

The University of Zambia
School of Medicine
Department of Public Health

**Factors associated with late antenatal care booking in
Zambia**

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Dissertation submitted to the University of Zambia for partial fulfilment of a
Master of Science in Epidemiology Degree

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DECLARATION

This dissertation is the original work of **Nyambe Sinyange**.

It has been produced in accordance with the guidelines for MSc. Epidemiology dissertation for the University of Zambia. It has not been submitted elsewhere for a degree at this or another University.

Signature.....

Date.....

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CERTIFICATE OF COMPLETION OF DISSERTATION

I, **Nyambe Sinyange** hereby certify that this dissertation is the product of my own work and, in submitting it for the Degree of Master of Science in Epidemiology programme, further attest that it has not been submitted to another University in part or whole for the award of any programme.

Signature.....

Date.....

I, **Prof Charles Michelo** having supervised and read this dissertation is satisfied that this is the original work of the author under whose name it is being presented.

I confirm that the work has been completed satisfactorily and is ready for presentation to the examiners.

Signature/Supervisor.....

Date.....

Head of Department.....

Date.....

Department.....

CERTIFICATE OF APPROVAL

The University of Zambia approves this dissertation of Nyambe Sinyange in partial fulfilment of the requirements for the award of the degree in Master of Science in Epidemiology.

Examiner's signatures

Date

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DEDICATION

This dissertation is dedicated to my children Inonge, Nyambe, Malama, Lilato and my wife Malama for the continuous support during the whole period of the programme. To my mother and father for their spiritual support in prayers during my studies, God himself can only truly tell how grateful I am for successfully completing this dissertation with family support.

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LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
AOR	Adjusted Odds Ratio
CI	Confidence Interval
CSO	Central Statistics Office
CPH	Census of Population and Housing
DHIS	District Health Information System
ERES	Excellency in Research Ethics and Science
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
IPT	Intermittent Presumptive Treatment of Malaria
MDG	Millennium Development Goals
NICE	National Institute for Health Care Excellence
OR	Odds Ratio
PMTCT	Prevention of Mother to Child Transmission
SEA	Standard Enumeration Area
UK	United Kingdom
UNICEF	United Nations Children's Fund
WHO	World Health Organization
ZDHS	Zambia Demographic and Health Survey

DEFINITION OF KEY WORDS

ANC booking: The first visit by a pregnant woman to the health facility for the purpose of initiating antenatal care services.

Early ANC booking: First antenatal care visit before 14 weeks of gestation (HMIS, Zambia 2012).

Late ANC booking: First antenatal care visit after 14 weeks of gestation (HMIS, Zambia 2012).

First antenatal visit before 14 weeks: This is a sum of women who made their first antenatal visit (for a given pregnancy) to the health facility before 14 weeks of gestation (HMIS, Zambia 2012).

First antenatal visit 14 to 19 weeks: This is a sum of women who made their first antenatal visit (for a given pregnancy) to the health facility from 14-19 weeks of gestation (HMIS, Zambia, 2012).

First antenatal visit before 20 weeks: A first visit by a pregnant woman to a health facility for the primary purpose of receiving antenatal care, often referred to as a `booking visit`, that occur before 20 weeks of gestation. The actual protocol followed during the visit might vary, but includes relevant screening procedures, laboratory tests (e.g. for syphilis), and counselling / health promotion (the latter often done in groups). A visit purely to take a pregnancy test is not counted as a first antenatal visit (HMIS Zambia, 2008).

First Antenatal visit after 20 weeks: A first visit by a pregnant woman to a health facility for the primary purpose of receiving antenatal care, often referred to as a `booking visit`, that occur at 20 weeks of gestation or later. The actual protocol followed during the visit might vary, but it should include relevant screening procedures, laboratory tests (e.g. for syphilis), and counselling / health promotion (the latter often done in groups). A visit purely to take a pregnancy test is not counted as a first antenatal visit (HMIS Zambia, 2008).

ABSTRACT

Introduction

In spite of the extreme importance of an early antenatal care visit, more than 50 per cent of Zambian pregnant women book for antenatal care late (ANC booking after 14 gestational weeks). Mothers who attend antenatal care late miss the opportunity to have early detection and prevention of both infectious and non-infectious diseases in pregnancy. The aim of the study was to determine factors associated with late antenatal care booking in Zambia using secondary survey data.

Methods

Firstly, proportions of ANC booking at 0-3 months, 4-5 month and 6-9 months were explored. Secondly, the social-demographic, social-economic, and biological factors associated with late ANC booking were investigated. Lastly the associations between barriers faced by women in accessing medical care and late antenatal care booking were investigated. The outcome variable was late ANC booking and this was compared with predictor variables. A weighted analysis using STATA version 12.0 was used. This involved descriptive statistics which included cross tabulations. Analytical statistics were done using bivariate logistic regression. To control for possible confounders, a multiple logistic regression was applied.

Results

A data set with a total of 3979 women aged 15 to 49 years was analysed. The proportion of ANC booking at 0 to 3 months, 4 to 5 months and 6 to 9 months were 19%, 56% and 25% respectively. Women who wanted their last child later (AOR: 1.35(1.10-1.66)) were more likely to book late than those with wanted pregnancies then. Women with higher education (AOR: 0.45 (CI-0.27-0.74)) were 55% less likely to book for ANC late compared to women with no education. Women aged 20-34 years (AOR: 0.70 (0.50-0.97)) were 30% more likely to book earlier than women younger than 20 years.

Conclusion

The results from the study suggest that women younger than 20 years of age, women with unwanted pregnancies and women with no education were more likely to book for antenatal care late. It is therefore recommended that more women should be educated beyond secondary education; should have access to family planning methods and be able use them.

1.0 INTRODUCTION

In spite of the extreme importance of an early antenatal care visit, more than 50% of Zambian pregnant women have their first antenatal care (ANC) late (CSO, 2007; CSO, 2013/2014). It is very important for pregnant women to book for antenatal care early, preferably in the first trimester of pregnancy, so as to detect and prevent any possible complications of pregnancy for the mother and the unborn child; thus, contributing to the reduction of perinatal morbidity and mortality (Oladokun et al., 2010). Such practice can ensure good chances of safe delivery and delivery of healthy children (Osungbade et al., 2011). The National Institute for Health Care Excellence (NICE) defines late booking as booking after 13 weeks and 6 days (NICE, 2008). The Ministry of Health (MoH) Zambia, in its latest Health Management Information System (HMIS) primary procedures manual, defines late ANC booking as ANC booking later than 14 weeks of gestation (MoH 2012).

Late ANC booking may contribute to high morbidity and mortality in women and children of Zambia. To illustrate this point, the United Nations Children's Fund (UNICEF) 2010 report for Zambia highlighted that 591 mothers per 100,000 live births die while the neonatal mortality rate was 34 per 1,000 live births (UNICEF, 2010). According to the 2013/2014 Zambia Demographic Health Survey (ZDHS), the maternal mortality ratio in Zambia stands at 398 per 100,000 live births while the infant mortality rate stands at 45 per 1000 live births (CSO, 2013/2014). Zambia has a burden of infectious diseases in pregnant women, which include HIV and syphilis. The prevalence of syphilis in Zambia among pregnant women is 4% (ZDHS, 2007); and in 2008, syphilis prevalence among pregnant women aged 15 to 49 years in both urban and rural women was 2.8% and 3.2% respectively (Makasa et al., 2012). According to the Ministry of Health (MoH), Zambia Antenatal Clinic Sentinel Surveillance Report 2008-2009, HIV infection rates among pregnant women were 16.4 per cent (MoH, 2010). The Joint United Nations Program on HIV/AIDS (UNAIDS), Children and AIDS Fifth Stock taking Report showed that 6,800 infants are born each year from HIV infected women in Zambia (UNICEF, 2010). This burden of disease could be reduced if pregnant women access ANC services early (WHO 2006).

Research in the field shows that many factors can be associated with late ANC booking (Adeyemi et al., 2007, Simkhada et al., 2008, Adekanle et al., 2008, Oladokun et al., 2010,

Ebeigbe and Igberase., 2010, Gross et al., 2012, Onoh et al., 2012,). These include social-demographic factors, social-economic factors and biological factors. Other factors may be barriers faced by women in accessing health care and these barriers may also influence their decisions to attend ANC early. Evidence from studies done in the UK and Tanzania show that social-demographic factors such as not being married or not living with the husband, being of ethnic groups with a low social standing, are associated with late ANC booking (Gross et al., 2012, Cresswell et al., 2013, Rowe et al., 2008). Studies have also shown that social-economic factors such as the educational level of the woman, wealth level, employment status, exposure to media and lack of knowledge about importance of early ANC are associated with late ANC booking (Adeyemi et al., 2007, Simkhada et al., 2008, Adekanle et al., 2008, Oladokun et al., 2010, Ebeigbe and Igberase., 2010, Gross et al., 2012, Onoh et al., 2012). Biological factors like nulliparity, previous foetal loss and HIV status may be associated with late ANC booking as seen in studies done in Nigeria, Tanzania, Kenya, Zambia (Banda et al., 2012, Gross et al., 2012, Sande et al., 2010, Okunlola et al 2008, Tariq et al., 2012). Women may experience barriers in accessing health such as long travel distances to health facilities, staff availability at the health facilities, staff attitudes at health facilities, problems getting money for treatment, having to take transport to the health facility and concerns about clinic booking procedures (Nwosu et al., 2012, Solarim and black., 2013, Enabudoso and Obhielo., 2012, Ifenne et al 2012). These barriers may also influence women's decision making regarding early ANC booking.

No study in Zambia that has utilised the ZDHS 2007 survey data to investigate the factors associated with late ANC booking in Zambia could be found. Secondary survey data has large sample size and therefore gives high-powered results (Rowe et al., 2008).

The aim of the study reported in this dissertation was to determine factors associated with late ANC booking in Zambia, using secondary data from the ZDHS 2007. The dissertation also includes methods, results, conclusions, limitations and recommendations of the study.

1.1 STATEMENT OF THE PROBLEM

More than 50 per cent of Zambian pregnant women attend their first ANC visit late. This is evidenced from the 2007 ZDHS and 2013/2014 ZDHS which estimated that 19% and 24% of women had their first ANC visit in the first trimester respectively. The HMIS 2013 as captured under Ministry of Health and Ministry of Community Development, Mother and Child Health

(MCDMCH) showed that the timing for the first ANC booking in Zambia has remained very low in the past three years. According to the HMIS 2011 data, only 26% of pregnant had their first ANC booking before 20 weeks and 61% booked after 20 weeks. Provincial data showed that pregnant women who booked before 20 weeks ranged from 20% in Copperbelt province to 35% in North Western province. According to the HMIS 2012 data, only 29% of women had their first ANC booking before 20 weeks with the lowest being in the Copperbelt (22%) while the highest was in eastern province with approximately 40%. In 2013, the HMIS showed that only 32% of pregnant women had their first ANC visit before 20 weeks. According to the HMIS 2013 data, Lusaka province and Copperbelt province had the highest number of pregnant women booking before 20 weeks while Eastern and North-Western province had the lowest.

Mothers who attend antenatal care late miss the opportunity to have early detection of both infectious and non-infectious diseases in pregnancy. The first ANC visit which is the first contact between the pregnant woman the health care provider is also important because it gives the opportunity to the health care provider to give the initial health education to the pregnant women so that they could plan their delivery and understand the importance of antenatal care. Mothers who book for ANC late also miss the opportunity to have focused ANC during their pregnancy and thereby risk having adverse outcomes for their pregnancy or their unborn babies.

Many factors in Zambia could be responsible for the low coverage in the timing of the first ANC visit. These may include social factors, biological factors and policy related factors. The research was aimed at examining the factors that are associated with late ANC booking in Zambia using secondary data from ZDHS 2007.

1.2 SIGNIFICANCE OF THE STUDY

Despite the MCDMCH and MoH putting in place interventions to improve the indicator coverage for ANC booking, which includes giving health education to the communities in country, more than 50% of the pregnant women in Zambia continue to book after twenty weeks gestation making it difficult to give appropriate and effective care to them (ZDHS 2007). A search of published literature in Zambia on factors associated with late ANC care only revealed one study published which examined specifically factors associated with late ANC booking. This study used primary data from two selected districts of Zambia namely Mpongwe and Ndola (Banda et al., 2012). There is therefore need to examine the factors associated with late ANC

booking in Zambia using a representative sample for the country. Most of the published literature that could be found on factors associated with Late ANC booking was from other countries other than Zambia and within other countries several studies have been done. Factors associated with late ANC booking can vary by province or by ethnic groups of Zambia, hence the need to explore. There was need therefore to conduct research in Zambia and highlight the issues surrounding late ANC booking so that appropriate interventions could be put in place. The study utilised secondary data from CSO which had a large sample size making it to have high power and representative of the population of Zambia. The 2008 HMIS procedures manual did not capture women who attended first ANC before 14 weeks and 14 to 19 weeks but instead combined the indicator at less the 20 weeks of gestation. This study determined the proportions of booking before three months, between four and five months and after five months. The questionnaire used in the ZDHS 2007 asked the participants important questions. This important information has not been published before in terms of statistical associations between various social, economic and biological factors with early first ANC visit. The answers to the questions were used to analyse the factors associated with late booking at country level.

This research was important because it provided the country with the most probable associations of the problem of late ANC booking at country level and therefore helps the country come up with focused interventions and include them in the action plans and budgets. Eventually, focused interventions will contribute to the attainment of the millennium development goals number four, five and six.

2.0 RESEARCH QUESTION

What factors are associated with late ANC booking in Zambia?

2.1 AIM OF THE STUDY

To determine factors associated with late ANC booking in Zambia

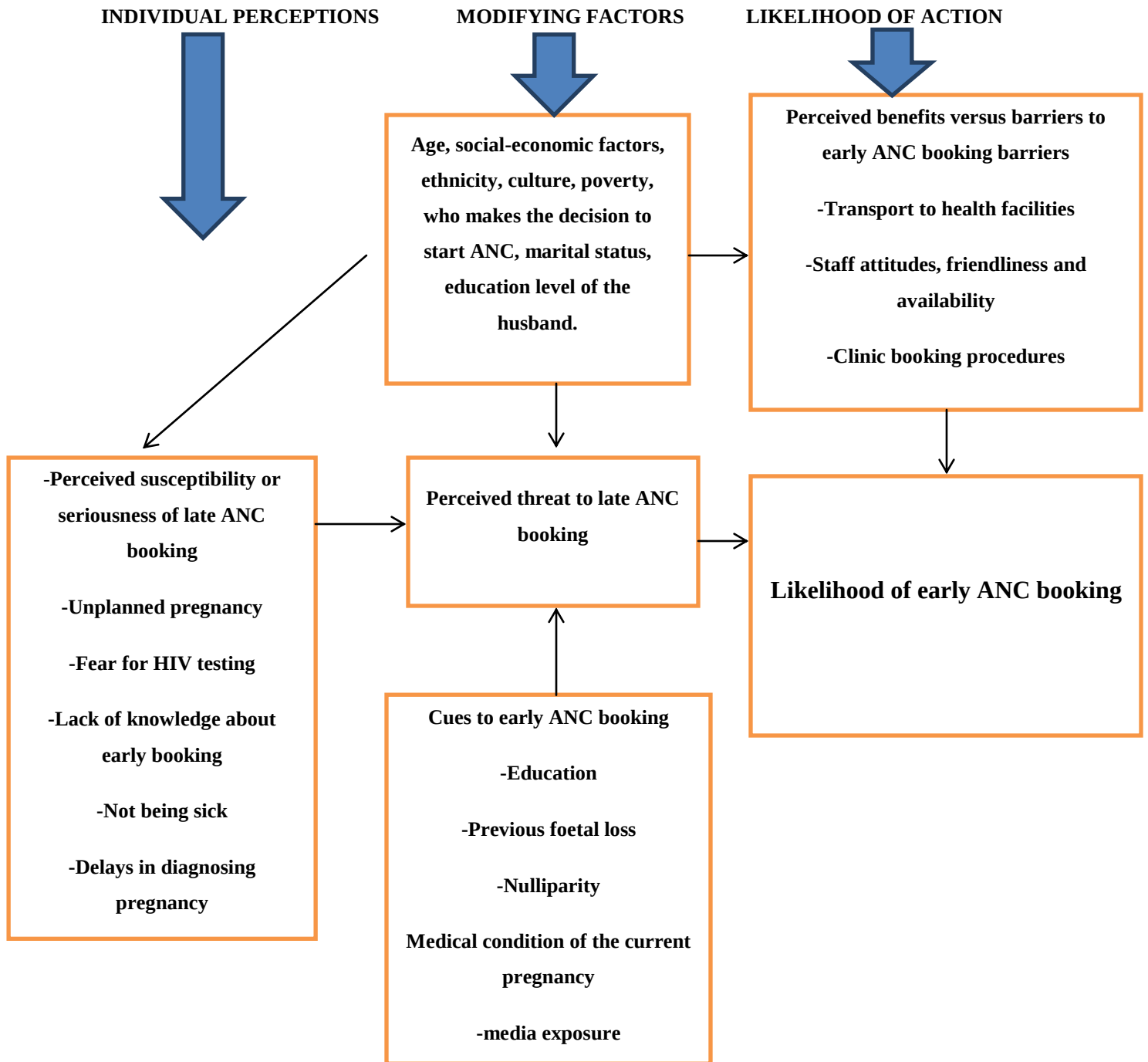
2.2 SPECIFIC OBJECTIVES

1. To determine the proportion of ANC booking at less than 14 weeks, 14 to 19 weeks and after 20 weeks gestation among women aged 15-49 years in Zambia.
2. To determine the proportion of late ANC booking among women aged 15-49 years by provinces of Zambia.
3. To compare the social-demographic, social-economic and obstetric characteristics of women with late ANC booking in Zambia.
4. To compare the barriers to access to medical care faced by women aged 15-49 years in Zambia with late ANC booking.

3.0 CONCEPTUAL FRAMEWORK

The following conceptual framework was developed to help answer and analyse the data related to general and specific objectives. It looks at individual perceptions, modifying factors and likelihood of action factors. It was adopted from the Health Belief Model (HBM). It addresses the individual's perceptions of the threat posed by a health problem like susceptibility and severity, factors influencing the decision to act (cues to action, barriers and self-efficacy) and the benefits of avoiding the threat.

3.1 CONCEPTUAL FRAMEWORK



Adopted from Health Belief Model (Glanz et al, 2002, p. 52)

4.0 METHODOLOGY

4.1 Study setting and population

The study population was made up of women aged 15 to 49 years who were interviewed during the ZDHS 2007. Only women who had a history of a live birth during the five years preceding the survey and had attended antenatal care during their last pregnancy which resulted in a live birth were included in the study.

4.2.0 The ZDHS data set

The ZDHS is conducted every five years with the intention to furnish program managers and policy makers with detailed information including levels of information in fertility, nuptiality, sexual activity, HIV and STIs, maternal and child health. The ZDHS 2007 is a nationally representative survey of 7146 women aged 15-49 years and 6500 men aged 15-59 years. It is based on data from the 2000 census of population.

The ZDHS 2007 obtained information on the extent to which women in Zambia receive care during pregnancy, during delivery and in the period after the baby is born. In the ZDHS 2007, women who had given birth in the five years preceding the survey were asked a number of questions about maternal care. For the last live birth in that period, mothers were asked if they had obtained antenatal care during the pregnancy. For women with two or more live births during the preceding five years, data obtained referred to the most recent birth.

4.2.1 The ZDHS 2007 sample design

The sample for the ZDHS 2007 was designed to provide estimates of population and health indicators at the national and provincial levels. By then, Zambia had only nine provinces. The sample design allowed for specific indicators, such as contraceptive use, to be calculated for each of the nine provinces (Central, Copperbelt, Eastern, Lusaka, Luapula, Northern, North-Western, Southern, and Western). The frame consists of 16,757 Standard Enumeration Areas (SEA). A SEA is a convenient geographical area with an average size of 130 households or 600 people. A SEA contains information about its location, the type of residence, the number of households and the number of males and females in the population. Each SEA has a cartographical map, which delimits the boundaries and shows the main landmarks of the SEA. A representative sample of

8,000 households was drawn for the ZDHS 2007 survey. The sample for ZDHS 2007 was a stratified sample selected in two stages from the Census of Population and Housing (CPH) 2000 frame. Stratification was achieved by separating every province into urban and rural areas. Therefore, the nine provinces were stratified into 18 sampling strata. Samples were selected independently in every stratum by a two-stage selection. Implicit stratifications and proportional allocation was achieved at each of the lower geographical/administrative levels by sorting the sampling frame according to the geographical/administrative order and by using a probability proportional to size selection at the first stage sampling. In the first stage, 320 SEAs were selected with probability proportional to the SEA size. The household listing operation was conducted in all selected SEAs, with the resulting lists of households serving as the sampling frame for the selection of households in the second stage. Selected SEAs with more than 300 households were segmented, with only one segment selected for the survey with probability proportional to the segment size. Household listing was conducted only in the selected. The final survey sample included 319 clusters instead of 320 clusters. A ZDHS 2007 cluster is either an SEA or a segment of an SEA. In the second stage selection, an average number of 25 households were selected in every cluster, by equal probability systematic sampling. A complete listing of households and a mapping exercise was carried out for each cluster in August 2006. All private households were listed. The listing excluded people living in institutional households (army barracks, hospitals, police camps, boarding schools, etc.). All women age 15-49 and all men age 15-59 who were either permanent residents of the households in the ZDHS 2007 sample or visitors present in the household on the night before the survey were eligible to be interviewed. HIV testing was performed in each household among eligible women and men who consented to the test. In a sub-sample of one in every three households, syphilis testing was performed among eligible women and men who consented to the test. In addition, a subsample of one eligible woman in each household was randomly selected to be asked additional questions about domestic violence.

Three questionnaires were used for the ZDHS 2007. These were the Household Questionnaire, the Women's Questionnaire, and the Men's Questionnaire. In addition to English, the questionnaires were translated into seven major local languages, Nyanja, Bemba, Kaonde, Lunda, Lozi, Tonga, and Luvale. The Household Questionnaire was used to list all the usual members and visitors of selected households. The Women's Questionnaire was used to collect

information from all women age 15-49. These women were asked questions on topics such as ,background characteristics (education, residential history, media exposure, etc.), birth history and childhood mortality, knowledge and use of family planning methods, fertility preferences, antenatal and delivery care ,breastfeeding and infant feeding practices ,marriage and sexual activity, women's work and husband's background characteristics, women's and children's nutritional status, malaria prevention and treatment, domestic violence, awareness and behaviour regarding HIV and other STIs and adult mortality including maternal mortality.

4.2.2 The late ANC booking determinants study design

The study design was a cross sectional study. It was designed to utilise secondary data from the ZDHS 2007 to determine the association between certain social, economic, demographic and biological factors with the timing of the first ANC care visit. The data set comprised of women who had a live birth in the five years preceding the ZDHS 2007. For those women who had more than one live birth during the five years preceding the ZDHS 2007, data extracted was based on information on their last pregnancy. The variables for analysis were extracted from the women's questionnaires designed and used during the ZDHS 2007. The main question which was used was those women who answered 'YES' to the question that asked on whether or not they had ever received ANC during their last pregnancy which resulted in a live birth within the five years preceding the study. This was followed by the question which asked about how many months pregnant they were when they first attended antenatal care.

Inclusion criteria

- All female respondents aged 15-49 years interviewed using the women's questionnaire during the ZDHS 2007.
- The women who had history of a live birth during the five years period preceding the study.
- All women that responded 'YES' to the question which asked whether they had received ANC in their last pregnancy within five years preceding the survey.
- All female respondents who remembered the number of months their pregnancy was when they first received ANC evidenced by those who answered appropriately the question that asked how many months pregnant they were when they first received ANC.

Exclusion criteria

- All female respondents who did not fall pregnant during the five years preceding the survey or answered 'NO' to the question whether they had fallen pregnant during the five years preceding the ZDHS 2007
- All female respondents who had fallen pregnant at least once during the five years preceding the study but could not remember how many months pregnant they were when they first received ANC for their last child.
- Female respondents with incompletely answered questionnaires

4.3.0 Data extraction and cleaning

All the information required for the analysis was obtained from the ZDHS 2007 data set under the individual recode. The individual recode contained all the responses to the woman's questionnaire used during the ZDHS 2007. Only variables that were important for analysis were kept as part of the data cleaning process.

The outcome variable was late antenatal care booking defined as attending first antenatal care after three months whereas early ANC booking was defined as attending first antenatal care visit for the first time in the first three months.

The predictor variables were checked for completeness and only those variables with complete information were included for analysis. The predictor variables that were checked for completeness were the respondent's age, education level, number of years of education, residence, region, religion, total number of children ever born, marital status, last child wanted, knowledge of family planning, ever used family planning, media exposure to television, media exposure to newspaper, media exposure to radio, ever tested for HIV, wealth index, problems getting permission to seek medical care, problems getting money for treatment, problems with distance to the health facility, problems with having to take transport, problems with not wanting to go alone, concern that there might be no drugs, concern that there might not be a female health provider, concern that there might be no provider, age of the partner, education level of the partner and final decision maker for health care.

4.3.1 Sampling

The sample size included all the women who met the inclusion and exclusion criteria, that is, history of a live birth during the five years preceding the ZDHS 2007, attended ANC for their last pregnancy which resulted in a live birth and could remember the number of months they had their first antenatal care visit to the health facility.

4.3.2 Data analysis

Data analysis was done using STATA software, version 12.0 SE (Stata Corporation, TX, USA). A weighted survey analysis was done due to the fact that this was survey data. Firstly descriptive statistics were used to determine the frequencies of late antenatal care booking. Cross tabulation to determine the overall distribution of predictor variables by early or late ANC booking and then stratified by urban and rural areas. This was followed by unadjusted logistic regression. Significance at unadjusted logistic regression was set at a p-value of 0.1 and a 95 per cent confidence interval. Variables that were found to be significant at unadjusted logistic regression were then fitted into the multiple logistic regression to control for confounding and to come up with the final model of predictor variables. For multiple logistic regression, significance was set at a p-value of 0.05 and 95 per cent confidence interval. Variables with the largest p-values were then removed one at a time until only significant variables were left in the final model. The analysed information was summarised using tables and graphs.

4.4 Ethical considerations

Ethics approval (Reference number 2014-May-012) was obtained from the Excellence in Research Ethics and Science (ERES) converge while permission to obtain and use data from ZDHS 2007 was obtained from the Central Statistical Office (CSO). No information regarding names of participants was obtained. The data set was only used for purposes of this study and not given to any other person or organisation.

Since there was no direct contact with participants, as the study involved secondary data, no obvious physical injury to participants was observed. Instead, the study brought out maximum benefits as information obtained and analysed can be used for decision making. A manuscript was submitted to the PanAfrican Medical journal for publication.

5.0 RESULTS

5.1 Descriptive statistics of factors associated with late ANC booking

In 2007, 3320 rural women and 4088 urban women were listed and overall response rate was 97 per cent. Of the *de facto* eligible and successfully interviewed population of all females aged 15 to 49, only the records of respondents that had completed the interview (n=3979), including answering the information on ANC attendance were included in the final analysis. Of the 3979 women 67% (2666) were from rural areas while 33% (1313) were from urban areas. The mean age overall was 28 (± 7) years but was 29 (± 7) years for rural and 27 (± 7) years for urban. In general, the majority (72%) of women were aged between 20 and 34 years, 79% of them married and 60% only attained primary education. The frequency distribution of predictor variables by timing of ANC booking is summarised in table one (see Table 1).

Table1: Frequency distribution of predictor variables of late ANC booking by timing of ANC booking among women aged 15-49 years in Zambia, stratified by rural and urban

Characteristic	Overall			Rural			Urban		
	Early	Late	P-value	Early-ANC booking	Late-ANC booking	P-value (chi ²)	Early-ANC booking	Late-ANC booking	P-value (chi ²)
	Number (%)	Number (%)		Number (%)	Number (%)		Number (%)	Number (%)	
Residence									
Rural	499 (19)	2167 (81)	0.15	n/a	n/a	n/a	n/a	n/a	n/a
Urban	282 (21)	1031 (79)		n/a	n/a	n/a	n/a	n/a	n/a
Age group (years) of respondent									
<20	47 (14)	283 (86)	0.04	33 (16)	179 (84)	0.47	14 (12)	104 (88)	0.04
20-34	584 (20)	2267 (80)		358 (19)	1505 (81)		226 (23)	762 (77)	
35-49	150 (19)	653 (81)		108 (18)	486 (82)		41 (20)	167 (80)	
Educational level of respondent									
No education	103 (21)	397 (79)	<0.01	97 (21)	356 (79)	<0.01	6 (13)	41 (87)	<0.01
Primary	430 (18)	2001 (82)		331 (18)	1503 (82)		99 (17)	498 (83)	
Secondary	200 (22)	728 (78)		65 (17)	310 (83)		135 (24)	418 (76)	
Higher	48 (38)	76 (62)		6 (75)	2 (25)		42 (36)	74 (63)	
Last child wanted									
Wanted then	464 (22)	1657 (78)	0.01	306 (20)	1185 (80)	0.03	158 (25)	472 (75)	0.02
Wanted later	184 (17)	908 (83)		115 (17)	577 (83)		69 (17)	331 (82)	
Wanted no more	133 (17)	638 (83)		78 (16)	409 (84)		55 (19)	229 (81)	
Problems getting money for treatment									

Yes	235 (16)	1156 (83)	<0.01	186 (17)	877 (83)	0.25	49 (15)	279 (85)	<0.01
No	547 (21)	2047 (79)		314 (19)	1296 (81)		233 (24)	751 (76)	
Problems with distance to the health facility									
Yes	338 (19)	1476 (81)	0.24	286 (18)	1284 (82)	0.47	52 (22)	192 (78)	0.98
No	443 (20)	1727 (80)		214 (19)	889 (81)		229 (21)	838 (79)	
Concern that there might not be drugs									
Yes	457 (21)	1756 (79)	0.13	326 (20)	1292 (80)	0.04	131 (22)	464 (78)	0.68
No	324 (18)	1447 (82)		173 (16)	880 (84)		151 (21)	567 (79)	
Media exposure (television)									
Not at all	533 (19)	2327 (81)	0.04	455 (19)	1910 (81)	0.31	78 (16)	417 (84)	<0.01
Less than once a week	30 (14)	182 (86)		12 (12)	87 (88)		18 (16)	95 (84)	
At least once a week	28 (19)	119 (81)		9 (17)	46 (83)		19 (200)	73 (80)	
Almost everyday	189 (25)	571 (75)		23 (15)	127 (85)		166 (27)	444 (73)	
Media exposure (newspaper)									
Not at all	524 (18)	2381 (82)	<0.01	397 (18)	1786 (82)	0.60	127 (17)	595 (82)	<0.01
Less than once a week	86 (19)	367 (81)		40 (19)	174 (81)		46 (19)	193 (81)	
At least once a week	128 (28)	329 (72)		46 (23)	156 (77)		82 (32)	173 (68)	
Almost everyday	43 (26)	122 (74)		16 (23)	52 (77)		27 (28)	70 (72)	

n/a= not applicable

5.1.2 Proportions of late ANC booking by months categories

Figure one shows that only a total of 781 (19%, 95% CI (18% - 21%)) of the women had their first antenatal care visit within the first three months of pregnancy (0-3 months) while 3,198 (81%, 95% CI (79% - 82%)) attended their first ANC visit at 4 to 9 months. Of the women in the rural areas 2,167 (81%, 95% CI (80% - 83%)) per cent had their first ANC visit after three months of gestation while in the urban areas, 1,313 (79%, 95% CI, (76%-81%)) of the women had their first ANC visit after three months. Of those who had the first ANC booking after three months, 2,183 (55%) had their first antenatal care visit at 4 to 5 months gestation and only 1,015 (26%) of the women attended their first ANC visit between 6 and 9 months (see figure 1 below).

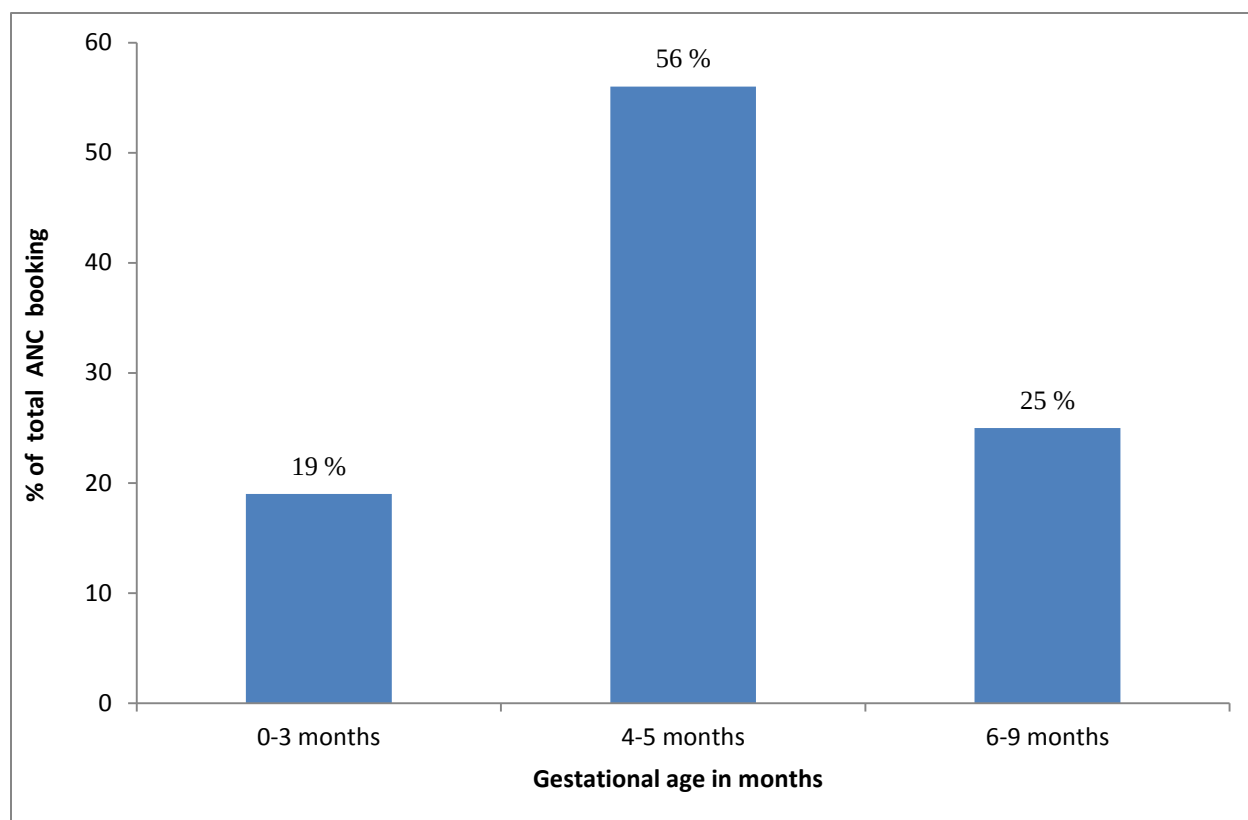


Figure 1: Proportions of ANC booking in categories of months of gestational age among women 15-49 years of age in Zambia

5.1.3 Proportions of late ANC booking by province

In all the provinces, Figure 2 shows that more than 50 per cent of women attended their first ANC visit late. Further, the Figure shows that there was a high proportion of late ANC booking in the urban areas from Eastern, Luapula, Northern, North Western, and Western provinces whereas there was a high proportion of late ANC booking in the rural areas from Central, Copperbelt, and Lusaka provinces.

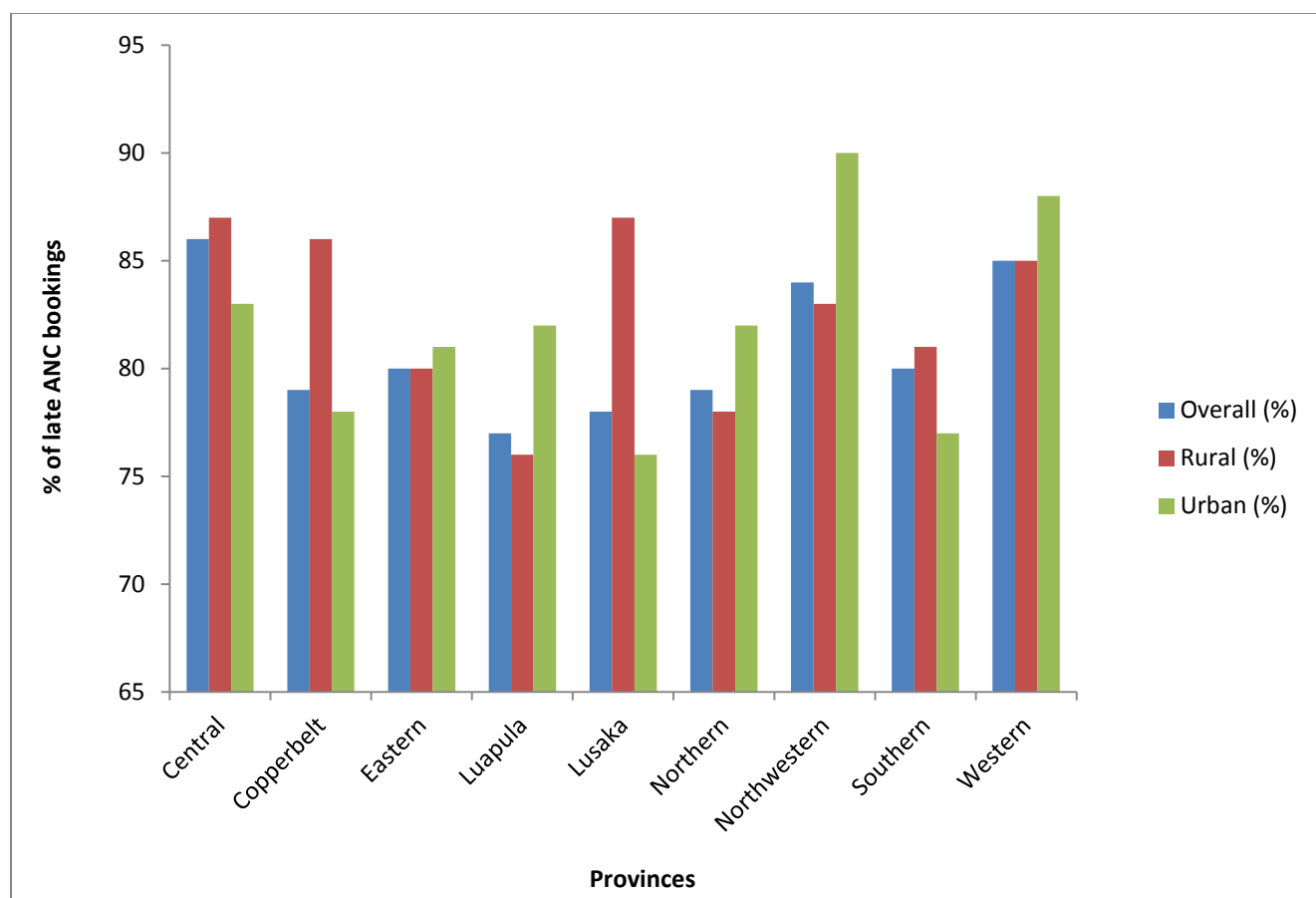


Figure 2: Proportions of Late ANC booking among women aged 15-49 years by provinces of Zambia stratified by rural and urban

5.2 Analytical statistics of factors associated with late ANC booking

5.2.1 Social-demographic factors associated with late ANC booking

Table 2 shows, at unadjusted logistic regression analysis, social-demographic factors associated with late ANC booking. Age group 20 to 34 years was associated with a decreased (p-value <0.01, CI 0.48-0.88, OR 0.65) chance of late ANC booking compared to age group less than 20 years. Last child wanted later was also associated with an increased (p-value <0.01, CI 1.13-1.69, OR 1.37) chance of late ANC booking compared to last child wanted then. Last child wanted no more was associated with an increased (p-value <0.01, CI 1.08-1.67, OR 1.34) chance of late ANC booking compared to last child wanted then. Having knowledge of family planning was associated with an increased (p-value 0.03, CI 1.07-3.64, OR 1.97) chance to late ANC booking.

Table 2: Social-demographic factors associated with late ANC booking among women aged 15-49 years in Zambia

Predictor variables for late ANC booking	Overall		Rural		Urban	
	OR (95% CI)*	P-value*	OR (95% CI)*	P-value *	OR (95% CI)*	P-value*
Age of respondent (years)						
<20	1	1	1	1	1	1
20-34	0.66 (0.48- 0.88)	<0.01	0.78 (0.52-1.17)	0.23	0.47 (0.28-0.79)	<0.01
35-49	0.74 (0.52 -1.04)	0.08	0.83 (0.55-1.26)	0.38	0.57 (0.29-1.10)	0.09
Marital status						
Never married	1	1	1	1	1	1
Married	0.93 (0.68-1.26)	0.65	0.91 (0.59-1.39)	0.65	0.89 (0.57-1.38)	0.59
Living together	0.68 (0.26-1.76)	0.43	0.93 (0.17-4.99)	0.94	0.59 (0.19-1.81)	0.36
Widowed	0.87 (0.48-1.57)	0.65	0.99 (0.42-2.36)	0.99	0.76 (0.50-0.36)	0.49
Divorced	0.76 (0.47-1.21)	0.25	0.62 (0.34-1.13)	0.12	1.04 (0.44-2.49)	0.91
Not leaving together	0.73 (0.39-1.35)	0.32	0.70 (0.32-1.54)	0.38	0.72 (0.26-1.95)	0.51
Last child wanted						
Wanted then	1	1	1	1	1	1
Wanted later	1.37 (1.13-1.69)	<0.01	1.29 (1.01-1.64)	0.04	1.59 (1.11-2.29)	0.01
Wanted no more	1.34 (1.08-1.67)	<0.01	1.36 (1.03-1.79)	0.03	1.38 (0.96-1.97)	0.08
Knowledge of family planning methods						
No	1					
Yes	1.97 (1.07-3.64)	0.03	2.36 (1.27-4.38)	<0.01	n/a	n/a

OR= Odds Ratio CI= Confidence Interval *Univariate logistic regression

5.2.2 Social-economic factors associated with late ANC booking

Table three shows Social-economic factors associated with late ANC booking at unadjusted logistic regression analysis. Higher educational level was associated with a decreased (p-value <0.01, CI 0.26-0.69, OR 0.42) chance of late ANC booking compared to no education. Media exposure to television almost every day was associated with a decreased (p-value <0.01, CI 0.54-0.90, OR 0.69) chance of late ANC booking compared to no exposure to television. Media exposure to newspaper almost every day was associated with a decreased chance (p-value 0.04, CI 0.41-0.98), OR 0.63) of late ANC booking compared to no exposure to television

Table 3: Social-economic factors associated with late ANC booking among women aged 15-49 years in Zambia

Predictor variables for late ANC booking	Overall OR (95% CI)*	P-value*	Rural OR (95% CI)*	P-value*	Urban OR (95% CI)*	P-value*
Religion						
Catholic	1	1	1	1	1	1
Protestant	0.92 (0.73-1.17)	0.52	0.97 (0.71-1.33)	0.85	0.83 (0.58-1.17)	0.28
Muslim	0.71 (0.18-2.72)	0.62	0.79 (0.16-3.94)	0.78	0.57 (0.05-6.20)	0.64
Others	0.94 (0.43-2.02)	0.87	1.14 (0.44-2.97)	0.78	0.56 (0.16-1.95)	0.37
Educational level of respondent						
No education	1	1	1	1	1	1
Primary	1.20 (0.93-1.55)	0.15	1.23 (0.94-1.62)	0.13	0.74 (0.28-1.92)	0.53
Secondary	0.94 (0.70-1.26)	0.67	1.29 (0.89-1.86)	0.17	0.45 (0.18-1.17)	0.10
Higher	0.42 (0.26-0.70)	<0.01	0.09 (0.02-0.37)	<0.01	0.27 (0.09-0.72)	0.01
Wealth index						
Poor	1	1	1	1	1	1
Middle	1.00 (0.79-1.30)	0.99	1.02 (0.77-1.34)	0.92	0.20 (0.03-1.41)	0.11
Rich	0.85 (0.66-1.09)	0.22	1.01 (0.65-1.56)	0.98	0.17 (0.03-1.11)	0.06
Numbers of years of education of respondent						
0	1	1	1	1	1	1
1-5	1.29 (0.98-1.70)	0.07	1.33 (1.00-1.78)	0.05	0.77 (0.26-2.23)	0.62
6-7	1.04 (0.80-1.38)	0.74	1.03 (0.76-1.40)	0.84	0.69 (0.27-1.79)	0.44
8-9	0.92 (0.67-1.27)	0.63	1.29 (0.87-1.90)	0.20	0.43 (0.16-1.10)	0.08
10-17	0.67 (0.47-0.95)	0.02	0.79 (0.41-1.53)	0.48	0.38 (0.14-0.99)	0.05
Media exposure (radio)						
Not at all	1	1	1	1	1	1
Less than once a week	0.80 (0.61-1.04)	0.10	0.88 (0.65-1.21)	0.45	0.66 (0.39-1.11)	0.11
At least once a week	0.93 (0.71-1.20)	0.56	1.06 (0.77-1.47)	0.72	0.76 (0.46-1.27)	0.29
Almost everyday	0.84 (0.68-1.03)	0.10	0.86 (0.68-1.08)	0.20	0.83 (0.54-1.27)	0.38
Media exposure (television)						
Not at all	1	1	1	1	1	1
Less than once a week	1.38 (0.90-2.13)	0.15	1.77 (0.89-3.52)	0.10	0.95 (0.52-1.74)	0.88
At least once a week	0.99 (0.66-1.49)	0.96	1.19 (0.60-2.35)	0.62	0.74 (0.44-1.28)	0.29

Almost everyday	0.69 (0.54-0.90)	<0.01	1.34 (0.79-2.26)	0.29	0.50 (0.36-0.71)	<0.01
Media exposure (newspaper)						
Not at all	1	1	1	1	1	1
Less than once a week	0.94 (0.72-1.22)	0.63	0.97 (0.70-1.41)	0.87	0.88 (0.59-1.32)	0.54
At least once a week	0.56 (0.43-0.74)	<0.01	0.75 (0.50-1.13)	0.17	0.45 (0.30-0.66)	<0.01
Almost everyday	0.63 (0.41-0.98)	0.04	0.74 (0.32-1.70)	0.48	0.55 (0.34-0.89)	0.01
OR= Odds Ratio CI= Confidence Interval *Univariate logistic regression						

5.2.3 Obstetric factors associated with late ANC booking

Table four shows obstetric factors associated with late ANC booking. More than five children ever born was associated with an increased (p-value <0.01, CI 1.23-2.54, OR 1.77) chance of late ANC booking compared to one child ever born. This association was seen in urban areas only.

Table 4: Obstetric factors associated with late ANC booking among women aged 15-49 years in Zambia

Predictor variables for late ANC booking	Overall		Rural		Urban	
	OR (95% CI)*	P-value*	OR (95% CI)*	P-value*	OR (95% CI)*	P-value*
Ever had pregnancy terminated						
No	1	1	1	1	1	1
Yes	1.06 (0.82-1.37)	0.70	1.28 (0.94-1.75)	0.11	0.75 (0.47-1.22)	0.25
Total number of children ever born						
1	1	1	1	1	1	1
2-4	1.15 (0.92-1.44)	0.22	0.99 (0.72-1.39)	0.98	1.25 (0.92-1.71)	0.15
5-15	1.24 (0.97-1.58)	0.08	0.97 (0.69-1.36)	0.84	1.77 (1.23-2.54)	<0.01
Ever used family planning methods						
No	1	1	1	1	1	1
Yes	0.84 (0.65-1.07)	0.16	0.92 (0.69-1.22)	0.54	0.70 (0.44-1.10)	0.12
Ever tested for HIV						
No	1	1	1	1	1	1
Yes	0.90 (0.73-1.10)	0.31	0.91 (0.70-1.16)	0.43	1.04 (0.75-1.44)	0.82

OR= Odds Ratio

CI= Confidence Interval

*Univariate logistic regression

5.2.4 Barriers to access to medical care associated with late ANC booking

Among the barriers women faced in accessing medical care, the variable that was significantly associated with late ANC booking was problems getting money for treatment (p-value <0.01, CI 0.63-0.91, OR 0.80) (see Table 5).

Table 5: Barriers to access to medical care associated with late ANC booking among women aged 15-49 years in Zambia

Predictor variables for late ANC booking	Overall		Rural		Urban	
	OR (95% CI)*	P-value*	OR (95% CI)*	P-value*	OR (95% CI)*	P-value*
Problems getting permission						
Big problem	1	1	1	1	1	1
Not a big problem	0.87 (0.56-1.36)	0.55	0.81 (0.46-1.42)	0.47	1.01 (0.49-2.08)	0.98
Problems with distance to the health facility						
Big problem	1	1	1	1	1	1
Not a big problem	0.89 (0.74-1.08)	0.23	0.92 (0.74-1.15)	0.46	1.00 (0.68-1.45)	0.98
Problems with having to take transport						
Big problem	1	1	1	1	1	1
Not a big problem	0.81 (0.66-0.99)	0.04	0.90 (0.71-1.14)	0.47	0.69 (0.48-1.00)	0.05
Problems with not wanting to go alone						
Big problem	1	1	1	1	1	1
Not a big problem	0.89 (0.70-1.12)	0.32	0.94 (0.72-1.22)	0.63	0.86 (0.53-1.39)	0.54
Concern that there might not be a female health provider						
Big problem	1	1	1	1	1	1
Not a big problem	0.92 (0.71-1.18)	0.52	1.01 (0.76-1.33)	0.97	0.76 (0.44-1.28)	0.30
Concern that there might not be a health provider						
Big problem	1	1	1	1	1	1
Not a big problem	1.06 (0.86-1.30)	0.57	1.18 (0.93-1.51)	0.17	0.88 (0.61-1.25)	0.46
Problems getting money for treatment						
Big problem	1	1	1	1	1	1
Not a big problem	0.80 (0.63-0.91)	<0.01	0.87 (0.69-1.10)	0.25	0.56 (0.42-0.74)	0.74
Concern that there might be no drugs						
Big problem	1	1	1	1	1	1
Not a big problem	1.16 (0.95-1.41)	0.14	1.27 (1.01-1.62)	0.04	1.07 (0.77-1.48)	0.68

5.2.5 Final model for predictor variables for late ANC booking

At multiple logistic regression analysis, last child wanted later was associated with an increased (p-value <0.01, CI 1.00-1.66, OR 1.35) chance of late ANC booking compared to last child wanted then after controlling for all other variables in the model. Last child wanted no more was also associated with an increased (p-value 0.03, CI 1.02-1.59, OR 1.27) chance of late ANC booking after controlling for all other variables in the model. Age group 20-34 was associated with a decreased (p-value 0.03, CI 0.50-0.97, OR 0.70) chance of late ANC booking compared to age group less than 20 years after controlling for all other variables in the model. Higher education level was associated with a decreased (p-value <0.01, CI 0.27-0.74, OR 0.45) chance of late ANC booking compared to no education after controlling for all other variables in the model. Concern that there might be no drugs was associated with an increased (p-value 0.02, CI 1.03-1.53, OR 1.26) chance of late ANC booking after controlling for all other variables in the model. Having knowledge of family planning was associated with an increased (p-value 0.02, CI 1.16-4.03, OR 2.17) chance of late ANC booking after controlling for all other variables in the model (see Table 6).

Table 6: Final model for predictor variables for late ANC booking among women aged 15-49 years in Zambia

Predictors of late ANC booking	Prevalence (%)	Overall AOR (95% CI)*	Rural AOR (95% CI)*	P-value*	Urban AOR (95% CI)*	P-value*
Last child wanted						
Wanted then	78	1	1	1	1	1
Wanted later	83	1.35 (1.10-1.66)	1.28 (1.00-1.65)	0.05	1.44 (0.99-2.09)	0.05
Wanted no more	83	1.27 (1.02-1.59)	1.31 (0.99-1.74)	0.05	1.17 (0.79-1.72)	0.42
Age of respondent (years)						
<20	86	1	1	1	1	1
20-34	80	0.69 (0.50-0.97)	0.81 (0.53-1.24)	0.34	0.53 (0.31-0.88)	0.01
35-49	81	0.75 (0.53-1.06)	0.86 (0.56-1.33)	0.50	0.58 (0.32-1.09)	0.089
Educational level of respondent						
No education	79	1				
Primary	82	1.19 (0.93-1.54)	1.24 (0.94-1.63)	0.12	0.78 (0.29-2.13)	0.62
Secondary	78	0.92 (0.68-1.22)	1.24 (0.86-1.79)	0.24	0.50 (0.18-1.36)	0.17
Higher	62	0.45 (0.27-0.74)	0.08 (0.08-0.38)	<0.01	0.34 (0.12-0.96)	0.04
Problems getting money for treatment						
Big problem	83	1				
Not a big problem	79	0.76 (0.63-0.92)	0.83(0.65-1.06)	0.13	0.62 (0.47-0.82)	<0.01
Concern that there might be no drugs						
Big problem	79	1				
Not a big problem	82	1.26 (1.03-1.53)	1.34 (1.05-1.70)	0.02	1.17 (0.84-1.62)	0.35
Knowledge of family planning methods						
No	68	1	1	1	1	1
Yes	81	2.16 (1.16-4.03)	2.39 (1.28-4.45)	<0.01	n/a	n/a
AOR= Adjusted Odds Ratio OR= Odds Ratio CI= Confidence Interval *Univariate logistic regression						

6.0 DISCUSSION

A high proportion of late ANC booking in lower educated rural groups with unplanned pregnancies or satisfied parity and women younger than 20 years were the core drivers of late ANC booking in this population. Similar results in a study in London done using routinely collected data showed that women aged 15 to 19 years were more likely to book for ANC late, similar to the findings reported here (Baker and Rajasingam, 2012, Emelumadu et al., 2014). The reasons for this are unclear but it is reasonable to think that young women aged 15 to 19 years are teenagers and may be more likely to be unmarried or may not know or understand the importance of booking for ANC early. Women older than 19 years on the other hand may be more likely to be married and starting family for the first time, and might be anxious about their safety as well as their babies hence the ease with which they book and attend ANC (Emelumadu et al., 2014). If unmarried, women aged 15 to 19 years may feel ashamed to disclose their pregnancies or be uncomfortable going for ANC without their partners and thus delay in booking for ANC. Some of this might be related to availability and affinity of health promotion messages regarding child and maternal survival. In the present it was thus not surprising to find that women exposed to the media tended to book early suggesting that they may have heard health promotional messages that modified positively their understanding on the role of ANCs in both child and maternal survival. Some answers to these possible reasons could be found through qualitative research.

It looks reasonable that unplanned pregnancies may not receive much attention regarding early ANC booking as shown in this study. Various barriers to early ANC booking may surround unplanned pregnancy and may include shame due to conception at old age, poor family spacing or delayed diagnosis of pregnancy. Results similar to the findings in this study were seen in a study done in the Copperbelt province of Zambia which showed that women with unplanned pregnancy were 4.4 times more likely to book for ANC late compared to those with planned pregnancies (Banda et al., 2012). A survey done in Tanzania similarly showed that women with unplanned pregnancies were two times more likely to book for ANC late compared to women with planned pregnancies (Exavery et al., 2013). The question, which arises, is whether the women know about any family planning methods. If they know about family planning methods,

do they have access them? Do the health promotion messages cater for those with unplanned pregnancies to encourage them to book early?

While it sounds logical that women with knowledge about family may book for ANC early, the results from this study did not support this reasoning. What this may be telling us is that women may be aware of the family planning methods but may fail to either access them or use them correctly. If women with knowledge about family planning conceived, they would most likely be ashamed to book for ANC early, as they would fear being questioned why they never used the family planning methods.

In this study, evidence was provided that women with higher education are more likely to book for ANC earlier than women with no education. This is supported by studies done in Nigeria, New Zealand Uganda and a systematic review of literature from African countries which similarly showed that women with higher education are more likely to book for ANC early (Simkhada et al., 2008, Ebeigbe and Igberase, 2010, Oladokun et al., 2010, Corbett et al., 2014). This may be attributed to differences in the levels of understanding on the importance of early ANC booking among the different levels of education of women (Baker and Rajasingam, 2012, Emelumadu et al., 2014). This probably explains why the variables media exposure to television and newspaper were significant at univariate logistic regression analysis and seem to be confounding at multiple logistic regression analysis. This suggests that women with higher education are more likely to read newspapers and watch television more frequently than less educated or not educated women.

Among barriers women faced in accessing health care, it was expected that distance to health facilities would be significant, but contrary to that, distance was insignificant at both univariate and adjusted logistic regression analysis. What appeared to be significant were women who had problems in getting money for treatment and women who were concerned that there might be no drugs at the facility (Corbett et al., 2014). Women who had no problems getting money for treatment were 36 per cent less likely to book for ANC late. Those women who thought non-availability of drugs at the health facility was not a big problem were 26 per cent more likely to book late. This may mean that drug availability at health facilities did not worry them or influence their decision to book for ANC early. If women booked late for ANC because of non-availability of drugs at health facilities, this may imply the lack of confidence or value they may

hold in all health services, including ANC services, offered by the health facilities. These grey areas could be addressed by a mixed-method study so that the qualitative component could be addressed to highlight specific issues the women who book late for ANC have.

7.0 CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

In this study, we found that late ANC booking is still a problem in Zambia, suggesting that a large proportion of pregnant women in Zambia miss the opportunity to have early detection and prevention any possible complications of pregnancy and the unborn child. These observations further show that this challenge is concentrated in women younger than 20 years of age, women with unwanted pregnancies and women with no education. The concentration of this problem in lower or no education groups may be an illustration of existing inequalities which might further explain past and present limitations in health promotion messages meant to mitigate this challenge. This could also have strategic hindrances in planned interventions aimed at enhancing both maternal and child survival. There is thus urgent need to re-pack health promotion message to specifically target these population sub-groups.

One limitation in the use of the survey data reported here was that the latest ZDHS data were only available for 2007 at the time of the study and that is about seven years ago suggesting that this picture may have changed. However and because this study was not linked to evaluations of associated maternal survival strategies, it is difficult to estimate the effect of this limitation. Other limitations were that some variables of interest like education of the partner and age of the partner had significantly missing data and could not be included in the analysis and certain questions could only be answered using the qualitative method approach and were thus not included in this analysis. The 2007 ZDHS only asked women with previous live birth in the five years preceding the survey questions about ANC and this may be a source of bias because those women without live births may be the ones with big challenges in booking for ANC early. Despite these limitations, the observed results were from a representative high-powered population based sample of women in Zambia and hence point to significant problems associated with late ANC booking which are difficult to ignore.

From the findings in this study, it's recommended women should be educated beyond primary and secondary education; women should have access to family planning methods and should be able to use them. It is also recommended that access to family planning methods as well as benefits early ANC booking and attendance be made as a right for women. To support this, the health promotion packages that encourage pregnant women to book for ANC early must thus be repackaged to suit differential background characteristics that account for their differences in

education status, age and parity as observed in this study. This is critical as these factors may have been missed in past maternal survival strategies in this population. If we look at this as a right for the women, an obligation for policy makers and a responsibility for primary care workers, we may save many lives, and consequently save millions of dollars currently incurred in current maternal health strategies. There is need to conduct a similar study using the ZDHS 2013/2014 in order to compare and analyse trends in late ANC booking.

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APPENDICES

Appendix 1: Budget

Activity	input		Unit cost(zmk)	Quantity required	Total cost (zmk)
Submit proposal to REC	REC fees		1000	1	1000
	Stationery	Reams of plain papers	35	10	350
		Tonner	1200	3	3600
		Binding	10	6	60
		Pens	25	10	250
	Equipment	Printer	2500	1	2500
Data analysis	Equipment	External hard drive	1200	1	1200
		Stata version 12	2400	1	2400
Report writing	Binding		80	5	400
Contingency	10% of the total cost				886
Total cost					12646

Appendix 2: Gantt chart

	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014	Oct 2014	Nov 2014	Dec 2014
Submit proposal to supervisor														
Submit and present proposal to department														
Submit and present proposal to the graduate forum														
Submit proposal to the dean post graduate														
Submit proposal to REC and wait for approval														
Data extraction														
Data analysis														
Report (dissertation)writing														
Present dissertation														

Appendix 3: Data extraction form

Selected responses to the woman's questionnaire in the ZDHS 2007 were the source of data.

Outcome variable

The number of months the woman first attended her antenatal care visit during her last pregnancy which resulted in a live birth during the five years preceding the ZDHS 2007. This was the response to question number 409 in the woman's questionnaire.

Predictor variables

S/N	Variable	Data Source
1	Age of respondent	Individual recode
2	Highest level of education of respondent	Individual recode
3	Media exposure to newspaper, radio and television (tv)	Individual recode
4	Religion	Individual recode
5	Tribe	Individual recode
6	Residence	Individual recode
7	Number of years of education of respondent	Individual recode
8	Region	Individual recode
9	Marital status	Individual recode
10	Last child wanted	Individual recode
11	Knowledge of family planning methods	Individual recode
12	Ever used family planning methods	Individual recode
13	Total number of children ever born	Individual recode
14	Ever tested for HIV	Individual recode
15	Wealth index	Individual recode
16	Ever had pregnancy terminated	Individual recode
17	Problems getting permission to get health care	Individual recode
18	Problems getting money for treatment	Individual recode
19	Problems with distance to health facility	Individual recode
20	Problems with having to take transport	Individual recode
21	Problems with not wanting to go alone	Individual recode
22	Concern that there might not be a female provider	Individual recode
23	Concern that there might not be a health provider	Individual recode
24	Concern that there might be no drugs	Individual recode
25	Final decision maker for health care	Individual recode
26	Education level of partner	Individual recode
27	Age of partner	Individual recode

Appendix 4: Do file used for analysis

/*FACTORS ASSOCIATED WITH LATE ANC BOOKING 3*/
cd "C:\woman's questionnaire"
use ZMIR51FL, clear
keep caseid v000 v001 v002 v002 v003 v004 v005 v009 v010 v011 v021 v022 v012 v013 v025 ///
v781 v026 v101 v102 v106 v107 v130 v131 v133 v149 v158 v159 v157 v190 v201 v213 v225 ///
v301 v302 v376 v367 m10_1 m13_1 v501 v502 v511 v535 v602 v701 v702 v705 v716 v730 v729 ///
v739 v743a v467a v467b v467c v467d v467e v467f v467g v467h v467i v228 ///
***** *****
DESCRIBING AND RECODING THE OUTCOME VARIABLE
***** *****
generate lateANCbooking=m13_1
label variable lateANCbooking "anc booking later than 3 months"
tab lateANCbooking
drop if lateANCbooking==98
recode lateANCbooking 0/3=0 4/9=1
tab lateANCbooking
drop if lateANCbooking==99
drop if lateANCbooking==.
gen ANCb=m13_1
recode ANCb 0/3=1 4/5=2 5/9=3
tab ANCb
***** *****
GENERATING AND LABELLING THE PREDICTOR VARIABLES
***** *****
gen ageres=v012
label variable ageres "age of respondent"
drop if ageres==.
gen agerescat=v013
recode agerescat 1=1 2/4=2 5/7=3
drop if agerescat==.
label variable agerescat "age of respondent in categories"
rename v025 res
recode res 2=0 1=1
tab res, nolabel

label variable res "type of residence (urban/rural)"
drop if res==.
gen reg=v101
drop if reg==.
label variable reg "region (province)"
gen rel=v130
drop if rel==.
label variable rel "religion"
gen eth=v131
drop if eth==.
label variable eth "ethnicity"
gen edusin=v133
drop if edusin==.
label variable edusin "education in single years"
recode edusin 0=1 1/5=2 6/7=3 8/9=4 10/17=5
gen eduhigh=v106
label variable eduhigh "highest education level"
drop if eduhigh==.
gen mar=v501
label variable mar "current marital status"
drop if mar==.
gen childtot=v201
recode childtot 1=1 2/4=2 5/15=3
drop if childtot==0
drop if childtot==.
label variable childtot "total number of children ever born"
gen wealth=v190
label variable wealth "wealth index"
recode wealth 1/2=1 3=2 4/5=3
drop if wealth==.
gen wantpreg=v367
label variable wantpreg "last child wanted"
drop if wantpreg==.
gen fpn=v301
label variable fpn "knowledge of family planning method"
recode fpn 0=1 1/3=2
drop if fpn==.
gen usedfp=v302
label variable usedfp "used any family planning method"
recode usedfp 0=1 1/3=2
drop if usedfp==.
gen termpreg=v228
label variable termpreg "ever terminated pregnancy"
drop if termpreg==.
gen permprob=v467b

label variable permprob "problems getting permission"
drop if permprob==.
gen monprob=v467c
label variable monprob "problems getting money"
drop if monprob==.
gen disprob=v467d
label variable disprob "problems with distance"
drop if disprob==.
gen traprob=v467e
label variable traprob "problems with transport"
drop if traprob==.
gen escoprob=v467f
label variable escoprob "problems with escort"
drop if escoprob==.
gen genprob=v467g
label variable genprob "problem with absence of female health provider"
drop if genprob==.
gen nopprob=v467h
label variable nopprob "problems with absence of provider"
drop if nopprob==.
drop if nopprob==9
gen druprob=v467i
label variable druprob "problems with drugs availability"
drop if druprob==.
gen everhivtest=v781
label variable everhivtest "ever tested for hiv"
drop if everhivtest==.
gen mediaexpradio=v158
label variable mediaexpradio "radio media exposure"
drop if mediaexpradio==.
gen mediaexptv=v159
label variable mediaexptv "tv media exposure"
drop if mediaexptv==.
gen mediaexpnp=v157
label variable mediaexpnp "news paper media exposure"
drop if mediaexpnp==.

DESCRIPTIVE STATISTICS

de
tab lateANCbooking
tab ageres
tab agerescat

tab res, nolabel
tab reg
tab rel
drop if rel==99
tab eth
tab edusin
tab eduhigh
tab mar
tab childtot
tab wealth
tab wantpreg
tab fpn
tab usedfp
tab termpreg
tab permprob
drop if permprob==9
tab monprob
drop if monprob==9
tab disprob
tab traprob
drop if traprob==9
tab escopro
tab genprob
drop if genprob==9
tab druprob
drop if druprob==9
tab everhivtest
drop if everhivtest==9
tab mediaexpradio
drop if mediaexpradio==9
tab mediaexptv
drop if mediaexptv==9
tab mediaexpnp
drop if mediaexpnp==9

WEIGHTED ANALYSIS

svyset, clear
gen weight=v005/1000000
svyset v021 [pweight=weight], strata(v022) singleunit(scaled)
svydescribe

* Descriptive statistical analysis

svy: tabulate res ANCb, count per cent row
svy: tabulate agerescat lateANCbooking, count per cent row
svy: tabulate res lateANCbooking, count per cent row
svy: tabulate reg lateANCbooking, count per cent row
svy: tabulate wealth lateANCbooking, count per cent row
svy: tabulate edusin lateANCbooking, count per cent row
svy: tabulate eduhigh lateANCbooking, count per cent row
svy: tabulate chldtot lateANCbooking, count per cent row
svy: tabulate usedfp lateANCbooking, count per cent row
svy: tabulate fpn lateANCbooking, count per cent row
svy: tabulate wantpreg lateANCbooking, count per cent row
svy: tabulate mar lateANCbooking, count per cent row
svy: tabulate mediaexpnp lateANCbooking, count per cent row
svy: tabulate mediaexptv lateANCbooking, count per cent row
svy: tabulate mediaexpradio lateANCbooking, count per cent row
svy: tabulate druprob lateANCbooking, count per cent row
svy: tabulate monprob lateANCbooking, count per cent row
svy: tabulate rel lateANCbooking, count per cent row
svy: tabulate permprob lateANCbooking, count per cent row
svy: tabulate disprob lateANCbooking, count per cent row
svy: tabulate traprob lateANCbooking, count per cent row
svy: tabulate termpreg lateANCbooking, count per cent row
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**Unadjusted logistic regression Analysis: Overall

xi:svy: logistic lateANCbooking i.agerescat
xi:svy: logistic lateANCbooking i.wealth
xi:svy: logistic lateANCbooking i.reg
xi:svy: logistic lateANCbooking i.edusin
xi:svy: logistic lateANCbooking i.eduhigh
xi:svy: logistic lateANCbooking i.usedfp
xi:svy: logistic lateANCbooking i.wantpreg

xi:svy: logistic lateANCbooking i.mar
xi:svy: logistic lateANCbooking i.mediaexpradio
xi:svy: logistic lateANCbooking i.mediaexptv
xi:svy: logistic lateANCbooking i.mediaexpnp
xi:svy: logistic lateANCbooking i.monprob
xi:svy: logistic lateANCbooking i.druprob
xi:svy: logistic lateANCbooking i.childtot
xi:svy: logistic lateANCbooking i.rel
xi:svy: logistic lateANCbooking i.everhivtest
xi:svy: logistic lateANCbooking i.disprob
xi:svy: logistic lateANCbooking i.fpn
xi:svy: logistic lateANCbooking i.termpreg
xi:svy: logistic lateANCbooking i.traprob
xi:svy: logistic lateANCbooking i.escoprob
xi:svy: logistic lateANCbooking i.genprob
xi:svy: logistic lateANCbooking i.permprob
xi:svy: logistic lateANCbooking i.nopprob
xi:svy: logistic lateANCbooking i.res

Unadjusted logistic regression Analysis: subpop Rural

xi:svy,subpop(if res==0):logistic lateANCbooking i.agerescat
xi:svy,subpop(if res==0):logistic lateANCbooking i.wealth
xi:svy,subpop(if res==0):logistic lateANCbooking i.reg
xi:svy,subpop(if res==0):logistic lateANCbooking i.edusin
xi:svy,subpop(if res==0):logistic lateANCbooking i.eduhigh
xi:svy,subpop(if res==0):logistic lateANCbooking i.usedfp
xi:svy,subpop(if res==0):logistic lateANCbooking i.wantpreg
xi:svy,subpop(if res==0):logistic lateANCbooking i.mar
xi:svy,subpop(if res==0):logistic lateANCbooking i.mediaexpradio
xi:svy,subpop(if res==0):logistic lateANCbooking i.mediaexptv
xi:svy,subpop(if res==0):logistic lateANCbooking i.mediaexpnp
xi:svy,subpop(if res==0):logistic lateANCbooking i.monprob
xi:svy,subpop(if res==0):logistic lateANCbooking i.druprob
xi:svy,subpop(if res==0):logistic lateANCbooking i.childtot
xi:svy,subpop(if res==0):logistic lateANCbooking i.rel
xi:svy,subpop(if res==0):logistic lateANCbooking i.everhivtest
xi:svy,subpop(if res==0):logistic lateANCbooking i.disprob
xi:svy,subpop(if res==0):logistic lateANCbooking i.fpn
xi:svy,subpop(if res==0):logistic lateANCbooking i.termpreg
xi:svy,subpop(if res==0):logistic lateANCbooking i.traprob
xi:svy,subpop(if res==0):logistic lateANCbooking i.escoprob
xi:svy,subpop(if res==0):logistic lateANCbooking i.genprob
xi:svy,subpop(if res==0):logistic lateANCbooking i.nopprob

Unadjusted logistic regression Analysis Subpop Urban

xi:svy,subpop(if res==1):logistic lateANCbooking i.agerescat
xi:svy,subpop(if res==1):logistic lateANCbooking i.wealth
xi:svy,subpop(if res==1):logistic lateANCbooking i.reg
xi:svy,subpop(if res==1):logistic lateANCbooking i.edusin
xi:svy,subpop(if res==1):logistic lateANCbooking i.eduhigh
xi:svy,subpop(if res==1):logistic lateANCbooking i.usedfp
xi:svy,subpop(if res==1):logistic lateANCbooking i.wantpreg
xi:svy,subpop(if res==1):logistic lateANCbooking i.mar
xi:svy,subpop(if res==1):logistic lateANCbooking i.mediaexpradio
xi:svy,subpop(if res==1):logistic lateANCbooking i.mediaexptv
xi:svy,subpop(if res==1):logistic lateANCbooking i.mediaexpnp
xi:svy,subpop(if res==1):logistic lateANCbooking i.monprob
xi:svy,subpop(if res==1):logistic lateANCbooking i.druprob
xi:svy,subpop(if res==1):logistic lateANCbooking i.childtot
xi:svy,subpop(if res==1):logistic lateANCbooking i.rel
xi:svy,subpop(if res==1):logistic lateANCbooking i.everhivtest
xi:svy,subpop(if res==1):logistic lateANCbooking i.disprob
xi:svy,subpop(if res==1):logistic lateANCbooking i.fpn
xi:svy,subpop(if res==1):logistic lateANCbooking i.termprob
xi:svy,subpop(if res==1):logistic lateANCbooking i.traprob
xi:svy,subpop(if res==1):logistic lateANCbooking i.escoprob
xi:svy,subpop(if res==1):logistic lateANCbooking i.genprob
xi:svy,subpop(if res==1):logistic lateANCbooking i.permprob
xi:svy,subpop(if res==1):logistic lateANCbooking i.nopprob

**Multiple logistic regression Analysis- overall- variable significant at unadjusted logistic regression analysis

xi:svy: logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn i.mediaexpnp i.mediaexptv i.traprob
xi:svy: logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn i.mediaexpnp i.traprob
xi:svy: logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn i.mediaexpnp
xi:svy: logistic lateANCbooking i.agerescat i.eduhigh i.childtot ///
i.monprob i.wantpreg i.fpn
xi:svy: logistic lateANCbooking i.eduhigh i.childtot ///
i.monprob i.wantpreg i.fpn i.mediaexpnp i.mediaexptv i.mediaexpradio i.traprob

xi:svy: logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn i.mediaexpnp i.mediaexptv i.mediaexpradio i.traprob
xi:svy: logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn i.mediaexpnp i.mediaexptv i.traprob
xi:svy: logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn i.mediaexpnp i.traprob
xi:svy: logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn i.traprob
xi:svy: logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn i.druprob
xi:svy: logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn i.druprob res

**Multiple logistic regression Analysis subpop Rural

xi:svy,subpop(if res==0):logistic lateANCbooking i.agerescat i.eduhigh i.childtot ///
i.monprob i.wantpreg i.fpn i.mediaexpnp i.mediaexptv i.mediaexpradio i.traprob
xi:svy,subpop(if res==0):logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn druprob

**Multiple logistic regression Analysis subpop Urban

xi:svy,subpop(if res==1):logistic lateANCbooking i.agerescat i.eduhigh i.childtot ///
i.monprob i.wantpreg i.fpn i.mediaexpnp i.mediaexptv i.mediaexpradio i.traprob
xi:svy,subpop(if res==1):logistic lateANCbooking i.agerescat i.eduhigh ///
i.monprob i.wantpreg i.fpn druprob

Appendix 5: Ethical clearance letter



33 Joseph Mwilwa Road
Rhodes Park, Lusaka
Tel: +260 955 155 633
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Email: eresconverge@yahoo.co.uk

I.R.B. No. 00005948
E.W.A. No. 00011697

17th July, 2014

Ref. No. 2014-May-012

The Principal Investigator
Mr. Nyambe Sinyange
The University of Zambia
School of Medicine
Dept. of Public Health
P.O. Box 50110,
LUSAKA.

Dear Mr. Sinyange,

**RE: FACTORS ASSOCIATED WITH LATE ANTENATAL CARE BOOKING
IN ZAMBIA.**

Reference is made to your corrections dated 9th July, 2014. The IRB resolved to approve this study and your participation as principal investigator for a period of one year.

Review Type	Ordinary	Approval No. 2014-May-012
Approval and Expiry Date	Approval Date: 17 th July, 2014	Expiry Date: 16 th July, 2015
Protocol Version and Date	Version-Nil	16 th July, 2015
Information Sheet, Consent Forms and Dates	• N/A.	16 th July, 2015
Consent form ID and Date	Version-Nil	16 th July, 2015
Recruitment Materials	Nil	16 th July, 2015
Other Study Documents	Data Extraction Tool.	16 th July, 2015
Number of participants approved for study	-	16 th July, 2015

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

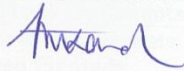
Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by ERES IRB must be filled in and submitted to us.
- ERES Converge IRB does not "stamp" approval letters, consent forms or study documents unless requested for in writing. This is because the approval letter clearly indicates the documents approved by the IRB as well as other elements and conditions of approval.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of ERES Converge IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,
ERES CONVERGE IRB



Dr. E. Munalula-Nkandu
BSc (Hons), MSc, MA Bioethics, PgD R/Ethics, PhD
CHAIRPERSON