that it can be a reference for those who are interested to perform a research on the same topic. Finding from the study is important for policy makers, stakeholders and program implementers addressing the issues related to maternal and perinatal morbidity and mortality.
- **Participants to be included**: Every midwife, nurse, doctor and health officer who attends to labour cases in the selected Hospitals and health centers and who consented to participate in the study.
- **Confidentiality:** All information you give will be kept confidential and won't be accessible to any third party. Your name won't be registered on the question sheet so that you will not be identified.

- **Risks and Benefits of the study**

Risks: The study will be carried out simply by asking you, the already prepared and structured questions. The procedure doesn't bear any physical or psychological trauma. Furthermore, you will not be forced to respond to the information you do not know.

Benefits: For your participation in the study no payment will be granted or has no any special privilege to you. But, participating in the study and giving your information to questions asked will have great benefits to the society. The results will be used to appeal to those in charge of the administration of health care at the local, state and federal levels to pay increased attention to the in-service training of health workers and also by participating you will contribute to improvements in the quality of care for women in labour in the future.

- **Consent:** Your participation in the study will be totally based on your willingness. You have the right not to participate from the beginning, or stop any time after starting participation. You will not be forced to respond to the information you do not know.

- **Name of principal investigator**: Engida Yisma

Date: _____ Signature_____

- **Address of PI:**

Mobile: +251910286465

E-Mail: engiday@gmail.com

Annex II.

Consent

ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE SCHOOL OF MEDICINE DEPARTMENT OF NURSING AND MIDWIFERY.

QUESTIONNAIRE PREPARED TO ASSESS KNOWLEDGE AND UTILIZATION OF PARTOGRAPH AMONG OBSTETRIC CARE GIVERS IN PUBLIC INSTITUTIONS OF ADDIS ABABA, ETHIOPIA.

Consent

My name is ----------. I am MSc student in Addis Ababa University, College of health sciences, School of Nursing and Midwifery. I am conducting a study to determine whether partographs are used in the management of labour for women and also to explore the level of knowledge about the partograph amongst obstetric health care givers.

If you decide to participate in the study, you will be asked some questions relating to whether you use the partograph in your health institutions and questions to determine your familiarity with the use of partograph.

There may be benefits to the society by participating in this study. The results will be used to appeal to those in charge of the administration of health care at the local, state and federal levels to pay increased attention to the in-service training of health workers. By participating you will contribute to improvements in the quality of care for women in labour in the future.

Any information you provide will be kept confidential. Your name will not appear on the questionnaire. Any information you provide will not be used against you. Your responses will not bring any harm to you and will not affect your job.

You are free to choose whether or not you wish to participate.

Do you agree in this study?

Yes ☐ No ☐

THANK YOU FOR YOUR COOPERATION

Annex III

Questionnaire

KNOWLEDGE AND UTILIZATION OF PARTOGRAPH AMONG OBSTETRIC CARE GIVERS IN PUBLIC HEALTH INSTITUTION OF ADDIS ABABA, ETHIOPIA.

Dear respondents,

We request that you kindly spare some minutes to answer the questions set out below. The study aims to assess knowledge and use of partograph in health facilities.

PART I – Socio - demographic characteristics of obstetric care givers in public health institutions.

No	Questions	Responses
101	Name of institution	_____
102	Type of institution	Hospital ---------- 1 Health center ---------- 2
103	Age (in years)	_____
104	Sex	Male ---------- 1 Female ---------- 2
105	What is the level of your Education?	Diploma ----------1 Bachelor of Science----------2 Medical Doctor----------3 Medical Doctor plus Specialization----------4 Other (specify) ----------89
106	Please indicate your number of years of work experience.	_____
107	What is your professional qualification?	Midwife ----------1 Nurse ----------2 Health officer (Ho)----------3 Medical doctor ----------4

PART II -The following questions are about knowledge of patograph among obstetric care givers in public health institutions.

108	Have you seen partograph before?	Yes----------1 No ----------2
109	Do you know partograph?	Yes ---------- 1 No ---------- 2→ **skip to 118**
110	If **Yes** to **"Q. 109**" what is the correct definition of partograph?	_____ _____ _____
111	Do you know the benefit of the patograph during labor?	Yes ---------- 1 No ---------- 2
112	Do you know the parts of the patograph?	Yes ---------- 1 No ---------- 2
113	If **Yes** to **"Q. 112"** list/mention the parts/ items recordable on partograph? ***(Do not give the respondents option to answer this question***)	Cervical dilatation----------1 Fetal heart rate----------2 Uterine contraction----------3 Descent of presenting part----------4 Maternal blood pressure----------5 Maternal pulse----------6 Colour of liquor----------7 Maternal temperature----------8 Oxytocin regimen----------9 Intravenous fluids and drugs----------10 Urine test results----------11

114	Would you explain the function of the alert line on the partograph?	_____ _____ _____
115	Would you explain the function of action line on the partograph?	_____ _____ _____
116	Do you know how to fill the partograph?	Yes ---------- 1 No ---------- 2
117	**In a normal progress of labor** 1. The graph/ plot on the partograph should fall to the left of alert line. 2. The graph/plot on the partograph should fall on the alert line. 3. The graph/plot on the partograph should fall to the right of the alert line	Yes ---------- 1 No ----------2 Don't know ---------- 3 Yes ---------- 1 No ----------2 Don't know ---------- 3 Yes ---------- 1 No ----------2 Don't know ---------- 3
118	**During labor:** 1. Three contractions in every 10 minutes is normal. 2. Minimum duration of a strong contraction is 40 seconds. 3. You require 10 minutes to effectively assess frequency of contractions. 4. Progress of labor is assessed by degree of cervical dilatation and descent of the presenting part 5. Labor is prolonged when it lasts more than 12 hours	Yes ---------- 1 No ----------2 Don't know ---------- 3 Yes ---------- 1 No ----------2 Don't know ---------- 3 Yes ---------- 1 No ----------2 Don't know ---------- 3 Yes ---------- 1 No ----------2 Don't know ---------- 3

119.	The partograph is one of the tools for implementing safe motherhood.	Yes ---------- 1 No ---------- 2

PART III –Information on utilization of patograph among obstetric care givers in public health institutions.

120	Do you care for women during labor either in this facility or somewhere?	Yes ---------- 1 No ---------- 2
121	Is partograph available in your labor ward at the present time?	Yes ---------- 1 No ---------- 2
122	Is partograph used to monitor patients during labor in your institution?	Yes ---------- 1→ **skip to 125** No ---------- 2
123	If **No** to **"Q. 122"** what were the reasons?	Couldn't find partograph----------1 Shortage of staff (work load)----------2 Little or no knowledge in use of partograph-------3 Time consuming----------4 Lack of training ----------5 Other reasons (specify) ----------89
124	**Do you use** partograph to monitor patients during labor in your institution?	Yes ---------- 1 No ---------- 2→ **skip to 127**
125	If **Yes** to **"Q. 124**" how often did you use?	Routinely ---------- 1 Occasionally ---------- 2 Sometimes ----------3
126	Where is your source of knowledge for Partograph use?	Place of work/clinic----------1 Colleagues ----------2 Training workshop----------3 University/College/School of nursing &/or midwifery ----------4 Reproductive health seminar----------5 Other (specify)----------89
127	If **No** to **"Q. 124"** what is/ are your reasons?	I have little or no knowledge----------1 Not available----------2 Much details to fill----------3

		Time consuming----------4 Other (specify)----------89
128.	Who can use partograph?	Traditional birth attendant----------1 Community health extension worker----------2 Nurses----------3 Midwifes----------4 Trained nurses/ midwives----------5 Medical doctors----------6
129	In your practice when do you usually enter information onto partograph?	Upon diagnosis of labor----------1 While the woman is still in labor----------2 After delivery of the baby----------3 Other time (please specify)----------89
130	When do you start plotting the Partograph?	Two centimeter (cm) dilation of the cervix--------1 Four centimeter (cm) dilation of the cervix-------2 Eight centimeter (cm) dilation of the cervix-------3 Unknown ---------- 99
131	**Which of the following diagnosis/assessment, can you make with the partograph?** 1. Obstructed labor 2. Prolonged labor 3. Poor progress of labor 4. Insufficient uterine contraction	Yes ---------- 1 No ----------2 Don't know ---------- 3 Yes ---------- 1 No ----------2 Don't know ----------3 Yes ---------- 1 No ----------2 Don't know ---------- 3 Yes ---------- 1 No ----------2 Don't know ---------- 3

	5. Suspected fetal distress	Yes ---------- 1 No ----------2 Don't know ----------3
	6. Abnormal fetal heart rate	Yes ---------- 1 No ----------2 Don't know ----------3
	7. Satisfactory progress of labor	Yes ---------- 1 No ----------2 Don't know ---------- 3
	8. Need for augmentation of labor with oxytocin	Yes ---------- 1 No ----------2 Don't know ---------- 3
	9. Need for caesarean section	Yes ---------- 1 No ----------2 Don't know ----------3
	10. Dehydration in the mother	Yes ---------- 1 No ----------2 Don't know ---------- 3
132	Does the patograph help you to refer cases?	Yes ---------- 1 No ----------2
133	If **Yes to "Q.132"** When do you refer cases for delay?	Alert line ---------- 1 Alert zone----------2 Action line----------3 Action zone----------4 Unknown----------99
134	Have you ever received training on the partograph before?	Yes ---------- 1 No ----------2→ **skip to 136**
135	If **Yes to "Q.134"** where were you trained to use the partograph?	In school----------1 In service ----------2 Others (specify)----------89
136	If **No** to **"Q.134"** Would you like to be trained on the partograph?	Yes ---------- 1 No ----------2

PART IV- Information on perception of partograph among obstetric care givers in public health institutions.

137	Do you like using partograph in your daily practice?	Yes ---------- 1 No ---------- 2
138	**Do you think the use of partograph** 1. Will reduce maternal deaths?	Yes ---------- 1 No ----------2 Don't know ---------- 3
	2. Will reduce maternal morbidity?	Yes ---------- 1 No ----------2 Don't know---------- 3
	3. Will reduce deaths in new birth?	Yes ---------- 1 No ----------2 Don't know ---------- 3
	4. Will reduce morbidity (or illness) in new born	Yes ---------- 1 No ----------2 Don't know ----------3
	5. Will increase efficiency of professionals attending to women in labor.	Yes ---------- 1 No ----------2 Don't know ---------- 3
	6. Is mandatory for improved quality of care when in labour	Yes ---------- 1 No ----------2 Don't know ---------- 3
139	Would you like partograph to be implemented in your services?	Yes ----------1 No ----------2

THANK YOU VERY MUCH!

Annex IV

Partograph review/record review checklist

Partograph record review check list for the assessment of the appropriateness of partograph use during labour by obstetric care givers in selected public health institutions of Addis Ababa, Ethiopia.

Name of the institution ----------

Type of the institution Hospital ----------1

Health center ---------- 2

Name of the reviewer ----------

Date ----------

No	Parameters of labour progress	Responses	Skipping pattern
101	Fetal heart rate	Not recorded ----------1 Substandard ----------2 Monitored to standard ----------3	
102	Was the state of amniotic fluid is recorded appropriately?	Yes ---------- 1 No ----------2	
103	Moulding	Not recorded ----------1 Substandard ----------2 Monitored to standard ----------3	
104	Cervical dilatation	Not recorded ----------1 Substandard ----------2 Monitored to standard ----------3	→ **Skip to 106** → **Skip to 106**
105	If monitored to standard to **"Q.104"** was action line crossed?	Yes ---------- 1 No ----------2	

106	Descent of head	Not recorded ----------1 Substandard ----------2 Monitored to standard ----------3	
107	Uterine contraction	Not recorded ----------1 Substandard ----------2 Monitored to standard ----------3	
108	Blood pressure	Not recorded ----------1 Substandard ----------2 Monitored to standard ----------3	
109	Was the condition of baby after birth recorded?	Yes ----------1 No----------2	→ **End**
110	If yes to **"Q.109"** how was Apgar score?	Good (Apgar 7-10) ----------1 Not good (Apgar 1-6) ----------2 Still birth ----------3	

Annex V

Sampling procedures using probability proportional to size of health center and hospitals

Types of institutions/ names of institutions		Number of obstetric care givers	Relative frequency	Proportional sample
HOSPITALS	Gandhi Memorial hospital	25	0.06	13
	Zewuditu memorial hospital	28	0.07	14
	Yekatit 12 hospital	24	0.06	12.
	Tikur Anbessa General Specialized hospital	27	0.07	14
	St. Paul General Specialized hospital	19	0.05	10
HEALTHCENTERS	Kolfe health center	8	0.02	4
	Woreda 13 Kebena health center	6	0.01	3
	Woreda 17 Bole health center	11	0.03	6
	Addis Ketama Heath center	13	0.03	6
	Kirkos health Center	6	0.01	3
	Woreda 28 (Kotebe) health center	11	0.03	6
	Tekle Haymanot health center	12	0.03	6
	Gulele health center	8	0.02	4
	Kasanchis health center	12	0.03	6
	Woreda 08 (Meshualekiya) health center	11	0.03	6
	Woreda 19 health center	10	0.02	4
	Kaliti health center	16	0.04	8
	Akaki health center	11	0.03	6
	Woreda 24 health center	8	0.02	4
	Woreda 23 health center	12	0.03	6
	Wereda 07 health center	15	0.04	8
	Entoto number 1 health center	9	0.02	5
	Shiromeda health center	12	0.03	6
	Lideta health center	6	0.01	3
	Beletishachewu health center	8	0.02	4
	Yeka health center	11	0.03	6
	Selam health center	10	0.02	5
	Saris health center	14	0.03	6
	Alem Bank health center	22	0.05	10
	Bole 17(Saris) kebele 20 health center	18	0.04	8
Total		**403**	1	202

Annex VI

Criteria for the partograph knowledge score

Parameters	**No**	**Yes**
Awareness of partograph	**0**	**2**
Correct definition of the partograph	**0**	**3**
Knows the benefit of the partograph to parturient	**0**	**2**
Knowledge of observations on the partograph		
Cervical dilatation	**0**	**3**
Fetal heart rate	**0**	**2**
Uterine contraction	**0**	**2**
Descent of the presenting part	**0**	**2**
Maternal blood pressure	**0**	**2**
Maternal pulse blood pressure	**0**	**2**
Color of liquor	**0**	**2**
Maternal temperature	**0**	**2**
Oxytocin regimen	**0**	**2**
Intravenous fluids & drugs	**0**	**2**
Urine test results	**0**	**2**

Minimum score: 0; Maximum score: 30. Scores, 0 – 10, poor level of knowledge; 11 – 20, fair level of knowledge; 21 – 30: good level of knowledge (19).

Annex VII

Partograph

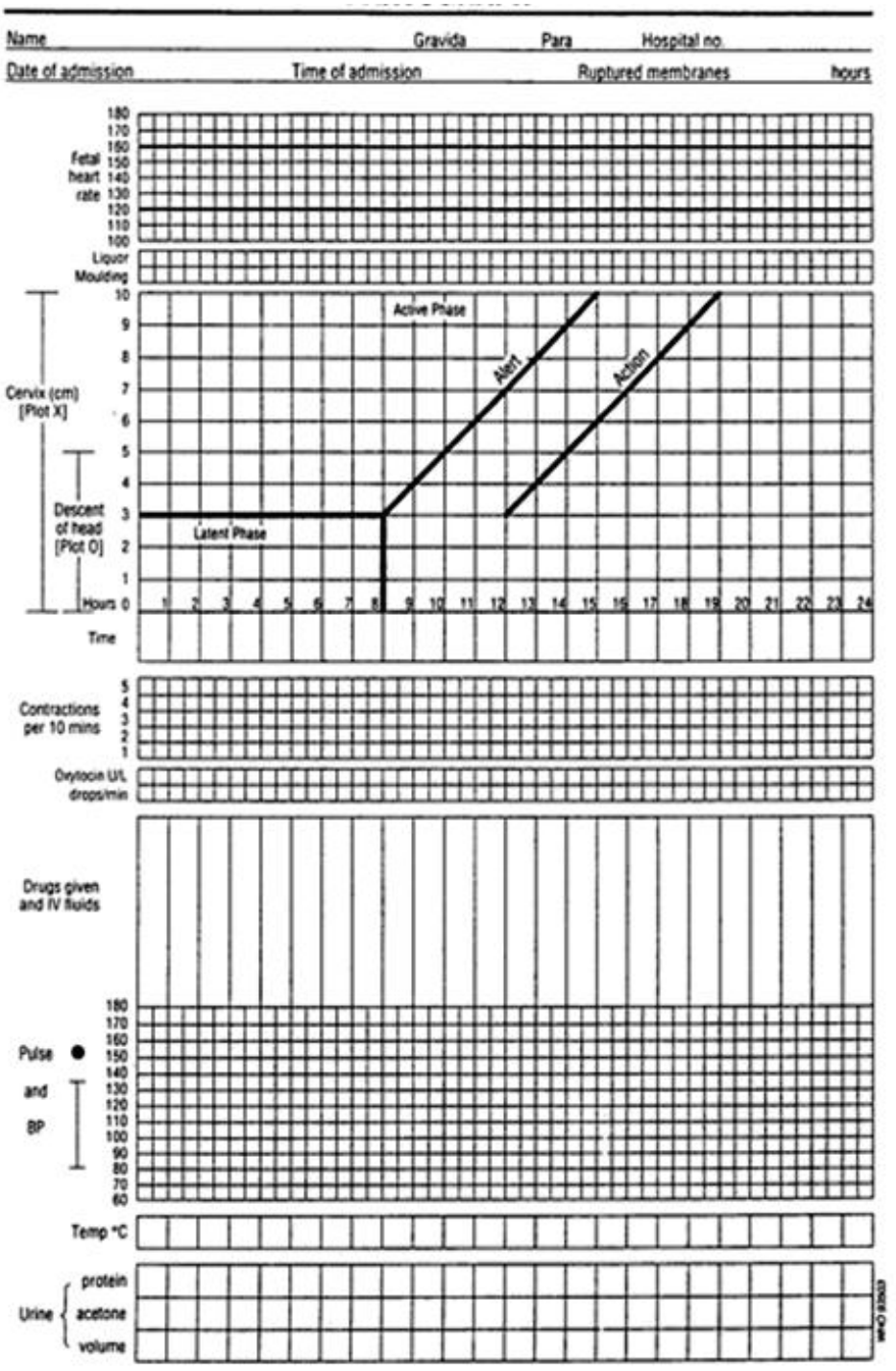

Figure 6. Original WHO partograph

(Source: WHO. 1994)

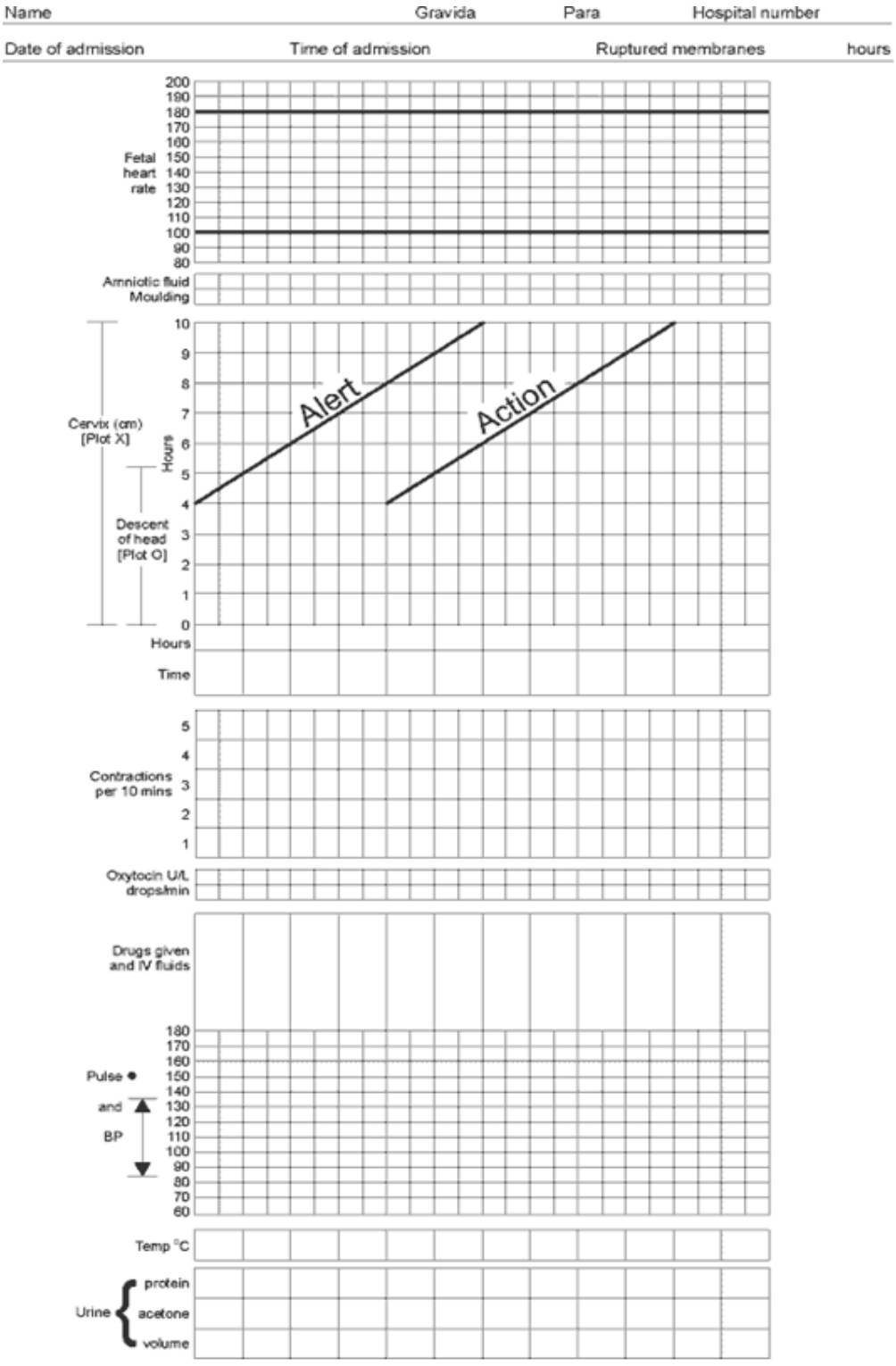

Figure 7.simplified WHO paragraph

(Source: WHO. 2008)

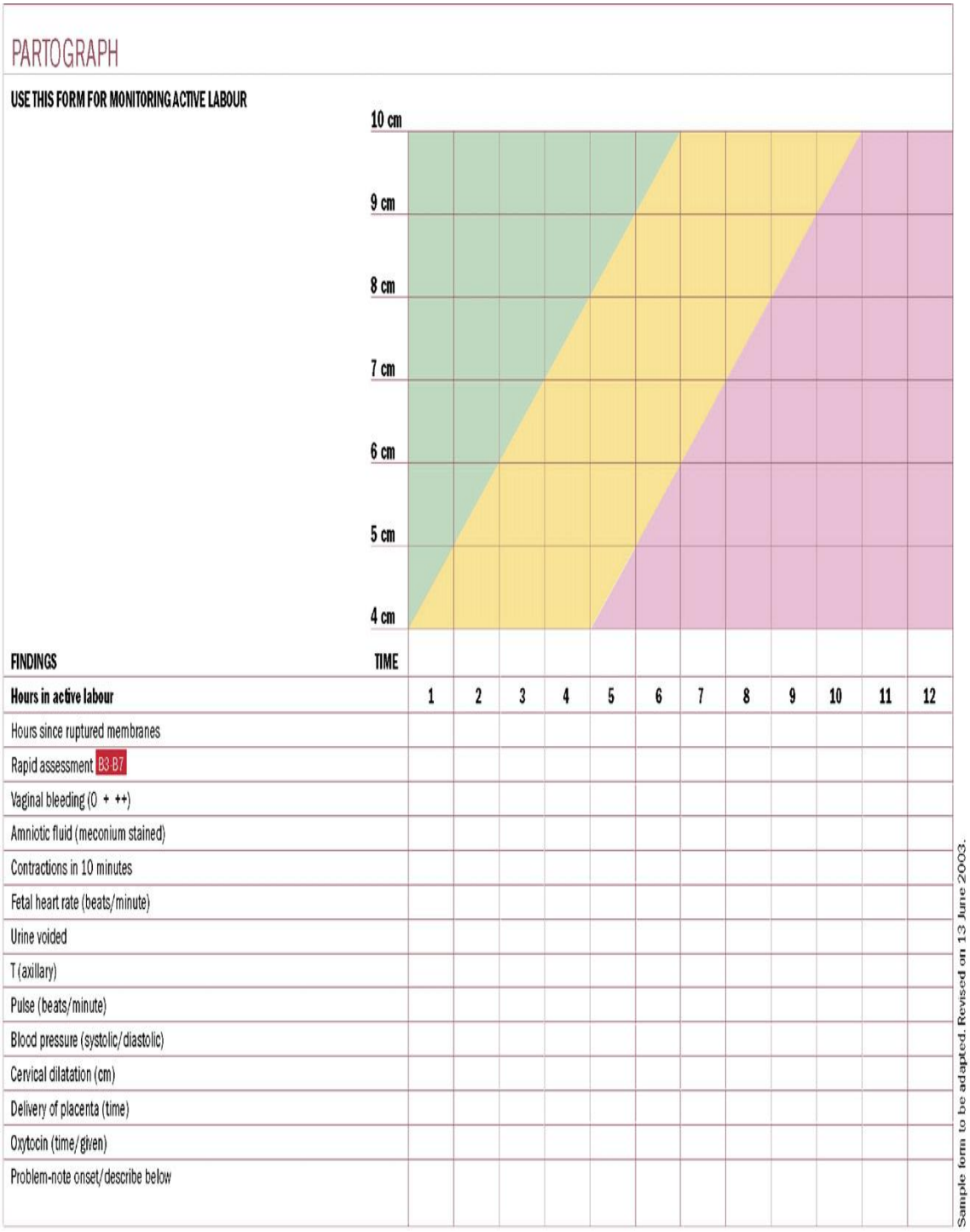

Figure 8. WHO Partograph for health centers use.

Annex VIII

DECLARATION

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

Name: Engida Yisma

Signature: _____

Place: Addis Ababa University

Date of submission_____

This thesis has been submitted for examination with my approval as the university advisor.

Name of the advisor	**Signature**
Ato Berhanu Dessalegn (RN, BSC, MPH)	_____