

Factors Associated with Health Facility Delivery Among Women with Disabilities in Uganda

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Abstract

Introduction: Nearly half of all the women who die due to pregnancy-related causes are from sub-Saharan Africa. Women living with disabilities' concerns are incomparable because they are compounded by their inabilities and external barriers in accessing health facility delivery. The aim of this paper was to study factors associated with health facility delivery among women with disabilities in Uganda.

Methods: A secondary analysis of data from a sample of 869 women with disabilities who reported having given birth of their last birth five years preceding the Uganda Demographic and Health Survey, 2016. Bivariate and multivariate logistic regressions were used to determine the relationships between health facility delivery and the explanatory variables.

Results: About two in three (67%) of the women with disabilities delivered their last child in a health facility. Women who attended four or more Antenatal Care (ANC) visits (OR=1.9, 95% CI: 1.4-2.5), mothers whose educational level is secondary or more (OR=4.5, 95% CI: 2.0-10.0) and mothers from the middle-income households (OR=1.6, 95% CI: 1.0-2.6) were most likely to deliver from a health facility. Similarly, mothers who regularly listened to the radio and owned a mobile phone (OR=1.7, 95% CI: 1.1-2.6) and mothers who resided in urban areas (OR= 2.2, 95% CI = 1.3-3.9) were likely to deliver from a health facility

Conclusion: The factors which were significantly associated with health facility delivery among women with disabilities were ANC visits, education, households' well-being (wealth quintile), exposure to media and place of residence. Regular and early commencement of ANC attendance should be emphasized. Economically empowering women with disabilities by increasing their level of income and also encouraging the girl child with disabilities to continue with education might increase in health facility delivery.

Keywords: Health Facility Delivery, Women with Disabilities, Uganda, Africa

1. Introduction

Nearly half of all the women who die due to pregnancy-related causes are from sub-Saharan Africa. Delivering from a health facility is one of the main interventions to reduce such deaths. They are lifesaving to both the mother and her child because of the availability of equipment and hygienic conditions that are vital to minimizing the risk of delivery complications [1]. A mother's ability to access and receive the necessary maternal health care determines her health outcome and the baby. Women with

disabilities experience the same fears and worries experienced by all women about giving a live birth. Women with disabilities' concerns are incomparable because they are compounded by their inabilities and external barriers. These include attitudinal biases of health and social service providers, physical barriers in clinical settings, poor dissemination of information and poverty among others [2]. More women with disabilities than women without disabilities have Cesarean sections performed even without consulting them, although disability by itself is not an indication

for Cesarean section and this can be performed only at a health facility [3].

Disability is defined by World Health Organisation (WHO) as a consequence of an impairment that may be physical, cognitive, mental, sensory, emotional, developmental, or some combination of these that result in restrictions on an individual's ability to participate in what is considered "normal" in their everyday society [4]. The Washington Group on Disability Statistics defines disability as having at least a severe difficulty or being unable to perform Activities of Daily Living (ADL) which include having difficulties with sight, hearing, communicating, walking and climbing, self-care and remembering or concentrating [5]. In Uganda Persons with Disabilities (PWDs) Act 2006 defines disability as “a substantial functional limitation of daily life activities caused by physical, mental or sensory impairment and environmental barriers resulting in limited participation”. The Washington Group on Disability Statistics definition is more preferred for surveys and censuses because it looks at participation which is easier to measure and it will therefore be used for this study.

Globally, persons living with disabilities are estimated to be around 15% of the world population and constitute a disproportionate percentage of the world's poor. The 2016 Uganda Demographic and Health Survey (UDHS) show that about 35% of the women aged 15 years and above had at least some difficulty where about 38% were in rural areas and about 26% in urban areas [6].

The 2016 Uganda Demographic and Health Survey (UDHS) collected disability information on all persons aged five years and above. The questions covered the six disability domains that limit a person's to perform the day-to-day activities and these included difficulties in seeing, hearing, walking, communicating, concentrating or remembering and personal care (washing whole body or dressing). This study examines the second level of disability and therefore any person who had a lot of difficulties, could not perform at all, or had at least two of “some difficulties” of the six domains is considered to be a person with a disability in this study.

Health facility delivery refers to giving birth to a child in a medical institution under the overall supervision of trained and competent health personnel where there are more amenities available to handle the situation and save the life of the mother and child. UDHS had questions on place of delivery and these included ‘at home’, ‘private and public hospital’, ‘private and public health center’, and ‘others’. A health facility, therefore, refers to a hospital or a health center either private or public. Giving birth at a health facility where skilled assistance can be provided is essential for safe delivery and child care. The period between labour and childbirth is moscritical because most maternal deaths arise from complications during delivery. Even with the best possible health services, delivery can become complicated if not handled properly. The United Nations' Convention on the Rights of Persons with

Disabilities guarantees persons with disabilities the same level of rights to access quality and affordable health care regardless of disability status . However, mothers with disabilities are disadvantaged in accessing maternal services as compared to their fellow counterparts without a disability.

Globally, about one in five births (21%) take place without the assistance of skilled personnel and 49% in Sub Saharan Africa (SSA). In Uganda, the proportion of births delivered at a health facility has improved over time. It increased from 41% in 2006 to 57% in 2011 and 73% in 2016. Among women with disabilities 67% delivered from a health facility. Pregnant women with disabilities are vulnerable given the state of their body physiology. Some are unable to walk, remember or concentrate, hear, see or a combination among others.

Delivering in a place where they can access proper medical attention and hygienic conditions can reduce the risk of complications and infections that may lead to death or serious illness to the mother, child, or both [7]. According to the 2016 UDHS, 73% of the births from all women and two-thirds (67%) of women with disabilities were delivered at a health facility. All women regardless of disability status are encouraged to deliver from a health facility. Therefore, if a third (33%) of women with disabilities did not deliver at a health facility, then this poses a serious concern given their status in accessing maternal health services in Uganda.

2. Methods

2.1. Data Source and Sample Size

The 2016 Uganda Demographic and Health Survey data was used. This is a cross-sectional nationally representative survey that used a stratified two-stage cluster sampling design. This survey provides information on demographic indicators, health, family planning status and trends in Uganda. Specifically, it collected information on fertility, marriage, sexual activity, family planning, HIV/AIDS, nutrition, childhood mortality adult mortality, maternal and child health (which includes place of delivery) among others (UBOS and ICF International, 2018). Women who had given birth five years before the survey were eligible for the place of delivery questions. Questions on disability were at the household level and therefore to analyse factors associated with health facility delivery among women with disabilities two 2016 UDHS files were merged (individual file=IR and Persons file=PR).

In total, the 2016 UDHS interviewed 18,506 women of which 1,821 women had disabilities. Among women with disabilities, 869 had given their most recent births five years preceding the survey. This is the sample that was used during the analysis.

2.2 Scope of the Study

This is a cross-sectional national study using the 2016 Uganda Demographic and Health Survey (UDHS) secondary data to examine factors associated with health facility delivery among women with disabilities in Uganda

2.3. Measure of Disability

Disability questions were at the household level and were asked to all persons aged five years and above. Disability is measured by examining six questions on limitations of performing day to day activities and these include difficulties in seeing, hearing, walking, communicating, concentrating or remembering and personal care (washing whole body or dressing). Respondents were asked if they had “no difficulty”, “some difficulty”, “a lot of difficulties”, “cannot do at all” and “don’t know” for each of the domains. These questions were therefore coded as (1 “No difficulty”, 2 “Yes some difficulty”, 3 “Yes a lot of difficulties”, 4 “Cannot do at all” and 8 “Do not know”). Any person who could not perform at all had a lot of difficulties or had at least two some difficulties on any of two of the six categories is considered to be having some disabilities in this study. This is one of the definitions recommended by the Washington Group on Disability Statistics (CDC, 2013)

2.4. Measure of Outcome Variable

The outcome variable (place of delivery) is analysed using the question: where did you give birth to (NAME)? Each eligible woman who had given birth 5 years before the survey was asked about “place of delivery” for last birth and next to last birth whether they took place. The options included “at a health facility (Private or public)”, “at home” or “any other place”. Those who delivered at a hospital or a health center (public or private) are coded as “1” (Health facility delivery), else coded as “0” (Elsewhere). The outcome variable (place of delivery) has a binary outcome. It is important to note that only the most recent births are included in the analysis of this study

2.5. Measures of Explanatory Variables

These are factors more likely to influence health facility delivery. They include demographic, socio-economic, community (place of residence and region) and enabling factors. Women’s demographic factors include age, marital status and number of living children. The socio-economic factors include education, religion, exposure to media and wealth quintile. The enabling factors on the other hand involved ANC attendance, payment for health services and distance to a health facility.

Age categorisation based on the pregnancy risky ages of “too early,” “ideal” and “too late”. It was therefore categorized into three age groups “15- 24”, “25-34” and 35-49. Marital status was recoded into “married” and “unmarried”. Unmarried includes women who had never got married, divorced and widowed. The Number of children was recoded into three categories 1=one child, 2=2 children, 3=3 children and 4= 4+ children. Women’s education level was recoded into three categories: none, primary and secondary or higher. Religion was coded as Christians, Muslims and Others. The category ‘Others’ comprised smaller non-Christian groups and traditions. The wealth index is a composite measure of a household’s cumulative living standard. Exposure to media includes a combination of women’s frequency of listening to radio and ownership of a mobile phone.

The wealth index, a proxy measure of a household’s long-term standard of living, is based on consumer goods, dwelling characteristics, type of drinking water source, toilet facilities, among others. For this study it was recoded into four quintiles: poorest, poorer, middle, and rich (combined richer and richest due to smaller numbers in each of these categories).

The number of ANC visits was coded basing on the number of times the respondent received antenatal care during pregnancy. The WHO recommends at least four visits, women who reported four or more times were categorized as having adequately attended ANC and those who had less than four visits were considered as not having adequately attended ANC. Distance to a health facility and payment for health services are recoded as binary variables reflecting whether each is a big problem or not. Fifteen sub-regions as grouped are collapsed into four namely Northern, Western, Central and Eastern regions.

2.6. Statistical Analysis

Three levels of data analysis are presented in this study. First descriptive statistics (frequencies and percentage distributions) to describe the characteristics of women with disabilities across the different demographic and socioeconomic factors including, age, region, place of residence, marital status, wealth index, educational level attainment, religion among others. The explanatory variables used in the analysis are selected based on the reviewed literature. Cross-tabulations between the outcome variable (place of delivery) and explanatory variables (demographic and socioeconomic factors) were used to explore associations. Pearson’s chi-squared (χ^2) tests were used to examine the significant differences between the place of delivery and the explanatory variables. The level of statistical significance using p-values was set at $p < 0.05$.

Multivariable logistic regression analyses were used to examine the association between place of delivery and explanatory variables whose p-values were less than 0.05 during the chi-square tests. The data was weighted using survey svy commands to account for the survey design including clustering and stratification. Results are presented in the form of Odds Ratios (OR) reporting at 95 % confidence intervals. Three models were used to control for the demographic, socio-economic and community factors. Some diagnostic tests were also carried out to test for multicollinearity among explanatory variables using the variance inflation factor. The analysis was done using STATA version 15.

3. Results

3.1. Descriptive Characteristics

Table 1 shows the distribution of women with disabilities with a recent birth five years before the survey. The majority (43%), were age 25-34 years. Eight in every ten (82%) were married and 64% had four or more children. About six in every ten women (58%) had adequate ANC visits as required by the WHO (four or more visits). In terms of education, 69% of women had a primary education level. The majority (87%) of women were Christians,

49% reported the distance to a health facility as being a big problem. Most of the women (99%) had no health insurance. Three-quarters of the women had no exposure to media, 85% lived in rural areas and more than a third (36%) were from the Western region.

Characteristics	Percent (%)	Frequency (n)
Age		
less than 25	19.7	171
25-34	42.8	372
35+	37.5	326
Relationship to head		
Head	27.1	235
Wife	61.1	530
others	11.9	104
Marital status		
Not married	18.4	160
Married	81.6	709
Living children		
one	11.8	102
Two	10.7	92
Three	13.3	114
Four or more	64.2	553
Antenatal visits		
0-3 visits	41.7	362
4+ visits	58.3	507
Education		
No formal education	16.8	146
Primary	68.9	599
Secondary+	14.3	124
Religion		
Christians	87.2	757
Moslem	10.6	92
Others	2.2	19
Total	100	869
Wealth Quintile		
Poorest	21	183
Poorer	27.7	241
Middle	23.3	202
Rich	28	243
Perceived distance to a health facility		
Big problem	48.7	423
Not a big problem	51.3	446
Getting money		
Big problem	57.7	502
Not a big problem	42.3	367
Health Insurance		
Not insured	99.1	861
Insured	0.9	8

Media influence		
No	75.2	654
Yes	24.8	215
Place of residence		
Urban	14.9	129
Rural	85.1	740
Region		
Central	17.4	152
Eastern	24.5	212
Northern	21.9	190
Western	36.2	315
Place of delivery		
Health facility	67.1	583
Elsewhere	32.9	286
Total	100	869

Table 1: Distribution of women with disabilities who had a recent birth five years before the survey by background characteristics in Uganda

3.2. Association Between Hiv Testing in The Past 12 Months and Independent Factors

The objective of this study was to examine the factors associated with health facility delivery among women with disabilities in Uganda. Table 2 shows the cross-tabulations of the place of delivery and background characteristics. Overall, two-thirds (67%) of women with disabilities delivered their most recent child at a health facility. The factors which were significantly associated with health facility delivery were age ($p=0.05$), number of living children ($p=0.00$), ANC visits ($p=0.00$), education ($p=0.00$), wealth quintile ($p=0.00$), perceived distance to a health facility ($p=0.03$), exposure to media ($p=0.00$) and place of residence ($p=0.00$).

Delivery in a health facility was highest (76%) among women who were age 25 years and younger compared to those aged 35 years and older (65%). The proportion of health facility delivery among women with one child was highest (81%) compared to those

with four or more children (62%). Health facility delivery among women with secondary or more levels of education was highest (81%) compared to women with no formal education (62%). Women from rich households were more likely (80%) to deliver from a health facility than their counterparts from the poorest households (57%). Women who perceived the distance to a health facility, not a big problem were more likely (71%) to deliver at a health facility than those thought otherwise (63%). Women who were exposed to media had a higher proportion (83%) of health facility delivery compared to those who were not (62%). Place of residence was significantly associated with health facility delivery with a higher proportion (86%) in urban areas compared to rural areas (64%). Other factors like the relationship to head, marital status, religion, health insurance and region were not significantly associated with health facility delivery. However, it should be noted that only eight women with disabilities had health insurance.

Characteristics	Health facility (%)	Elsewhere (%)	Women (N=869)	P-value
Age				
less than 25	75.5	24.5	171	0.050
25-34	64.8	35.2	372	
35+	65.3	34.7	326	
Relationship to head				
Head	68.1	31.9	235	0.490
Wife	65.7	34.3	530	
others	72	28	104	
Marital status				
Not married	63.2	36.8	160	0.250
Married	68	32	709	

Living children				
one	81.4	18.6	102	0.000
Two	75	25	92	
Three	70	30	114	
4+	62.4	37.6	553	
Antenatal Visits				
0-3 visits	57.8	42.2	362	0.000
4+ visits	73.8	26.2	507	
Education				
No formal Education	61.6	38.4	67	0.000
Primary	63.2	36.8	441	
Secondary+	80.7	19.3	201	
Religion				
Christians	66	34	757	0.200
Moslem	77.6	22.4	93	
Others	60	40	19	
Wealth quintile				
Poorest	56.7	43.3	183	0.000
Poorer	57.8	42.2	241	
Middle	71.8	28.2	202	
Rich	80.2	19.8	243	
Perceived distance to health facility				
Big problem	63.3	36.7	423	0.030
Not a big problem	70.7	29.3	446	
Getting money				
Big problem	64.6	35.4	502	0.090
Not a big problem	70.5	29.5	367	
Health insurance				
Not insured	67.2	32.8	861	0.470
Insured	55.9	44.1	8	
Media influence				
No	61.9	38.1	654	0.000
Yes	82.9	17.1	215	
Place of residence				
Urban	86	14	129	0.000
Rural	63.8	36.2	740	
Region				
Central	72	28	151	0.310
Eastern	64.4	35.6	212	
Northern	71.5	28.5	190	
Western	63.9	36.1	316	
Total	67.1	32.9	869	

Table 2: Distribution of women with disabilities by place of delivery and demographic, socio-economic factors

3.3. Multivariable Results

Disability status was significantly associated with health facility delivery. Women with disabilities had reduced odds ratios (OR=0.6, 95% CI: 0.6-0.7) of delivering at a health facility compared to their fellow counterparts with no disabilities.

Variable	Model 1		Model 2		Model 3	
	Adjusted ORs	95% CI	Adjusted ORs	95% CI	Adjusted ORs	95% CI
Mother's age (rc= 15-24)						
25-34	1	[0.6,1.8]	0.9	[0.5,1.5]	0.9	[0.5,1.6]
35+	1.5	[0.8,2.8]	1.2	[0.6,2.4]	1.2	[0.6,2.4]
Mother's education (rc=no education)						
Primary	1.3	[0.9,1.9]	1.2	[0.8,1.7]	1.2	[0.8,1.7]
Secondary+	8.0***	[3.7,17.0]	5.0***	[2.3,11.0]	4.5***	[2.0,10.0]
Number of children alive (rc=one)						
Two	0.7	[0.3,1.5]	0.7	[0.4,1.6]	0.8	[0.4,1.6]
Three	0.6	[0.3,1.3]	0.6	[0.3,1.3]	0.6	[0.3,1.3]
4+	0.4*	[0.2,0.9]	0.5	[0.2,1.0]	0.5	[0.2,1.0]
Antenatal visits (rc=0-3)						
4+ visits			1.9***	[1.4,2.6]	1.9***	[1.4,2.5]
Perceived distance to health facility (rc=big problem)						
Not a big problem			1.1	[0.8,1.5]	1.1	[0.8,1.5]
Wealth quintile (rc=poorest)						
Poorer			1	[0.7,1.5]	1	[0.7,1.6]
Middle			1.6*	[1.0,2.6]	1.6*	[1.0,2.6]
Rich			1.7*	[1.1,2.8]	1.5	[0.9,2.5]
Media influence (rc=No)						
Yes			1.7*	[1.1,2.6]	1.7*	[1.1,2.6]
Residence (rc=Rural)						
Urban					2.2**	[1.3,3.9]
Observations	927		927		927	
ORs=Odd ratios; 95% confidence intervals in brackets; * $p < 0.05$ - ** $p < 0.01$ - *** $p < 0.001$; rc=reference category- model (1) = adjusting for predisposing factors- model (2) =adjusting for enabling factors and model (3) =adjusting for community factor.						

Table 3: Adjusted odds ratios (ORs) for regression on health facility delivery by selected explanatory variables among women with disabilities in Uganda

Table 3 shows the logistic regression results for the three fit models that measure the association between health facility delivery and women with disabilities background characteristics. The models only include significant variables ($p < 0.05$) at a bivariate level of analysis. The first model (model 1) shows the association between health facility delivery and the predisposing factors. The second model (model 2) adjusts for the enabling factors to the first model and the third model (Model 3) adjusts for community factors.

The factors which were significantly associated with health facility delivery among women with disabilities were ANC visits, education, households' well-being (wealth quintile), exposure to media and place of residence. Women who attended four or more ANC visits had increased odds (OR=1.9, 95% CI: 1.4-2.5) of

delivering at a health facility compared to those who had less than four ANC visits. Women with secondary or more education are almost five times likely (OR=4.5, 95% CI: 2.0-10.0) to deliver from a health facility than those with no formal education. Similarly, women from the middle-income households had increased odds ratios (OR=1.6, 95% CI: 1.0-2.6) of delivery at a health facility compared to those from the poorest households. Relatedly, women who regularly listened to the radio and owned a mobile phone had increased odds ratios (OR=1.7, 95% CI: 1.1-2.6) of delivering at a health facility than those who did not listen or own a mobile phone. Women in urban areas are more likely (OR= 2.2, 95% CI = 1.3–3.9) to deliver from a health facility compared to their counterparts in rural areas.

On the other hand, the woman's age, perceived payment for health services and number of living children were not significantly associated with health facility delivery among women with disabilities in Uganda.

4. Discussion

The main objective of this study was to examine factors associated with health facility delivery among women with disabilities in Uganda. The factors that were significantly associated with place of delivery among women with disabilities were the number of ANC visits, level of education, wealth quintile, exposure to media and place of residence. These factors are discussed in turn as below:

The woman's level of education has been reported to be significantly associated with health facility delivery especially secondary education and above. Educated women with disabilities are more informed and make personal decisions about their health [8-10]. The results further reveal an increase in facility delivery among women with disabilities as the level of education increases. Women with disabilities who go for four or more ANC visits are more likely to deliver from a health facility than those who go for less than four ANC visits. The results are consistent with other studies done on all women regardless of disability in Kenya and Ethiopia [11-14]. The studies by showed that health personnel attitudes towards women with disabilities during ANC may deter women from delivering from a health facility.

On the other hand, the choice of going for ANC has been reported to be made by the woman herself but delivery from the health facility is done by someone else especially where cost is involved [15]. This could be true for women with severe disabilities (especially women who cannot function at all). The decisions of going for ANC and where to deliver from might be decided by someone else.

It has been reported that women from wealthier households are more likely to deliver from a health facility compared to those from the poorest household [16-20]. In Uganda the cost of accessing health services is high. The private health facilities that offer better services are costly. Government health facilities also have private wings which charge highly and hence making them not different from private facilities

Women with disabilities who frequently listen to the radio and own mobile phones are more likely to deliver from a health facility than those who do not. This could be true because these women are exposed to information about maternal health. The effect could be explained by the fact that most media programs broadcast the promotion of institutional delivery repeatedly that may influence mothers to develop positive behavior towards delivering in a health facility. The results are consistent with studies by which showed that awareness of health facility delivery and easy communication between the service providers and women with disabilities improves health facility delivery [21-25]. They also contend that

women with disabilities rarely receive pertinent information and advice relating to labour and childbirth tailored to their disability needs which is true in a country like Uganda.

Women with disabilities who reside in urban areas are more likely than their counterparts in rural areas to deliver at a health facility. This shows how unevenly health facilities are distributed by place of residence but also women from urban areas are more exposed than their rural counterparts. Urban areas have more health facilities than rural areas they also attract more experienced health personnel and also people can afford the cost. The findings are in line with studies by and which showed that women in urban areas are more likely to deliver at a health facility compared to those from rural areas. These findings are inconsistent with studies done by Kerala India respectively that showed lower facility use among urban women compared to their rural counterparts. Women with health insurance has been reported to be associated with health facility delivery [26-30]. There were a few observations of women (08) with disabilities under health insurance, so it was not possible to confirm the findings from the two studies.

Distance to a health facility and ability to pay was reported to be significantly associated with health facility delivery and. The results from this study found out on the contrary that both perceived distance to a health facility and the ability to pay was not significantly associated with health facility delivery.

5. Conclusion

In Uganda, a third (33%) of women with disabilities did not deliver from health facilities. Women with disabilities who go for four or more ANC visits are more likely to deliver from a health facility. Similarly, women with a secondary or higher level of education are also likely to deliver from a health facility. The economic position of the household, exposure to mass media and place of residence are determinants of health facility delivery among women with disabilities. The socio-economic factors influencing health facility delivery among women with disabilities were level of education and wealth quintile. Women with secondary or higher levels of education and those from wealthier households are likely to deliver from a health facility. The other enabling factors that determine health facility delivery were exposure to mass media, number of ANC visits (more than four visits) and place of residence more so women from urban areas are more likely to deliver from a health facility [31-49].

Declarations

Ethics approval and consent to participate

Data used in this study was obtained with permission from the DHS program website. The ICF IRB reviewed and approved the 2016 Uganda Demographic and Health Survey. The ORC MACRO, ICF Macro, and ICF IRBs complied with the United States Department of Health and Human Services regulations for the protection of human research subjects (45 CFR 46).

No further ethical approval was necessary since the study was based

on anonymous public use data with no identifiable information on survey respondents

Consent for Publication

Not applicable

Availability of Data and Materials

The datasets generated and analysed during the study are publicly available and can be accessed from DHS program website ([The DHS Program - Available Datasets](#)).

Competing interests

The author(s) declare that they have no competing interests.

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Authors' Contributions

GJ conceptualized and developed the study. SOW reviewed the study and literature. GJ analysed the data and interpreted the results and participated in the drafting of the manuscript. All read and reviewed the manuscript. All authors read and approved the manuscript.

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References

1. Moyer, C. A., & Mustafa, A. (2013). Drivers and deterrents of facility delivery in sub-Saharan Africa: a systematic review. *Reproductive health*, 10(1), 1-14. <https://doi.org/10.1186/1742-4755-10-40>
2. Ahumuza, S. E., Matovu, J. K., Ddamulira, J. B., & Muhanguzi, F. K. (2014). Challenges in accessing sexual and reproductive health services by people with physical disabilities in Kampala, Uganda. *Reproductive health*, 11, 1-9.
3. Smeltzer, S. C. (2007). Pregnancy in women with physical disabilities. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 36(1), 88-96.
4. World Health Organization. (2011). World report on disability 2011. World Health Organization.
5. CDC. (2013). Washington Group on Disability Statistics. Retrieved from, 1-22. https://unstats.un.org/unsd/statcom/doc10/2010-20-WashingtonGroup E.pdf%0Ahttp://www.cdc.gov/nchs/washington_group/wg_questions.htm
6. UBOS & ICF. (2017). Uganda Demographic and Health Key Indicator Report, 2016. Kampala: UBOS and Calverton, Maryland.
7. Kabali, E., Gourbin, C., & De Brouwere, V. (2011). Complications of childbirth and maternal deaths in Kinshasa hospitals: testimonies from women and their families. *BMC Pregnancy and Childbirth*, 11, 1-9.
8. Yaya, S., Bishwajit, G., & Ekholuenetale, M. (2017). Factors associated with the utilization of institutional delivery services in Bangladesh. *PloS one*, 12(2), e0171573.
9. Enuameh, Y. A. K., Okawa, S., Asante, K. P., Kikuchi, K., Mahama, E., Ansah, E., ... & Ghana EMBRACE Implementation Research Project Team. (2016). Factors influencing health facility delivery in predominantly rural communities across the three ecological zones in Ghana: a cross-sectional study. *PloS one*, 11(3), e0152235.
10. Yebyo, H., Alemayehu, M., & Kahsay, A. (2015). Why do women deliver at home? Multilevel modeling of Ethiopian National Demographic and Health Survey data. *PLoS One*, 10(4), e0124718.
11. Berhan, Y., & Berhan, A. (2014). Antenatal care as a means of increasing birth in the health facility and reducing maternal mortality: a systematic review. *Ethiopian journal of health sciences*, 24, 93-104.
12. Kawakatsu, Y., Sugishita, T., Oruenjo, K., Wakhule, S., Kibosia, K., Were, E., & Honda, S. (2014). Determinants of health facility utilization for childbirth in rural western Kenya: cross-sectional study. *BMC pregnancy and childbirth*, 14, 1-10.
13. Worku, A. G., Yalew, A. W., & Afework, M. F. (2013). Factors affecting utilization of skilled maternal care in Northwest Ethiopia: a multilevel analysis. *BMC international health and human rights*, 13(1), 1-11.
14. Anyait, A., Mukanga, D., Oundo, G. B., & Nuwaha, F. (2012). Predictors for health facility delivery in Busia district of Uganda: a cross sectional study. *BMC pregnancy and childbirth*, 12(1), 1-9.
15. Tann, C. J., Kizza, M., Morison, L., Mabey, D., Muwanga, M., Grosskurth, H., & Elliott, A. M. (2007). Use of antenatal services and delivery care in Entebbe, Uganda: a community survey. *BMC pregnancy and childbirth*, 7(1), 1-11.
16. Smith, E., Murray, S. F., Yousafzai, A. K., & Kasonka, L. (2004). Barriers to accessing safe motherhood and reproductive health services: the situation of women with disabilities in Lusaka, Zambia. *Disability and rehabilitation*, 26(2), 121-127.
17. Montagu, D., Yamey, G., Visconti, A., Harding, A., & Yoong,

- J. (2011). Where do poor women in developing countries give birth? A multi-country analysis of demographic and health survey data. *PloS one*, 6(2), e17155.
18. Montagu, D., Yamey, G., Visconti, A., Harding, A., & Yoong, J. (2011). Where do poor women in developing countries give birth? A multi-country analysis of demographic and health survey data. *PloS one*, 6(2), e17155.
19. Mitra, S., Posarac, A., & Vick, B. (2013). Disability and poverty in developing countries: a multidimensional study. *World Development*, 41, 1-18.
20. Gichane, M. W., Heap, M., Fontes, M., & London, L. (2017). "They must understand we are people": Pregnancy and maternity service use among signing Deaf women in Cape Town. *Disability and health journal*, 10(3), 434-439.
21. Australia, L. L. C., Devine, A., Marella, M., & Melbourne, A. C. C. (2016). Access to maternal and newborn health services for women with disabilities in Timor-Leste.
22. Morrison, J., Basnet, M., Budhathoki, B., Adhikari, D., Tumbahangphe, K., Manandhar, D., ... & Groce, N. (2014). Disabled women's maternal and newborn health care in rural Nepal: A qualitative study. *Midwifery*, 30(11), 1132-1139.
23. Bremer, K., Cockburn, L., & Ruth, A. (2010). Reproductive health experiences among women with physical disabilities in the Northwest Region of Cameroon. *International Journal of Gynecology & Obstetrics*, 108(3), 211-213.
24. Thomas, C., & Curtis, P. (1997). Having a baby: some disabled women's reproductive experiences. *Midwifery*, 13(4), 202-209.
25. Dickson, K. S., Adde, K. S., & Amu, H. (2016). What influences where they give birth? Determinants of place of delivery among women in rural Ghana. *International journal of reproductive medicine*, 2016.
26. Exavery, A., Kanté, A. M., Njozi, M., Tani, K., Doctor, H. V., Hingora, A., & Phillips, J. F. (2014). Access to institutional delivery care and reasons for home delivery in three districts of Tanzania. *International journal for equity in health*, 13, 1-11.
27. Mezmur, M., Navaneetham, K., Letamo, G., & Bariagaber, H. (2017). Individual, household and contextual factors associated with skilled delivery care in Ethiopia: evidence from Ethiopian demographic and health surveys. *PLoS One*, 12(9), e0184688.
28. Enuameh, Y. A. K., Okawa, S., Asante, K. P., Kikuchi, K., Mahama, E., Ansah, E., ... & Ghana EMBRACE Implementation Research Project Team. (2016). Factors influencing health facility delivery in predominantly rural communities across the three ecological zones in Ghana: a cross-sectional study. *PloS one*, 11(3), e0152235.
29. Amoakoh-Coleman, M., Ansah, E. K., Agyepong, I. A., Grobbee, D. E., Kayode, G. A., & Klipstein-Grobusch, K. (2015). Predictors of skilled attendance at delivery among antenatal clinic attendants in Ghana: a cross-sectional study of population data. *BMJ open*, 5(5), e007810.
30. Gage, A. J. (2007). Barriers to the utilization of maternal health care in rural Mali. *Social science & medicine*, 65(8), 1666-1682.
31. Akinwande, M. O., Dikko, H. G., & Samson, A. (2015). Variance inflation factor: as a condition for the inclusion of suppressor variable (s) in regression analysis. *Open journal of statistics*, 5(07), 754.
32. Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: does it matter?. *Journal of health and social behavior*, 1-10.
33. Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: does it matter?. *Journal of health and social behavior*, 1-10.
34. Bayou, Y. T. (2014). Maternal health care seeking behaviour and preferences for places to give birth in Addis Ababa, Ethiopia (Doctoral dissertation, University of South Africa).
35. Brooks, M. I., Thabrany, H., Fox, M. P., Wirtz, V. J., Feeley, F. G., & Sabin, L. L. (2017). Health facility and skilled birth deliveries among poor women with Jamkesmas health insurance in Indonesia: a mixed-methods study. *BMC health services research*, 17, 1-12.
36. Chowdhury, M. E., Ronsmans, C., Killewo, J., Anwar, I., Gausia, K., Das-Gupta, S., ... & Borghi, J. (2006). Equity in use of home-based or facility-based skilled obstetric care in rural Bangladesh: an observational study. *The Lancet*, 367(9507), 327-332.
37. Onis, M. D., Onyango, A. W., Borghi, E., Siyam, A., Nishida, C., & Siekmann, J. (2007). Development of a WHO growth reference for school-aged children and adolescents. *Bulletin of the World health Organization*, 85(9), 660-667.
38. Gabrysch, S., & Campbell, O. M. (2009). Still too far to walk: literature review of the determinants of delivery service use. *BMC pregnancy and childbirth*, 9, 1-18.
39. Kitui, J., Lewis, S., & Davey, G. (2013). Factors influencing place of delivery for women in Kenya: an analysis of the Kenya demographic and health survey, 2008/2009. *BMC pregnancy and childbirth*, 13, 1-10.
40. Persons, A., & Act, D. (2006). I SIGNIFY my assent to the bill. President Date of assent : THE PERSONS WITH DISABILITIES ACT, 2006 ., 1-19.
41. Redshaw, M., Malouf, R., Gao, H., & Gray, R. (2013). Women with disability: the experience of maternity care during pregnancy, labour and birth and the postnatal period. *BMC pregnancy and childbirth*, 13(1), 1-14.
42. Stephenson, R., Baschieri, A., Clements, S., Hennink, M., & Madise, N. (2006). Contextual influences on the use of health facilities for childbirth in Africa. *American journal of public health*, 96(1), 84-93.
43. Trani, J. F., Browne, J., Kett, M., Bah, O., Morlai, T., Bailey, N., & Groce, N. (2011). Access to health care, reproductive health and disability: a large scale survey in Sierra Leone. *Social science & medicine*, 73(10), 1477-1489.
44. Virgo, S., Gon, G., Cavallaro, F. L., Graham, W., & Woodd, S. (2017). Who delivers where? The effect of obstetric risk on facility delivery in East Africa. *Tropical medicine & international health*, 22(9), 1081-1098.
45. Walsh-Gallagher, D., Sinclair, M., & Mc Conkey, R.

-
- (2012). The ambiguity of disabled women's experiences of pregnancy, childbirth and motherhood: a phenomenological understanding. *Midwifery*, 28(2), 156-162.
46. UBOS. (2014). National Population and Housing Census. Kampala.
47. Rasmussen, M., & Lewis, O. (2007). United Nations Convention on the rights of persons with disabilities. *International Legal Materials*, 46(3), 441-466.
48. UNFPA. (2014). Setting standards for emergency obstetric and newborn care. Basic and comprehensive care.
49. World Health Organization. (2015). WHO global disability action plan 2014-2021: Better health for all people with disability. World Health Organization.

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