International Journal of Economic Sciences and Applied Research 5 (2): 145-162

Determinants of Maternal Healthcare Utilization in Zimbabwe

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Abstract

Zimbabwe and other developing countries struggle to achieve millennium development goals originally set for 2015. To assist health policy making, there was an investigation of how demographic, socioeconomic and cultural factors determine maternal healthcare services use in Zimbabwe. A logistic model for four different maternal healthcare services using data from the 2005/6 Zimbabwe Demographic Health Survey was estimated. Secondary education increases the odds of use of maternal health services by at least 2 times at 1 percent level of significance whilst access to information increases the odds by 1.52 at the 5 percent level of significance. Women in urban areas are more likely to give birth at healthcare facilities OR 3.49 compared to their rural counterparts at 1 percent significance level. Women from highest income households are more likely to give birth at health facilities than those from poorest households OR 6.44 at 1 percent level of significance whilst the pattern is consistent for other services as well. Other important determinants are age, education, wealth, polygamy and religious affiliation. Generally, policy makers have to appreciate that these factors affect different maternal health services differently. Consequently, strategies to improve the uptake of maternal healthcare like mass media and health workers, particularly for disadvantaged sections of the population like rural areas and the uneducated, should be targeted at specific components rather than planning umbrella strategies.

Keywords: Utilisation, Maternal healthcare, Millennium Development Goals, Zimbabwe

JEL Classification: I10, I18, I19

1. Introduction

There has been a considerable amount of evidence showing that good health in general and maternal health in particular can play a major role in poverty alleviation and human development (Thomas and Strauss, 1997; Govindasamy and Ramesh, 1997; Filippi, Ronsmans and Campbell, 2006; Odwee, Okurut and Adebua, 2006). Women's health in particular, needs proper attention to avoid reduction in consumption levels associated with

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the loss of a mother which was observed in Zimbabwean households (Lindelow, 2002). More broadly, investment in maternal health has valuable equity benefits, since differences in maternal and child mortality and morbidity mirror the huge discrepancies between rich and poor people both within and between countries (Borghi et al., 2006).

Although the MDGs top global health priorities at the moment, health for all remains an elusive goal in most developing countries (Carr, 2004). There is an increasingly visible gap between households that have access to healthcare and those who are excluded from such benefits (WHO, 2005). In 2004, maternal mortality rates for Sub Saharan countries stood at 900 deaths per 100 000 live births compared to 9 deaths per 100 000 live births for developed countries (WHO, 2004). In Zimbabwe, the under five mortality rate for the richest fifth of the population was reported to be 62 deaths per 1000 live births compared to 100 deaths per 1000 live births for the poorest fifth who are constrained from accessing healthcare by their incomes (Gwatkin et al., 2003). In fact, researchers have found that a large proportion of mothers and children remain excluded from the health benefits that others in the same country enjoy. For example, Gwatkin et al. (2003) found that 94 percent of births by the richest fifth of Zimbabwean women are attended by medically trained personnel compared to only 57 percent of the poorest fifth. This paper uses the Zimbabwe Demographic Health Survey of 2005/6 to find out the major determinants of maternal healthcare utilisation and determine if these determinants are universal to all maternal health services. This will help healthcare policy makers to formulate strategies for the provision of maternal healthcare and achievement of the MDGs.

A variety of studies have been carried out in different countries to investigate factors that influence maternal healthcare utilisation (Elo, 1992; Govindasamy and Ramesh, 1997; Magadi et al., 1999; Navaneetham and Dharmalingam, 2000; Mekonnen and Mekonnen, 2002; Abouzahr and Wardlaw, 2003; Stephenson et al., 2006; Sarma and Rempel, 2007). Most of them investigate how socioeconomic, demographic and cultural factors influence utilisation.

Age is the most used demographic characteristic. From theory, ageing leads to rising depreciation in health stock which implies increasing marginal cost of health investment. The demand for health capital is thus expected to fall with ageing (Grossman, 2000). However, the demand for healthcare inputs for health stock may rise due to inelastic demand curve for health. Empirical evidence has various findings. Age can be negatively related to healthcare utilisation since it captures past maternal experience especially where there were no complications in previous pregnancies and child health (Sarma and Rempel, 2007). This negative relationship, however, could be due to diminishing marginal willingness to invest in the additional children's health, that is, in the case of mistimed or unwanted pregnancies (Magadi et al., 1999). There are cases however, where younger women have been observed to utilise less maternal healthcare (Magadi et al. 1999), and also where older women utilise more healthcare which is attributed to the experience hypothesis which says that maternal age reflects the woman's accumulated knowledge of healthcare services and the value she places on modern facilities (Elo, 1992; Grossman, 2000).

Socioeconomic and cultural factors include education, wealth status, religion, polygamy, exposure to the media, place of residence and autonomy in decision making.

Commonly held beliefs and norms that could be religious or cultural, shape the way individuals perceive their own health and the health services available. Religious and cultural beliefs have been found to be sources of exclusion from maternal healthcare utilisation in India and Africa (Stephenson et al., 2006). Although most studies have ignored polygamy, it is a customary practice that is associated with traditionalists. Stephenson et al. (2006) found that women in polygamy were less likely to report for delivery at a health institution. Maternal healthcare utilization is constrained by women's lack of decision making power, the low value placed on women's health and the negative or judgmental attitudes of family members (WHO, 2005). Women with more autonomy in decision making, which is determined by the society and culture, have also been found to be more likely to use maternal healthcare (Stephenson et al., 2006).

On access to the media, Stephenson et al. (2006) found that women who were exposed to reproductive messages were more likely to utilise health facilities for delivery in Malawi, Kenya and Tanzania whilst no effect was found for Ghana, Ivory Coast and Burkina Faso. This implies that the impact of access to the media on maternal healthcare utilization is country specific.

Costs and proximity to a healthcare facility are health facility related characteristics which also influence maternal healthcare utilisation. From economic theory, price is negatively related to demand. Although healthcare in Zimbabwe is subsidized, there are registration fees that are demanded especially at municipal clinics. In addition to that, healthcare is characterised by implicit costs like time and transportation. Sarma and Rempel (2007) found distance to a healthcare facility negatively related to utilisation, especially for distances of more than ten kilometers. The Zimbabwean government claims that it has done good work by reducing distance to healthcare facilities through the construction of healthcare facilities around the country. The average distance to the nearest healthcare facility is between eight to ten kilometers (MHCWZ, 1999). We will seek to validate the claim made by the government that it has done enough to reduce the problem of having to travel long distances to healthcare facilities in Zimbabwe. Women residing in rural areas have also been found to utilise less healthcare than their urban counterparts in Ethiopia (Mekonnen and Mekonnen, 2002). Navaneetham and Dharmalingam (2000) had conflicting findings for different components of maternal healthcare in India.

Education has been found to be a source of exclusion in studies conducted in India and different countries in Africa. Mekonnen and Mekonnen (2002) found education linearly increasing with utilisation in Ethiopia. Navaneetham and Dharmalingam (2000) found uneducated women less likely to use maternal healthcare, but found no differences in utilisation among the educated. The household's level of wealth has also been found to be an important determinant of maternal healthcare utilization with the poor being the most disadvantaged (Castro-Leal et al., 2000; Carr, 2004). Furthermore, public healthcare programmes targeted to reach the poor end up benefiting only the rich instead (Castro-Leal et al., 2000).

Findings from other countries have been inconsistent and sometimes actually conflicting. It appears however, that most of these studies conclude that the impact of factors that determine healthcare utilisation are unique to settings. Different settings have different socioeconomic backgrounds, cultural Practices, demographic characteristics and income distribution. Furthermore, no quantitative study has been carried out yet to study how the factors influence maternal healthcare utilisation in Zimbabwe. This study thus seeks to discover how demographic, cultural and socioeconomic variables influence particular groups of women from utilising different maternal health services.

This paper is organized as follows. Section 2 describes research methodology of the study followed by section 3 which contains the empirical analysis and results. The last section presents discussion of the research findings and conclusions.

2. Methodology

This study uses secondary data from the Zimbabwe Demographic and Health Survey (ZDHS) 2005-6. The survey was carried out by the Central Statistical Office (CSO), assisted by Macro International Inc. between August 2005 and March 2006. A sample of 8907 women was interviewed during the survey. This large dataset gives an advantage of low variance associated with estimating using large samples. The birth records dataset from the survey contains information on maternal healthcare utilisation. It provides healthcare information on women who had pregnancy any time in the five years prior to the survey, from the time they were pregnant to the infancy of the child. The dataset was obtained from Macro International's MEASURE DHS project website www.measuredhs.com.

Maternal healthcare is a package consisting of different components. In order to determine if determinants of utilisation are the same for all components such that a single strategy can be used for the whole maternal healthcare package, determinants of antenatal care, uptake of Tetanus Toxoid (TT) injections, place of delivery and postnatal care will be investigated. The logit model will be used to estimate the utilization of each of these four components of maternal healthcare.

We estimated utilisation of maternal healthcare using the following logistic model;

P (Utilization = 1|X) = F (Age, Age squared, Education level, Wealth Status, Place of residence, Whether child was wanted, Independence in decision making, Religion, Distance to facility, Cost of care, Access to information, Whether in Polygamy)

The equation says that the probability of a woman utilising maternal healthcare given observed characteristics X, is given by a function F. F is a function of the observed characteristics X. By assuming that the stochastic term follows a cumulative logistic distribution, F becomes a cumulative distribution function for the logit model. The odds ratios were estimated in STATA 10.

3. Results

3.1 Sociodemographic characteristics

Table 1 presents the sociodemographic characteristics of the sample. 8907 women of mean age 35.2 years were interviewed. On average, each woman has 4 children whilst only 25.89 percent are formally employed. 10.62 percent of the respondents never attained any education whilst 46.75 percent and 40.54 percent attained only primary and secondary education respectively. 46.57 percent of these women live in poverty whilst 74.92 live in rural areas. 75.99 percent of the women are married whilst 4.24 percent are divorced and 12.83 percent are widowed.

3.2 Multivariate Analysis

Logistic regressions were conducted using STATA 10 for each of the four maternal healthcare services and the results presented in Table 2 were obtained. Table 2 shows the results of multivariate analysis of the antenatal care, TT injections, place of delivery and postnatal care utilisation in terms of odds ratios and p- values. Cost of healthcare and autonomy in carrying out healthcare decision are insignificant variables for all maternal healthcare components under analysis.

3.3.1 Tetanus Toxoid Injections

Age, education, wealth status, type of marriage and whether the current pregnancy was wanted are the determinants of the uptake of TT injections. The odds of taking the required TT injections are two times higher among women who attained secondary education than among those who had no schooling at all significant at 1 percent level. Women who belong to the richer and richest societies are 61 percent and 91 percent more likely to take the required TT injections than women from the poorest family settings at 1 percent significance level whilst the middle class women are 38 percent more likely to do the same at 5 percent significance level. Women who wanted the current pregnancy are 20 percent more likely to use the service whilst women in polygamous households are 22 percent less likely to take adequate TT injections compared to women in non polygamous households both at 5 percent significance level. There Age squared variable shows an odds ratio of 1 implying that the odds of women at both ends of the reproductive age spectrum utilising TT injections are not different from those of women in the middle ages at 10 percent significance level.

3.3.2 Antenatal Care

Age, education, wealth status, religious affiliation, access to information, polygamy and whether the current pregnancy was wanted are the determinants of antenatal care utilisation. The odds of utilising antenatal care are 1.83 times and 4.84 times higher among women who have attained secondary education only and higher education respectively than among women who never attended school both significant at 1 percent. The odds of utilising the same service are 1.84 times higher amongst women from the richest households than among women from the poorest households at 5 percent level of significance.

Table 1: Demographic characteristics of respondents

Characteristics	
N	8907
Mean Age, years (SD)	35.2 (8.4)
Mean Parity, n(SD)	4.1 (2.2)
Occupation n (%)	
Agriculture Self Employed	16.59
Household and Domestic	3.5
Formal Employment	25.89
Unemployed	54.02
Education (%)	
At least High School	2.09
Secondary school	40.54
Primary school	46.75
Never attended school	10.62
Wealth Status Index (%)	
Poorest	24.87
Poorer	21.70
Middle	19.84
Richer	18.17
Richest	15.43
Place of Residence (%)	
Urban	25.08
Rural	74.92
Marital Status (%)	
Married	75.99
Divorced	4.24
Widowed	12.83
Other	6.93

Traditionalists and apostolic women are 19 percent less likely to use this same service than those from other religious affiliations at 5 percent level of significance whilst women from polygamous households are 31 percent less likely to use the service compared to women from non polygamous households at 1 percent level of significance.

Table 2: Odds Ratios and p- values for the determinants of uptake of TT injections, Antenatal Care, Delivery at health facility and Postnatal care

Variables	TT2		ANC		Delivery at health facility		Postnatal care	
	OR	p-value	OR	p-value	OR	p-value	OR	p-value
Age	0.92**	0.038	1.12***	0.008	1.02	0.716	1.00	0.998
Age2	1.00*	0.057	0.99**	0.012	1.00	0.687	1.00	0.559
Distance								
Close	1		1		1		1	
Too far	0.99	0.903	1.13	0.27	0.80*	0.058	1.06	0.704
Wealth								
Poorest	1		1		1		1	
Poor	1.20	0.102	1.06	0.591	1.30**	0.022	1.27	0.165
Middle	1.38**	0.017	1.25*	0.092	2.01***	0.000	1.24	0.357
Richer	1.61***	0.006	1.21	0.322	2.50***	0.000	1.24	0.491
Richest	1.91***	0.006	1.84**	0.022	6.44***	0.000	0.71	0.681
Religion								
Other	1		1		1		1	
Trad/Apostolic	0.86*	0.081	0.81**	0.016	0.75***	0.007	0.89	0.433
Child wanted								
No	1		1		1		1	
Yes	1.20**	0.034	1.48***	0.000	1.33***	0.004	0.98	0.889
Residence								
Rural	1		1		1		1	
Urban	0.72*	0.075	0.78	0.219	3.49***	0.000	0.89	0.803
Education								
No education	1		1		1		1	
Primary	1.33	0.122	1.23	0.312	1.53*	0.082	0.80	0.38
Secondary	2.01***	0.000	1.83***	0.006	2.90***	0.000	1.04	0.895
Higher education	0.91	0.752	4.84***	0.003	17.7***	0.006	-	
Polygamy								
No	1		1		1		1	
Yes	0.78**	0.039	0.69***	0.004	0.65***	0.002	0.81	0.249

Information								
No access	1		1		1		1	
Less than 7 days	0.97	0.816	1.23	0.127	1.16	0.360	1.16	0.545
At least 1 week	0.91	0.497	1.49**	0.024	0.91	0.611	1.18	0.604
Everyday	1.07	0.535	1.41***	0.002	1.04	0.779	1.52**	0.05
Antenatal Care								
No	-			-	1		1	
Yes					2.13***	0.000	1.86***	0.000

***, ** and * represent 1 percent, 5 percent level of significance and 10 percent levels of significance

The odds of utilising antenatal care are 1.49 times higher amongst women who listen to radio programmes than amongst those who do not have access to the same media at 5 percent level of significance, although the odds fall to 1.41 times for those who listen every day at 1 percent significance level. Women who wanted the current pregnancy are 46 percent more likely to utilise the same service compared to those who had not wished for the pregnancy at 1 percent level of significance. There Age squared variable shows an odds ratio of 0.99 implying that the odds of women at both ends of the reproductive age spectrum utilising antenatal care are almost the same as those of women in the middle ages at the 5 percent significance level.

3.3.3 Delivery at Healthcare Facility

Education, wealth status, type of marriage, the desire for current pregnancy, place of residence, distance to the health centre, religious affiliation and antenatal care influence delivery at a healthcare facility. The odds of delivery at a healthcare facility are 17.7 and 2.9 times higher among women who attained higher education and up to secondary education respectively than among those who had no schooling at all both significant at the 1 percent level. The odds of delivery at a healthcare facility amongst women who belong to the middle, richer and richest societies are 2, 2.5 and 6.4 times higher than amongst those women from the poorest family settings all at 1 percent level of significance whilst the odds for women from the poor society utilising the same service are 1.3 times higher at the 5 percent significance level. Traditionalists and apostolic women are 25 percent less likely to use the same service than those from other religious affiliations whilst women who wanted the current pregnancy are 33 percent more likely to use the service, both significant at the 1 percent level. The odds for delivery at a healthcare facility are 3.5 times higher among women from urban areas than among their rural counterparts at 1 percent level of significance. Women in polygamous households are 35 percent less likely to deliver at a healthcare facility compared to those from non polygamous households also at 1 percent significance level. Women who cited distance as a big problem for getting to the nearest healthcare facility are 20 percent less likely to give birth at health centers, significant at 10 percent level. The fact that a woman attended antenatal sessions has also proved to be a significant determinant of delivery at health centers. The odds for delivery at a health centre are 2.1 times higher among women who attended antenatal sessions than amongst women who did not get antenatal care at 1 percent level of significance.

3.3.4 Postnatal Care

Postnatal care has only two significant determinants. The odds of utilising postnatal care are 1.86 times higher among women who received antenatal care than among women who did not, at 1 percent significance level. The odds of utilising this same service are 1.52 times higher amongst women who have access to radio programmes on a daily basis than among women who do not have access at all significant at 5 percent level.

Goodness of fit statistics show that the estimated model was different from a constant only equation with Pseudo R- squared values of 0.05 for estimations of TT injections, postnatal care and antenatal care. Place of delivery had a pseudo R- squared value of 0.22. However, these statistics have no natural interpretation beyond informing that the model was different from a constant only model. Predictive power statistics showed that the model can correctly predict 60.69, 65.92, 74.61 and 71.23 percent for the uptake of TT injections, postnatal care, place of delivery and antenatal care respectively.

4. Discussion and Conclusion

4.1 Discussion

Generally, we found that the determinants of service utilisation are not uniform across all components of maternal health services. Hence, as adopted in other empirical studies, researchers and policy makers in Zimbabwe cannot generalise but have to be specific about the component of maternal healthcare under scrutiny (Navaneetham and Dharmalingam, 2000; Mekonnen and Mekonnen, 2002; Lubbock and Stephenson, 2008; Kistiana, 2009).

Education has been found to affect the uptake of TT injections, antenatal care and delivery at a healthcare facility albeit, differently. Different education levels actually affect the services differently except for secondary education. Higher education has a positive impact on antenatal care and delivery at a healthcare facility whilst primary education only affects delivery at a health facility. Secondary education results in substantial improvement in the uptake of TT injections, antenatal care and delivery at a healthcare facility compared to no schooling at all. In consistence with previous studies, education has a significantly strong and positive effect on the uptake of TT injections and antenatal care (Govindasamy and Ramesh, 1997; Navaneetham and Dharmalingam, 2000; Mekonnen and Mekonnen, 2002; Kistiana, 2009; McTavish et al., 2011). This clears the ambiguity on the effects of education on healthcare utilisation implied in the Grossman model. According to the Grossman model, the educated generate health at less cost than the uneducated. It is however not clear whether this should cause the educated to utilise more or less healthcare. This finding seems to suggest that since the educated generate health at less cost than the uneducated (Grossman, 2000), they have a higher incentive of utilising maternal healthcare because it is relatively cheaper for them to do so. The implication is that the less educated are less likely to take TT injections and antenatal care. Furthermore, education augments women's autonomy resulting in women developing greater confidence and capabilities to make decisions regarding their own health (Kistiana, 2009). The significant impact of education on delivery at health institutions is evidence that educated women have better knowledge and information on modern medical treatment (Kistiana, 2009). The link from education to higher utilization of health services extends to better health outcomes like lower child and maternal mortality (Boyle et al., 2006). In order to fill in the gap of education, health workers can be used to provide knowledge in villages which can be simplified even in form of pictures to those illiterate. In another study by Lubbock and Stephenson (2008) in Nicaragua, many women acknowledged that their knowledge of maternal health services came from health workers. In addition to that, Sunil et al. (2006) and Karim et al. (2010) found that higher rate of household visits by health workers were associated with improved maternal healthcare utilisation. Social groups can also be useful in promoting maternal and child health. Valadez et al. (2005) found out that with inter-organisational networking, the density of health committees and mothers' clubs associated with ANC attendance by more than three times. Electronic media is another alternative useful for educational campaigns to spread information. More interestingly, McTavish et al. (2011) noted that national policies that are able to address female literacy in Sub-Saharan Africa may help reduce income-related inequalities in maternal health care use.

Access to information has a strong significant impact on the uptake of antenatal care and postnatal care in Zimbabwe. This shows that the electronic media has a strong impact on maternal healthcare utilisation in Zimbabwe. Women without access to the electronic media are at a higher disadvantage in terms of awareness about antenatal and postnatal care. A study in Indonesia had the same findings and went on to suggest mass media campaigns to promote healthcare utilisation (Kistiana, 2009). Higher impact of the media will help complement the effects of education.

Women from apostolic households and those that believe in traditional healing are less likely to make antenatal visits and deliver healthcare facilities than women from other religious affiliations. This shows that religious affiliation is a strong and significant source of exclusion from antenatal care and delivery at healthcare facilities. The exclusion of women affiliated to apostolic sects and traditional practice from antenatal care and delivery services has also been documented elsewhere. Stephenson et al. (2006) found non Catholic women less likely to use maternal healthcare in Ghana, whilst Catholic women were less likely to utilise maternal healthcare in Kenya when compared to Protestants. In Zimbabwe, women affiliated to apostolic sects do not take medical services because they believe in faith healing and they prefer traditional midwives. Traditionalists do not believe in modern day medicine and they prefer cleansing and traditional herbs. This was also found by Lubbock and Stephenson (2008) and since the problem is community held beliefs, health workers would be more useful as they were found to have significant influence in the same literature.

Polygamy also negatively influences uptake of both antenatal care and TT injections. The reason could be that there would be a number of women relying on one husband for money to travel to healthcare facilities and to pay for healthcare services. In addition to that, polygamy is mostly practised by apostolic sects who believe in spiritual healing. Stephenson et al.'s (2006) had a similar finding whereby women in polygamy were less likely to deliver in healthcare facilities. This is related to findings by Lubbock and Stephenson (2008) in Nicaragua that individual and community knowledge, and the degree of communication with other women affects women's decisions to seek care. Stories about successful pregnancies and deliveries with little or no complications can influence non seeking behaviour. Health workers in this case will be very helpful as they were also found to have an impact towards seeking care Lubbock and Stephenson (2008).

The positive impact that wealth exerts on the uptake of place of delivery, TT injections and antenatal care implies that the poor are excluded from benefiting from these services. This finding is in consistence with Castro- Leal et al.,'s (2000) finding that even public health expenditures meant to help the poor end up benefiting the rich. Some poor women are excluded from maternal healthcare utilisation because they are poor. This is possibly because there are implicit costs of healthcare besides the fee charged for the actual maternal healthcare service. These include transport, opportunity cost of waiting and information costs. This finding is also in consistence with other previous literature by Agboolah (2009) and Lubbock and Stephenson (2008). Brazier et al. (2009) suggested the upgrading of maternity services at primary care facilities to improve poor women's access to maternal healthcare utilization. This was after their study in Burkina Faso showed overall increase in maternal healthcare utilization at upgraded facilities when compared to the current conventional primary care facilities.

A wanted pregnancy is positively and significantly related to uptake of TT injections, delivery at health centre and antenatal care. Previous studies document that a pregnancy that is mistimed or not wanted leads to non utilisation of maternal healthcare (Magadi et al., 1999). There is still need however, to find out the women who get unwanted pregnancies mostly. If they are teenagers, they will be afraid of revealing that they are pregnant. They will be left out on maternal healthcare utilisation because of fear. Infact, it has been found that teenagers are less likely to receive adequate antenatal care and have non-professional deliveries compared to older women (Magadi et al., 2007).

Women residing in rural areas are less likely to deliver at healthcare facilities than their urban counterparts. This finding is not in consistence with findings in Ethiopia by Mekonnen and Mekonnen (2002). As Mekonnen and Mekonnen (2002) explained, most women in urban areas of sub-Saharan countries have increased knowledge and have more access to maternal health services compared with their rural counterparts. Most mass media programmes to encourage healthcare utilisation reach to the urban population more than in rural areas whilst traditionalists and apostolic sects who do not use modern healthcare consist of a significant population in rural areas than in urban areas. This finding could also be a revelation of the challenges that women in sub- Saharan rural areas face with ambulance and other emergence transportation. Most rural areas do not have effective ambulances compared with urban areas which have private ambulances supplementing municipal and government vehicles. In other cases, the rural district hospital ambulances have challenges in terms of poor road infrastructure which means delayed or slow response to those who call for the services.

The cost variable on its own was found to be an insignificant source of exclusion for all components under study. Advocates of cost recovery schemes argue that charging healthcare service drives the rich to private hospitals leaving public healthcare facilities for the poor. Our finding that cost is not a source of exclusion in Zimbabwe is not surprising. Most hospitals in Zimbabwe are government run. The services that they offer are highly subsidized to the extent that costs cannot be expected to prohibit maternal healthcare utilisation. It has also been found that the distance to a health facility is not a significant determinant of antenatal care, TT injections uptake and postnatal care. This appears to validate the Zimbabwean government's claim that it has eliminated the problem of distance to a nearest health facility.

The data used has several strengths. The Zimbabwe Demographic Health Survey has a large sample size and the survey's structure is almost standard across a range of countries. The sample size and thorough methods of data collection ensure fewer inconsistent or unknown values. The data however could have been more useful to this study had some particular information been collected in quantitative form. Examples are distance to the nearest health facility, cost of transport and cost of health services. Large scale surveys like the ZDHS are expensive and as a consequence, they are only conducted periodically. Although the 2005- 6 ZDHS is the most recent at the time of writing, the information provided might not reflect the current situation and practices. The dataset had major issues with missing data. STATA dropped at least half of the total respondents due to some missing data as a result of people who refused to participate and unanswered. Missing data results in biased findings if the people for whom data is missing are systematically different. In addition to that, there may be inefficient statistical estimates due to the loss of information. Furthermore, missing data can result in increased analytic complexity as analysts use statistical procedures to fill in the missing data. However, the dataset was very large such that even after dropping half the dataset, the remainder was still large enough to ensure reduced bias and there was not a need to manipulate data to fill in missing data. Surveys rely on a self-report method of data collection. Inaccuracies can come up as a result of intentional deception, poor memory, or misunderstanding of questions. Furthermore, this method is descriptive, not explanatory, and, therefore, cannot offer any insights into cause-and-effect relationships.

We can thus conclude that the major determinants of maternal healthcare utilisation in Zimbabwe are cultural, demographic and socioeconomic in nature. This justifies the use of demographic and sociocultural factors to model healthcare utilisation in developing countries. Different components of maternal healthcare, however, seem to be affected by sociocultural and demographic factors differently. Factors that affect antenatal care, uptake of TT injections and postnatal care are not necessarily the same and also differ in terms of significance.

However, as argued by Mekonnen and Mekonnen (2002), Peabody et al. (2006) and Hulton et al. (2007), service-related factors are also important determinants of exclusion and need investigation. Future research can explore the impact of the providers' characteristics on utilisation of maternal health services. Elements like quality of care, type of provider, actual distance and attitude of staff still need to be explored. Quality of care has in fact been found positively related to higher health outcomes elsewhere (Peabody et al., 2006). Quality of health institutions in India was found to be compromised by essential drug shortages, women being left unsupported, physical and verbal abuse, and births occurring in hospitals without a health professional in attendance, problems also prevalent in Zimbabwe (Hulton et al., 2007).

The impact of maternal childhood on maternal healthcare utilisation might also be explored since it has been found that maternal childhood has an impact on child health outcomes (Gisselmann, 2006). In addition to that, urban migration experience and social ties to urban and international migrants found to lower the barriers to maternal healthcare utilization in Guatemala also need to be investigated for Zimbabwe in future research (Lindstrom and Muñoz-Franco, 2006). Due to high unemployment, a lot of potential workforce has migrated to Europe and neighbouring countries. They support their relatives back home financially which might have an influence in access to healthcare.

Studies on maternal and child healthcare have been found to have implications for other reproductive health services. Seiber et al. (2005) found the intensity of maternal and child healthcare utilization positively associated with subsequent contraceptive use among in Guatemala. This implies that findings in this study can also be used to for policy purposes on other reproductive health services where research is scarce or out dated. More importantly, attention to these findings improves maternity utilization with ripple effects to maternal and infant mortality reduction as noted by Onah et al. (2006).

4.2 Conclusion

The major objective of this study was to find out the determinants of different maternal healthcare services. In particular, there was an attempt to find out how determinants of maternal healthcare utilisation interplay. In addition to that, by comparing the determinants of different components of maternal healthcare, there was also an effort to find out if the study of one component can be used to make conclusions about all maternal healthcare services.

The determinants of utilisation influence the uptake of different maternal healthcare services differently. This means that policy makers have to be careful in terms of structuring strategies to improve utilisation. A strategy that might improve antenatal care utilisation will not necessarily have a significant impact on postnatal care. Variables that policy makers have to pay attention in developing countries include education, wealth status, preference of the pregnancy, religious affiliation, polygamy, place of residence, access to information and age.

A number of policies can be recommended from these findings. Firstly, in order to improve maternal and child health, there is a need for targeting a particular service and develop strategies particularly for that service instead of an umbrella strategy for all maternal health services. Uneducated women are less likely to use both antenatal care and TT injections. Making secondary education universal in Zimbabwe might solve this issue albeit in the long run. Health workers can be used in maternal health awareness programmes which are more useful and realistic in the short run. In particular, policy makers should use the electronic and mass media to communicate and spread awareness. These can help fill the void of formal education lacking in some sections of the population. This method can also be used to influence decisions in cases where the pregnancy is mistimed or unwanted and also to change attitudes in the case of sociocultural factors like polygamy and religious affiliation. Lastly, the government can improve delivery at healthcare facilities by addressing challenges of road infrastructure and find out ways for increasing emergency medical transportation in rural areas like engaging private ambulance services.

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Appendix

Table A1: Odds Ratios and Cluster adjusted 95% Confidence intervals for the determinants of uptake of TT injections, Antenatal Care, Delivery at health facility and Postnatal care

Variables	TT2	ANC	Delivery at health facility	Postnatal care
Age	0.92 [0.84- 0.99]	1.12 [1.03- 1.22]	-	-
Age2	1.00 [0.99- 1.00]	0.99 [0.99- 1.00]	-	-
Distance				
Close	-	-	1	-
Too far			0.80 [0.64- 1.01]	
Wealth				
Poorest	1	1	1	-
Poor			1.30 [1.04- 1.63]	
Middle	1.38 [1.06- 1.80]		2.01 [1.54- 2.62]	
Richer	1.61 [1.14- 2.26]		2.50 [1.71- 3.65]	
Richest	1.91 [1.20- 3.05]	1.84 [1.09- 3.09]	6.44 [2.81- 14.8]	
Religion				
Other	-	1	1	-
Trad/Apostolic		0.81 [0.68- 0.96]	0.75 [0.61- 0.92]	
Child wanted				
No	1	1	1	-
Yes	1.20 [1.01- 1.42]	1.48 [1.24- 1.76]	1.33 [1.1- 1.61]	
Residence				
Rural	-	-	1	-
Urban			3.49 [2.09- 5.83]	
Education				
No education	1	1	1	-
Primary				
Secondary	2.01 [1.37- 2.96]	1.83 [1.19- 2.82]	2.90 [1.76- 4.77]	
Higher education		4.84 [1.72- 13.6]	17.7 [2.3- 139.2]	
Polygamy				
No	1	1	1	-
Yes	0.78 [0.61- 0.99]	0.69 [0.53- 0.88]	0.65 [0.49- 0.85]	

Information				
No access	-	1	-	1
Less than 7 days				
At least 1 week		1.49 [1.05- 2.1]		
Everyday		1.41 [1.14- 1.76]		1.52 [1.0- 2.3]
Antenatal Care				
No	-	-	1	1
Yes			2.13 [1.76- 2.59]	1.86 [1.41- 2.45]