Factors influencing the utilisation of antenatal care content in Uganda

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Abstract

Background

Uganda records an inadequate utilisation of antenatal care programmes. The study set out to investigate the factors associated with the use of antenatal care content to inform policy makers of the pertinent factors that need to be influenced by policy.

Method

Data for the study was taken from a nationally representative Uganda Demographic and Health Survey (UDHS) 2006. The study employed both descriptive and community fixed effects approaches to examine the factors associated with the use of antenatal care content in Uganda.

Results

On average, only 16% of women used the full content of antenatal care. Only 12% of women had a urine sample taken, 28% a blood sample taken, and 53% their blood pressure measured. Almost two-thirds of women (63%) took iron supplements, 77% had their weight measured, and 27% were given drugs for intestinal parasites. The utilisation of the content of care was significantly associated with education of the mother and her partner, wealth status, location disparities, timing and frequency of antenatal visits, nature of facility visited, access to media, family planning, and utilisation of professional care.

Conclusion

Efforts are needed to educate girls beyond secondary level, establish village outreach clinics with qualified staff to attract the hard to reach women in the rural areas, and

facilitate antenatal care utilisation irrespective of the ability to pay.

Key Words

What this study adds:

1. Whereas literature is extensive in this area, our literature survey failed to identify a study, using a nationally representative survey, published for the case of Uganda.
2. The study highlights the significance of information asymmetry in the utilisation of antenatal care content.
3. Antenatal care delay and frequency of antenatal visits are significantly associated with the utilisation of antenatal care content.

Background

Antenatal care plays an important role in ensuring a healthy mother and baby during pregnancy and after delivery.[1] Antenatal care programmes are designed to maximise good health outcomes; low maternal and neonatal mortality, low postpartum anaemia, and appropriate birth weight.[2,3] It is during antenatal care that the identification of pregnancy complications and risks are made and appropriate referral or specialist case management recommended.[2] Mothers are given important information on danger signs during pregnancy, preventive and curative treatment, appropriate nutrition, breastfeeding, and contraceptive use. Mothers also get the opportunity to establish a social relationship with the healthcare provider in preparation for childbirth.[2] There is little wonder then that countries all over the world are taking deliberate efforts to ensure provision of appropriate content of antenatal care in order to reap admirable maternal health outcomes. Provision of appropriate content of antenatal care is an important means of achieving the Millennium Development Goals (MDGs) 4 (reducing child mortality by two-thirds) and 5 (reducing the maternal mortality ratio by three-quarters) by the year 2015.

According to the Uganda Demographic and Health Survey Report[4], the content of antenatal care consumed in Uganda included the measurement of blood pressure, testing of

urine for bacteriuria and proteinuria, and blood tests to detect syphilis and severe anaemia. It also includes taking iron supplements, intestinal parasite drugs, tetanus toxoid injections, weight and height measures, and information about danger signs during pregnancy, and where to go in case of complications.[4] However, according to the World Health Organization (WHO)[5] not all items included in antenatal care impact on maternal and neonatal health. In a WHO antenatal care randomised trial, a new model was introduced with just a few examinations and tests (blood pressure measurement, testing of urine for bacteriuria and proteinuria, and blood tests to detect syphilis and severe anaemia). Routine weight and height measurement at each visit is considered optional.[5]

Understanding the factors influencing the utilisation of appropriate antenatal care content is a matter of great policy concern to the government and other stakeholders, especially donors. To the best of our knowledge, hitherto, there has been no study in Uganda attempting to understand the factors influencing the utilisation of antenatal care content. In other parts of the world, several studies have been cited attempting to understand the utilisation of antenatal care content.[6-8] The studies done in Uganda were undertaken to understand the factors influencing the utilisation of antenatal care in general with no particular attention to the content of care.[9-12]

In the same vein, the factors influencing the utilisation of antenatal care in a general picture have been widely studied. The authors identify a number of factors such as maternal education, maternal employment, age, poverty, and access to the media as influencing the utilisation of antenatal care services.[3, 13-18] Laveist[16] and McDonald[20] find that the differences in economic status amongst prospective mothers significantly explain the differences in accessibility and utilisation of antenatal care services. Some authors[19] find travel time to the health facility an important factor explaining consistent utilisation of antenatal care services. Other significant factors found in other papers[1,3] are polygamous union, husband's education, parity, and female empowerment. Surprisingly, previous birth complications such as stillbirth or Caesarean section were insignificant in influencing early prenatal booking.[3] Other studies[20] highlight the importance of awareness of care during pregnancy and knowledge of pregnancy-related complications in influencing utilisation of antenatal care services in India.

It is apparent from the literature survey that most of the papers dealt with the general determinants of access to antenatal care services. The socioeconomic differences amongst mothers in relation to the content of antenatal care are scarcely captured in current literature. This paper extends the existing literature by analysing the factors influencing the utilisation of antenatal care content. This should provide more informative insights to policy makers about potential public health strategies that can increase the uptake of appropriate antenatal care content in Uganda.

Method

The data was obtained from the Uganda Demographic and Health Survey (UDHS) 2006 conducted by Macro International on behalf of the Uganda Bureau of Statistics (UBOS).[4] The 2006 UDHS is a nationally representative survey of 8,531 women aged 15–49 and 2,503 men aged 15–54. The sample was designed to allow separate estimates at the national level and for rural and urban areas of the country. Three questionnaires were used, namely; a household questionnaire, a women's questionnaire, and a men's questionnaire. Sampling was done in two stages, in the first stage 321 clusters were selected from among a list of clusters sampled in the 2005–2006 Uganda National Household Survey (UNHS) in order to generate matching samples that can allow for linking of 2006 UDHS health indicators to poverty data from the 2005–2006 UNHS. Additional 17 clusters were selected from the 2002 Census frame from Karamoja to increase the sample size to allow for reporting of Karamoja specific estimates in the UDHS. Finally, 30 internally displaced camps (IDPs) were selected from a list of camps compiled by the United Nations Office for Coordination of Human Affairs completing a total of 368 primary sampling units.[4] In the second stage, households in each cluster were selected based on a complete listing of households as per UNHS listing, however, in addition to the UNHS sampled households an additional 20 households were randomly selected in each cluster.[4]

The DHS provides a rich source of information on antenatal care services. Mothers were asked: the number of times they visited a health facility for antenatal care, the gestational period of pregnancy when the first visit was initiated, whether they were given or bought iron supplements and intestinal parasite drugs. Further, it includes information on whether mothers were measured for blood pressure, weight, and height; and whether they were informed of any danger signs during pregnancy and where to go in case of emergency. Mothers were also asked whether urine samples were taken for proteinuria and bacteriuria. They were also asked whether blood samples were taken for haemoglobin or packed cell volume estimation and to check for syphilis and anaemia. They were also asked whether they received tetanus toxoid injections. They were also asked whether they were examined by

trained health personnel and whether they obtained care from home, government, or a private facility. The UDHS provides information on the demographic characteristics of the country. It contains information on household size, age and sex distribution, region, location, religious affiliation, occupation of household members, the number of children ever born by a woman, marital status, and educational attainment of women and men. The wealth index showing the economic status of the household is also provided.

The dependent variable was constructed as a seven-item index of maternal reports of the content of antenatal care they received during their immediate birth preceding the survey. The index included such items as whether mothers were weighed, received iron supplements, had blood and urine samples taken, were given at least two tetanus toxoid injections, had blood pressure measured, and were given intestinal parasite drugs. Our index ranges from one to seven, where one represents all women that received one item out of seven items in the package and seven representing all women that received all items in the package. This content index was constructed following the insights drawn from Barber.[8] We sought to understand the factors influencing the attainment of maximum items in the package.

We controlled for a number of independent variables guided by the previous literature. The literature suggests that the birth history (in relation to complications) of the mother is significant in influencing antenatal care utilisation. We capture this by constructing dummy variables of whether the last birth was by Caesarean section, and if a mother experienced any other difficulty during the last pregnancy. We also created dummy variables for the education of the mother at different levels: no education, primary, secondary and postsecondary. A woman's antenatal choice is strongly influenced by her husband's characteristics especially the socio-economic background and opinions. We therefore controlled for husband's level of education and occupation in our analysis.

We also define region and location controls; central, east, north, and west as well as rural if a mother lived in a rural area. These variables are used to control for the community peculiarities relating to availability and accessibility to healthcare facilities. We control for maternal age by grouping mothers in the five year age cohorts (15–49) and we create a binary variable for each cohort. This is based on the body of literature that asserts that older mothers may be less likely to use maternal healthcare services due to experience accumulated over time especially if she already has many children.[21] The behaviour of household members
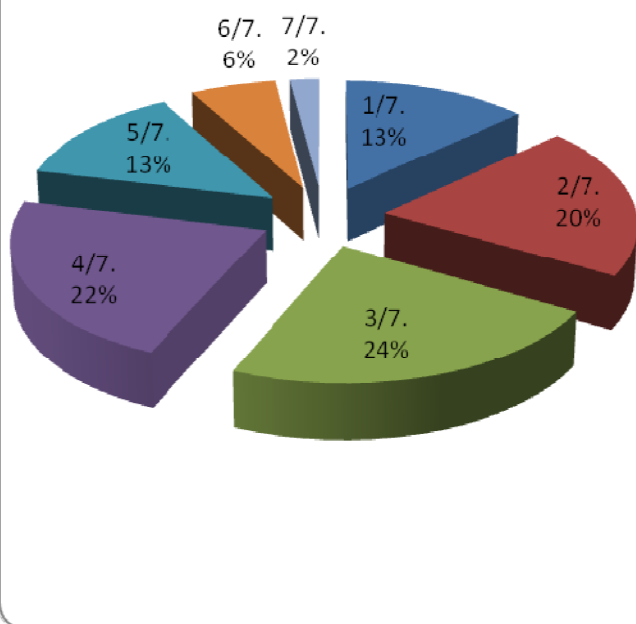
is influenced by the cultural and/or religious background. We introduced dummies for religious affiliation; Protestant, Catholic, Muslim, and 'Others' that includes Evangelicals, Adventists, Orthodox, and Traditionalists. The most direct household characteristic that influences maternal healthcare utilisation is the wealth or economic status. The UDHS, 2006 constructed a wealth index by combining information on household assets, such as ownership of consumer items, type of dwelling, source of water, and availability of electricity into a single asset index. The sample is split into five equal groups (quintiles) from one (lowest, poorest) to five (highest, richest). In all our estimations, the poorest quintile is used as the base category. Literature asserts that the quality of antenatal care depends on the ownership of the facility. We created dummy variables of whether the ownership of the health facility is by government or is privately owned.

In order to estimate the determinants of access to antenatal care content, we employed a community fixed effects regression methodology. This technique controls for the systematic differences in the utilisation of content based on individual and household characteristics. We regress the seven-item content index on individual, household, and demographic characteristics and the fixed effects reflect the average content received, purged of differences in characteristics.[8]

Results

Our analysis yields interesting findings concerning maternal utilisation of antenatal care content that is important for policy formulation and advocacy. Our findings show that, on average, only 16% of women uptake all the items in the antenatal care content. Considering the individual components, it is shown that, on average, 77% were weighed, 53% had blood pressure measured, 12% had a urine sample taken, 28% had a blood sample taken, 63% were given or bought iron tablets or syrup, 27% were given intestinal drugs, 50% received at least two tetanus injections, and 89% sought professional care. Looking at the components of our seven-item index (weighing, blood pressure, urine and blood sample, iron supplements, intestinal drugs, and tetanus injection) a similar picture is portrayed (Figure 1). There is a higher percentage of women (24%) who received only three items out of seven, followed by those who received four out of seven (22%), and those who received two out of seven (20%). The percentage of women keeps declining at an upper end of the content index; 13% of women received five items out of seven and this is equivalent to those who received only one item out of seven. Only 6% and 2% received six items out of seven and seven out of seven, respectively.

Figure 1: Percentage of women who received at least one item out of seven of the antenatal care content

there is a high percentage of women (54%) who received at least two tetanus injection before childbirth in a government hospital compared to 48% in a private hospital.

Our findings articulate the role played by maternal education in influencing the utilisation of antenatal care content (Table 1). Mothers who have attained secondary education, compared to counterparts with no education, are 0.3 (p<0.01) percentage points more likely to use antenatal care content. The role of education is even more pronounced at a higher level of education. Mothers who have attained postsecondary education, compared to counterparts with no education, are 0.4 (p<0.05) to 0.5 (p<0.01) percentage points more likely to use antenatal care content. Whereas partner's education is important in influencing the utilisation of antenatal care content, it is not as strong as maternal education both in terms of significance and magnitude. The descriptive findings are in line with the regression findings. There is a higher average percentage of women (49%) with postsecondary education who received the entire content compared to their counterparts with no education (12%). There is a high average percentage of women with postsecondary education who were weighed (92%), had blood pressure measured (87%), a urine sample taken (42%), a blood sample taken (64%), were given iron supplements (78%), were given intestinal drugs (47%), were given at least two tetanus injections (65%), and received professional care (96%). This is compared to quite lower average percentages of women with no education that were weighed (78%), had blood pressure measured (45%), had a urine sample taken (8%), had a blood sample taken (21%), were given iron supplements (61%), were given intestinal drugs (23%), were given at least two tetanus injections (49%), and received professional care (86%).

Ownership of antenatal care facility significantly influences the utilisation of antenatal care content. Compared to their counterparts obtaining antenatal services from home, women going to the government and a private facility are 1.8 (p<0.01) and 1.7 (p<0.01) percentage points, respectively, more likely to use antenatal content (Table 1). The descriptive findings show differences in maternal utilisation of antenatal care content by ownership of the facility. Of the women going to the private facility 19% use all components of antenatal care compared to only 16% of their counterparts going to the government facility. There is a higher percentage of women (79%) who were weighed in a government hospital compared to 73% who were weighed in a private hospital. On the other hand, there is a higher percentage of women (61%) whose blood pressure was measured in a private hospital compared to counterparts (51%) who were measured in a government hospital. In the same vein, there is a higher percentage of women (19%) whose urine sample was taken in a private hospital compared to only 11% in a government hospital. There is no difference between the average percentages of women whose blood sample was taken and those who received professional antenatal care between private and government facilities. There is a high average percentage of women (69%) who received iron supplements in a private hospital compared to 66% in a government hospital. However, there is a high average percentage of women (29%) who received intestinal drugs in a government hospital compared to 25% in a private hospital. Similarly,

Location differences are revealed to be significant in influencing the utilisation of antenatal care content (Table 1). Being in the rural area, compared to one in the urban area, reduces the utilisation of antenatal care content by 0.3 (p<0.01) to 0.4 (p<0.01) percentage points. The descriptive findings are in line with the regression results. There is a high average percentage of women in the urban area (31%) using the entire content of care compared to counterparts in the rural area (14%). Furthermore, there is a high percentage of women in the urban area who were weighed (90%), had blood pressure measured (80%), had a urine sample taken (29%), had a blood sample taken (57%), were given iron supplements (72%), were given intestinal drugs (28%), were given at least two tetanus injections (58%), and received professional care (96%). This is compared to quite low average percentages in the rural area who were

weighed (75%), had blood pressure measured (48%), had a urine sample taken (10%), had a blood sample taken (24%), were given iron supplements (62%), were given intestinal drugs (27%), were given at least two tetanus injections (50%), and received professional care (88%).

The importance of media penetration in leading to the utilisation of antenatal care content cannot be underestimated (Table 1). Women having access to media at least once a week and those having access daily are 0.5 (p<0.01) to 0.7 (p<0.01) percentage points more likely to use antenatal care content compared to counterparts who have no access at all. The descriptive findings confirm these regression results. There is a high average percentage of women who have access to media everyday (42%) who used the entire content of antenatal care compared to counterparts with no access at all (14%). Additionally, there is a high percentage of women who have access to media everyday who were weighed (87%), had blood pressure measured (86%), had a urine sample taken (37%), had a blood sample taken (68%), were given iron supplements (82%), were given intestinal drugs (36%), were given at least two tetanus injections (63%), and received professional care (94%). This compared to very low average percentages of women with no access to media who were weighed (76%), had blood pressure measured (49%), had a urine sample taken (10%), had a blood sample taken (25%), were given iron supplements (62%), were given intestinal drugs (26%), were given at least two tetanus injections (50%), and received professional care (89%).

The birth history of mothers is also important in influencing the utilisation antenatal care content (Table 1). Women who had pregnancy-related problems during a previous birth are 0.15 (p<0.1) percentage points more likely to use the antenatal care content compared to their counterparts who had normal pregnancies. The descriptive findings show that there is a high percentage of women (20%) who had an earlier pregnancy-related problem who used the entire content of care compared to counterparts who had no problems at all (16%). There is a high average percentage of women with an earlier pregnancy-related problem who took a urine sample (13%), had a blood sample taken (31%), and were given intestinal drugs (33%). This is compared to lower percentages of women with no earlier pregnancy-related problems who took a urine sample (12%), had a blood sample taken (28%), and were given intestinal drugs (27%). However, there is no difference between women who had an earlier pregnancy-related problem and those who had no problem for iron supplements and tetanus injection but those who had no problem outperformed

those who had a problem for being weighed, blood pressure measurement, and received professional care.

Our findings are also assertive on the role played by the economic status of the household or the ability to pay in influencing the utilisation antenatal care content. Compared to counterparts in the poorest quintile, women in the richest quintile are 0.3 (p<0.01) to 0.4 (p<0.01) percentage points more likely to use the antenatal care content. The descriptive findings are in line with the regression results. There is a high percentage of women in the richest quintile using the entire content of care (31%) compared to counterparts in the poorest quintile (13%). In addition, there is a high percentage of women in the richest quintile that were weighed (84%), had blood pressure measured (76%), had a urine sample taken (28%), had a blood sample taken (52%), were given iron supplements (71%), were given intestinal drugs (33%), were given at least two tetanus injections (59%), and received professional care (93%). This compared to quite lower percentages of women in the poorest quintile who were weighed (77%), had blood pressure measured (44%), had a urine sample taken (8%), had a blood sample taken (19%), were given iron supplements (67%), were given intestinal drugs (26%), were given at least two intestinal drugs (52%), and received professional care (90%).

The frequency of antenatal visits increases the possibility of using antenatal care content (Table 1). If a mother increases her visits by one round, it increases the utilisation of antenatal care content by 0.6 (p<0.01) to 0.7 (p<0.01) percentage points. The descriptive findings confirm the regression findings in Table 1. There is a high average percentage of women (21%) with at least four antenatal visits who used the entire content of care compared to only 11% who had less than four visits. Furthermore, there is a high percentage of women with at least four antenatal visits who were weighed (82%), had their blood pressure measured (60%), had a urine sample taken (16%), had a blood sample taken (33%), were given iron supplements (72%), were given intestinal drugs (31%), were given at least two tetanus injections (60%), and received professional care (92%). This is compared with lower average percentages of women with less than four antenatal visits who were weighed (73%), had blood pressure measured (45%), had a urine sample taken (8%), had a blood sample taken (23%), were given iron supplements (56%), were given intestinal drugs (24%), were given a tetanus injection (43%), and received professional care (88%).

Initiating the first antenatal visit later, compared to counterparts initiating it earlier, reduces the utilisation

antenatal care content by 0.13 (p<0.1) percentage points (Table 1). These regression results are supported by our descriptive findings. There is a high percentage of mothers (21%) who initiated the first visit in the first trimester that used the entire content of care compared to only 15% of mothers who initiated their first visits later. Additionally, there is a high percentage of women who initiated the first visit in the first trimester who were weighed (78%), had blood pressure measured (56%), had a urine sample taken (18%), had a blood sample taken (31%), were given iron supplements (68%), were given intestinal drugs (31%), and were given a tetanus injection (59%). This is compared to lower average percentages of women who initiated the first visit in later trimesters that were weighed (77%), had blood pressure measured (52%), had a urine sample taken (11%), had a blood sample taken (28%), were given iron supplements (65%), were given intestinal drugs (28%), and were given a tetanus injection (51%). However, those who initiated the first visit later outperformed those who initiated it in the first trimester in using professional antenatal care.

Mothers seeking antenatal care from a trained provider are 0.6 (p<0.01) percentage points more likely to use antenatal care content compared to counterparts who stay at home (Table 1). The descriptive findings confirm these regression results. There is a high percentage of women (16%) who use professional antenatal care that use the entire content of care compared to their counterparts who do not use professional care (9%). Furthermore, there is a high percentage of women who use professional antenatal care that were weighed (79%), had blood pressured measured (54%), had a urine sample taken (12%), had a blood sample taken (28%), were given iron supplements (66%), were given intestinal drugs (28%), and were given at least two tetanus injections (53%). This is compared to very low average percentages of women who do not use professional care that were weighed (57%), had blood pressured measured (34%), had a urine sample taken (6%), had a blood sample taken (23%), were given iron supplements (39%), were given intestinal drugs (18%), and were given at least two tetanus injections (32%).

Additionally, mothers practicing family planning are 0.12 (p<0.01) percentage points more likely to use antenatal care content (Table 1). The descriptive findings are in line with the regression results. There is a high percentage of women (21%) who practice family planning that use the entire content of care compared to their counterparts who do not (12%). Furthermore, there is a high percentage of women who practice family planning that were weighed (82%), had blood pressure measured (61%), had a blood sample taken

(36%), were given iron supplements (68%), were given intestinal drugs (31%), were given at least two tetanus injections (54%), and used professional care (91%). This is compared to very low average percentages of women who do not practice family planning that were weighed (73%), had blood pressured measured (46%), had a blood sample taken (22%), were given iron supplements (60%), were given intestinal drugs (25%), were given at least two tetanus injections (48%), and received professional antenatal care (88%). Surprisingly, there is a higher percentage of mothers (18%) that do not practice family planning whose urine sample was taken compared to their counterparts who do practice (8%).

Discussion

WHO introduced a new model of antenatal care utilisation with just a few examinations and tests (blood pressure measurement and undertaking urine and blood tests). The effect of this new model in a developing country context is questionable. Developing countries like Uganda are characterised by poor health outcomes for women and children such that eliminating some of the content of antenatal care may worsen the situation. Nonetheless, the UDHS Report[4] shows a dismal utilisation of the antenatal care content (especially those considered more effective by WHO) by women who gave birth in the five years preceding the survey. It is shown that only 12% of women had a urine sample taken, 28% a blood sample taken, and 53% their blood pressure measured. Almost two-thirds of women (63%) took iron tablets or syrup, 77% had their weight measured, and 27% were given drugs for intestinal parasites.

The very low utilisation of antenatal care content in Uganda is worrying in the face of high vulnerability of mothers to pregnancy-related problems. A WHO Report[2] shows that annually, there are over 500,000 maternal deaths worldwide of which 99% occur in developing countries like Uganda. The maternal mortality ratio in developing countries is 450 maternal deaths per 100,000 live births compared to only nine in developed countries. According to the Report, every year three million babies are stillborn and almost one-quarter of these die during birth. Among the 133 million babies who are born alive each year, 2.8 million die in the first week of life and slightly less than one million in the following three weeks. Neonatal tetanus, which can be avoided by appropriate antenatal care, is still killing 100,000 babies a year.[2] The estimated maternal mortality ratio from the UDHS is 435 deaths per 100,000 live births.[4] The under-five and infant mortality rates are still high at 137 and 78 per 1,000 live births respectively.[26] These health outcomes threaten the attainment of the MDGs by 2015.

The study employed both bivariate and multivariate approaches during the analysis. The descriptive findings show a very low average percentage of women using the entire content of antenatal care. In addition, the average percentages of women using the individual components of the antenatal care content are quite low and worrying. A lower percentage of women who had examinations carried out on blood and urine were also observed in a study conducted in Nigeria.[6] Mathews[22] found that the level of iron supplements utilisation is very low in India despite a very high concentration of women with anaemia. This may probably be attributed to low literacy of mothers and cultural barriers especially in rural areas. Many local health units lack the capacity (personnel and equipment) to conduct tests of anaemia, syphilis and bacteriuria. Given this picture, it may not be surprising that maternal problems like postpartum anaemia and mortality and morbidity still take root amongst Ugandan mothers. It is noteworthy that there seems to be no remarkable difference between a private facility and a government facility in the provision of appropriate antenatal care looking at both the regression coefficients and the descriptive average percentages. The private facility outperformed the government facility in the provision of blood pressure measurement, urine sample, and iron supplements. On the other hand, the government facility outperformed the private facility in the provision of weighing facilities, intestinal drugs, and tetanus injection. There is a need for government policy to make antenatal care content more available and affordable in government and private facilities so as to enable the majority to obtain antenatal care in these facilities other than home.

The findings show that maternal education, especially at secondary and postsecondary levels is very pertinent in influencing the utilisation of antenatal care content. It is noted that although partner's education is important, maternal education is more pronounced in influencing the utilisation of antenatal care content. Previous studies have also found maternal education imperative not only in influencing the utilisation of antenatal care content but also in attending antenatal care in general.[3,13-18] Therefore, government effort and that of other stakeholders (especially donors and MDGs activists) should be focused on enhancing female education beyond secondary level in order to attain favourable maternal health outcomes in the future. The government should make an intervention aimed at mitigating the conditions that lead girls to drop out of school early. Female scholarship programmes can be used to target girls from poor families and government legislation against early marriages may help girls to remain in school longer. The government of Uganda programme of free

secondary education is relevant and should be supported with gender parity at the forefront. It should be noted, though, that female education is more of a long-term than a short-term measure.

It is also found that mothers living in rural areas, compared to counterparts in urban areas, are less likely to use the antenatal care content. This can be attributed to the unavailability of most of the items of the antenatal care content in the rural areas. This may also be brought about by low demand for antenatal care content in the rural areas due to poverty and hence health centres do not stock them at all. For most rural areas in Uganda, whereas health centres may exist in terms of buildings, items like iron tablets, intestinal drugs, and equipment for testing blood and urine samples are non-existent. Other papers looking at other countries in the world have also found location imperative in influencing maternal healthcare utilisation.[23-25] Government policy should be designed to make antenatal care and its right content easily available and affordable in rural areas. The government can earmark finances, for example from donors, intended to subsidise items of antenatal care content to ensure universal utilisation.

Media penetration amongst the masses was revealed to be important in influencing the utilisation of antenatal care content. Mothers with access to media are more informed than their counterparts concerning the usefulness of attending antenatal care and also using all the recommended content. Informed mothers are empowered to ask their antenatal care providers for some services should there be a delay in the provision of such services. Other studies from different parts of the world have also found media penetration important in influencing maternal health care utilisation.[3, 13-18] Government policy is needed to increase media penetration amongst the masses with healthcare information at the forefront. The government may tax less the suppliers of small radios that use small and less expensive cells so that many people can afford the radios and also be able to operate them on a daily basis. Following up this policy is the need to design clear and insightful healthcare messages that can be passed on to the masses.

The findings also underscore the importance of the socioeconomic class in influencing the utilisation of antenatal care content. It is shown that women in a higher wealth quintile, compared to those in the poorest, are more likely to use the antenatal care content. Other authors have also underlined the importance of the wealth status in influencing maternal health-seeking behaviour.[3,13-18] Government policy should ensure that all women,

irrespective of the ability to pay, have access to the recommended antenatal care content by subsidising the antenatal care provision. Additionally, poverty eradication programmes highlighted in the National Development Plan (NDP, 2010-15) will go a long way in increasing healthcare availability amongst the masses in Uganda.

The number of antenatal visits and initiating the antenatal visit in the first trimester are imperative in influencing the utilisation of antenatal care content. This is attributed to the fact that antenatal care content is phased out in relation to the gestation period of pregnancy. This means that the earlier a mother attends and also makes a number of visits increases the likelihood of maximising the utilisation of antenatal care content. Whereas WHO[2] came up with a new model of antenatal care that advocates less visits, this model may not apply to all women and in all countries due to differences in conditions. In a typical third-world country like Uganda with very poor health outcomes, early and regular visits may be more rewarding. Sensitisation campaigns are needed to help mothers understand the importance of initiating antenatal visits early and also to make regular visits as recommended by a professional provider depending on the condition of pregnancy and how different components of care are phased.

Mothers practising family planning and those seeking care from a professional provider are more likely to use the antenatal care content. Family planning helps mothers to have babies in the right spacing and hence allows them resources and time to attend the next antenatal sessions with ease. On the other hand, professional antenatal care providers have the required knowledge and expertise on what pregnant mothers want at a particular gestation period. Government sensitisation campaigns to encourage mothers to practise family planning, seek care from professionals, and also to motivate professionals to accept work stations up country may be of great help.

One of the limitations of our study is that we eliminated from our analysis women who did not seek prenatal care. In addition, we lacked a basis of weighting the various components of the antenatal care content. As such, our seven-item content index just added together the number of items, out of seven, a particular mother consumed without any weights.

Conclusion

This study set out to investigate the factors influencing the utilisation of antenatal care content. The factors found important in influencing the utilisation of antenatal care content includes: ownership of facility, maternal education, location, access to media, wealth status, timing and frequency of antenatal visits, family planning and the use of professional care. Government efforts should be designed to enhance female education beyond secondary level for future favourable health outcomes. Mothers should be motivated to seek care from a formal government or private institution and not from home. Also mothers should seek care from a professional provider and also practice modern family planning to gain access to quality antenatal care. Government policy should help to increase media penetration amongst the masses and sensitise mothers on the importance of initiating the first visit early enough and also on the frequency of visits for a maximum uptake of the care content. Location disparities should be eliminated by outreach village clinics that should be well stocked with the requirements of a successful antenatal care. The government should ensure universal utilisation of antenatal care irrespective of the ability to pay. The government can subsidise or pay up front for diagnostics, physical examination, and other preventive procedures.

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PEER REVIEW

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CONFLICTS OF INTEREST

I declare that there are no conflicts of interest

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Tables

Table 1: Determinants of utilisation of antenatal care content (community fixed effects)

VARIABLES	Model (1)	Model (2)	Model (3)
Place of antenatal care: Government facility		1.79***	
		(0)	
Private facility		1.72***	
		(0)	
Mother's education: primary	-0.12**	-0.10	
	(0.04)	(0.11)	
Secondary	0.21**	0.29***	
	(0.04)	(0.00)	
Postsecondary	0.40**	0.52***	
	(0.04)	(0.00)	
Partner's education: primary	0.06	0.07	
	(0.40)	(0.35)	
Secondary	0.29***	0.27***	
	(0.00)	(0.00)	
Postsecondary	0.24*	0.23*	
	(0.05)	(0.06)	
Location: rural	-0.41***	-0.41***	-0.31***
	(1.44e-05)	(6.77e-06)	(0.00)
Access to media:< once a week	0.15*	0.11	0.20**
	(0.09)	(0.22)	(0.034)
At least once a week	0.57***	0.55***	0.69***
	(6.91e-07)	(7.64e-07)	(1.71e-08)
Every day	0.57***	0.54***	0.70***
	(0.00)	(0.00)	(0.00)
Difficulty during pregnancy	0.14*	0.13	0.12
	(0.09)	(0.11)	(0.18)
Wealth quintiles: Poor	-0.10	-0.10	-0.09
	(0.14)	(0.13)	(0.20)
Medium	0.03	0.05	0.03
	(0.69)	(0.48)	(0.64)
Rich	0.08	0.11	0.12
	(0.32)	(0.18)	(0.17)
Richest	0.28**	0.34***	0.40***
	(0.01)	(0.00)	(0.00)
Number of antenatal visits	0.62***	0.59***	0.68***
	(0)	(0)	(0)
Number of months of pregnancy of 1st visit	-0.12*	-0.12*	-0.06
	(0.09)	(0.07)	(0.39)
Practising family planning	0.12***	0.12***	
	(2.99e-05)	(1.22e-05)	
Trained antenatal care provider	0.62***		0.62***
	(1.73e-10)		(8.33e-10)
Mother's occupation: Agriculture			-0.25**
			(0.01)
Services			-0.05
			(0.77)
Blue collar			-0.19
			(0.16)
Partner's occupation: Agriculture			0.03
			(0.70)
Services			0.35**
			(0.01)
Blue collar			0.14
			(0.11)
Constant	2.10***	0.92***	2.01***
	(0)	(0.00)	(0)
Observations	3,77	3,86	3,44
R-squared	0.18	0.20	0.16

Notes: Religion, and age cohorts of mothers have been controlled for but the results have not been shown. The regional dummies/cross-section units are eliminated from the analysis by the fixed effects transformation.