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## The Association between Women's Empowerment and Uptake of Child Health Services: A Demographic and Health Survey-Based Synthesis

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## ABSTRACT

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Globally 1.5 million children die from illnesses that could be prevented through vaccination. Since 2010 there has been stagnation in global coverage of child vaccination, despite many public health efforts. Women, who are caregivers for sick children in most societies, may not have the capacity to make decisions such as seeking health care. This study examines the association between mothers' empowerment and uptake of child vaccination and diarrhea treatment, through a secondary analysis of data from the 2016 Zimbabwe Demographic and Health Survey.

The results show that only 22% of mothers had high levels of decision-making, while 12% had full ownership of assets. For uptake of child health services, 76% of children age 12-23 months received basic vaccinations, and 42% of children under age 5 were treated for diarrhea. The unadjusted analysis showed a significant association between mother's empowerment and child vaccination. However, no statistically significant association was found between mother's empowerment and child health outcomes, after controlling for other sociodemographic factors.

The regression analysis showed some statistically significant predictors of child health outcomes, however. Predictors that favored completion of basic vaccines included being in the middle wealth quintile compared with the poorest wealth quintile, having visited a health facility in the past 12 months, and having health insurance. Mothers who visited a health facility in the past 12 months had 50% higher odds of receiving treatment for diarrhea for their children under age 5 compared with mothers who did not visit a facility. Internet use by the mother also favored receiving treatment for children's diarrhea.

Universal health insurance may improve child health outcomes. Advising mothers on websites to access child health messages, particularly where the household heads are 15-24 years old, may improve uptake of health messages.

**Key Words:** Demographic and Health Survey, treatment of diarrhea, uptake of child health services, vaccination, women's empowerment



# 1 INTRODUCTION

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In most societies women are the primary caregivers for the family and the sick—and at times are blamed for misfortunes and illness in their families. Women’s disempowerment has been significantly associated with poor maternal and child health outcomes and adverse reproductive health outcomes (Godha, Hotchkiss, and Gage 2013; Dimbuene et al. 2017). Women’s empowerment is multidimensional and has been operationalized using measures such as participation in making household decisions and having access to and control over assets (Cunningham et al. 2015; Afifi 2009).

Despite the existing studies, several questions remain unanswered concerning the measurement and aggregation of quantitative indicators of women’s empowerment and their associations with measures of child health status, such as the effect of women’s decision-making power on child morbidity and mortality, and the association between women’s asset ownership and their uptake of child health services (Pratley 2016; Ford et al. 2017). Studies have reported an association between women’s empowerment and child mortality, full vaccination, and nutritional status (Cunningham et al. 2015). Women’s empowerment has been found to be significantly and positively associated with child health outcomes. A study in Ethiopia revealed that low status of women and their disempowerment are highly associated with poor health outcomes (Wado 2013).

In Zimbabwe, few studies have tried to measure women’s empowerment quantitatively and to assess its association with child health outcomes. While the Zimbabwe Demographic and Health Surveys (ZDHS) report on women’s empowerment issues, the data have not been routinely analyzed to explore the association between indicators of women’s empowerment and child health outcomes. There has been minimal use of Demographic and Health Surveys (DHS) data for further statistical analysis of this topic, and for interpretation to better inform health programs and health education.

This study assessed the association between women’s (mothers’) empowerment and selected child health outcomes, based on analysis of data from the 2015 ZDHS. Variables used to measure women’s empowerment include women’s control over their own earnings or their partner’s earnings, ownership of assets, and participation in decision-making on their own health. The child health outcomes that were assessed in the DHS were vaccination status and treatment status for diarrhea. The study will ultimately contribute to the achievement of critical strategic goals in health, such as Sustainable Development Goal 3 and UNICEF strategic goals on child health, by highlighting significant correlates of child health outcomes.



## **2 LITERATURE REVIEW**

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### **2.1 Women's Empowerment and Its Determinants**

Studies have shown that women's empowerment is a function of both demographic and socioeconomic factors in a society. Empowerment of women is the process of enabling them to have the power to navigate life's challenges in all areas of their lives (Mahmud, Shah, and Becker 2012). Many studies have identified socioeconomic and demographic factors as determinants of women's empowerment. These include maternal age, spousal age difference, women's education level, exposure to media (Gupta 2008), inter-spousal education difference, place of residence, household wealth, women's employment status, women's control over their own earnings and over husband's earnings, ownership of assets, and family structure (Mahmud, Shah, and Becker 2012; Wado 2013).

Both demographic and socioeconomic factors have been reported to affect the decision-making ability of women on their own health and that of their children, since they influence women's health care-seeking behavior (Upadhyay and Hindin 2005). Most studies assess women's participation in decision-making through three types of household decision-making: woman's own health care, major household purchases, and visits to family or relatives (Ibrahim, Tripathi, and Kumar 2015).

Factors that measure women's autonomy, mobility, and control over resources have been reported to be direct measures of the level of women's empowerment (Kabeer 2012). Some studies add a fourth domain that assesses the gender-role attitudes of women as a measure of women's empowerment (Corroon et al. 2014). The backdrop of arguments in favor of making progress toward women's empowerment is that there are inherent positive outcomes for families and societies.

### **2.2 Association between Women's Empowerment and Child Health**

The literature has demonstrated that women's empowerment is linked to child health outcomes (Pratley 2016). Issues around the child's general hygiene and access to health care services include but are not limited to vaccination and long-term nutritional status, which depend upon the mother's capacity to make decisions, including participation in decisions concerning the allocation of household resources (Kabeer 2012). This then translates to the notion that child survival outcomes are shaped by women's empowerment.

Studies have attempted to measure quantitatively women's empowerment and its association with child health status. Many studies have acknowledged that the quantification of women's empowerment is a complex process that is highly situational and sensitive to context. A systematic review by Pratley (2016) revealed a statistically significant positive effect of women's empowerment on child health outcomes such as child mortality, full vaccination, and nutritional status. Similarly, Na and colleagues evaluated the association between women's empowerment and child feeding practices in sub-Saharan Africa by analyzing DHS data between 2010 and 2013 (Na et al. 2015). Their review assessed women's empowerment using nine standard items, which were reduced to three main dimensions—economic, socio-familial, and legal. The study concluded that the likelihood of meeting recommended infant and young child feeding criteria was positively associated with the economic dimension of women's empowerment.

A study in Ghana on women's empowerment in agriculture and children's health status yielded a statistically nonsignificant association between the two. However, children's health status was found to be significantly associated with control variables such as mother's education, child's age, and place of residence (Zereyesus et al. 2017). A systematic review of women's empowerment and child nutritional status showed that women's empowerment was associated with the level of child malnutrition, though the findings were mixed (Gupta 2008). This study, as well as similar studies, concluded that women's empowerment domains may relate differently to different measures of child nutritional status. These results concur with an assessment of the association between women's empowerment and maternal and child health in Benin (Alaofè et al. 2017), which found that efforts to improve nutrition in children can be enhanced by promoting women's self-confidence and decision-making.

From the literature reviewed, a general consensus is that women's empowerment is associated with child health status. However, most of these studies focused on women's empowerment and child nutrition only. Very few sought to determine the association between women's empowerment and other child health status indicators that are hypothesized to have an even closer association with women's empowerment, such as treatment for children who get sick with different conditions, including pneumonia and diarrhea, and health care behavioral indicators such as immunization status of children.

This study addresses the gap in the literature on women's empowerment and child health outcomes in Zimbabwe. The purpose of this study is to empirically explore the association between women's empowerment and child health status and outcomes. The study addresses the following research questions:

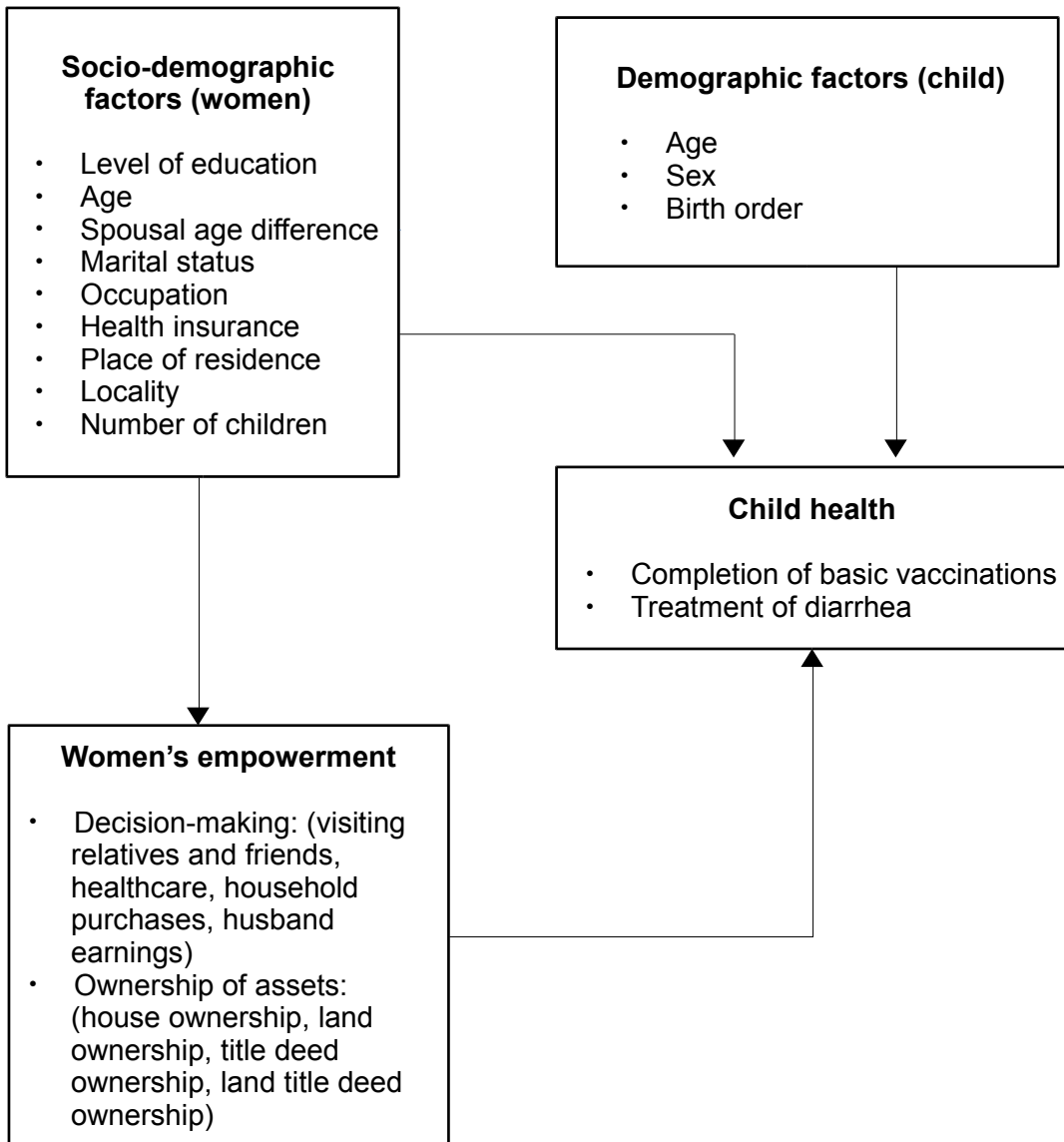
1. What is the current status of women's empowerment in Zimbabwe?
2. What is the level of uptake of child health services in Zimbabwe?
3. What is the association between mother's empowerment and uptake of child health services?

### **2.3 Conceptual Framework**

Child health is conceptualized as an outcome that is dependent on the empowerment of the mother in the Zimbabwean context. Mother's empowerment for this research is operationalized as women having control over own earnings and their husband's earnings, ownership of assets, employment status, and participation in household decision-making. The study also conceptualizes this empowerment against a backdrop of other covariates or sociodemographic factors that directly affect child health outcomes and also are indirectly associated with child health outcomes by their bearing on women's empowerment. These confounding variables include women's education, age, spousal age difference, marital status, occupation, health insurance coverage, and place of residence. Figure 1 illustrates the conceptual framework.



Figure 1 Conceptual framework





## **3 DATA AND METHODS**

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### **3.1 Data**

The study was conducted through secondary analysis of data from the 2015 Zimbabwe Demographic and Health Survey (Zimbabwe National Statistics Agency and ICF International 2016). The ZDHS was based on data obtained from de facto household females age 15-49 and males age 15-54. In the 2015 ZDHS, 11,196 households were selected through complex sampling, beginning with selection of 166 urban and 234 rural clusters, followed by random selection of households from the clusters. The survey used the 2012 Zimbabwe national census as a sampling frame.

The children's recode file was used for the analysis; therefore, the unit of analysis is the child, and any variables referring to the women are identified as the mother's characteristics. The file has data for children born to interviewed women in the previous five years (0-59 months). This includes data on the children's demographic characteristics and such health-related characteristics as immunization and treatment of diarrhea, fever, and cough. Moreover, the file also contains data pertaining to the mothers' sociodemographic variables and sexual and obstetric histories. The demographic and occupational characteristics of the mothers' partners are also available in the same file. Since empowerment variables included decisions about husband's/partner's earnings, the study sample for this analysis included only married women—5,145 women, as well as 1,010 children under age 5 who had had diarrhea in the two weeks before the survey, and 1,263 children age 12-23 months (the vaccination-age category).

### **3.2 Variables**

Women's empowerment was measured through two indicators: extent of participation in household decision-making, and ownership of assets. The women's empowerment indicators were measured at the child level and will therefore also be referred to as the mother's empowerment in the results. The extent of women's participation in decision-making was determined by their responses to questions about who normally decides on social visits to friends and family, women's own health care, large household purchases, and the use of husband's earnings in the household. Possible responses included: respondent alone; respondent and husband/partner jointly; husband alone; or other people. The four responses were recoded into husband or other (zero points), joint (1 point), and respondent alone (2 points). Similar recoding was also done for the variables regarding who decides on social visits, women's health care, and household purchases. The decision-making variable was generated by summing the four decision-making items: who decides on social visits; women's own health care; large household purchases; and the use of husband's earnings. Thus the total decision-making scores ranged from zero to eight points. A score of zero showed that the woman was not involved in any decision-making, while a score of eight showed that the woman was making all of the decisions herself. We coded zero points as no participation in decision-making, 1-5 points as moderate decision-making, and 6-8 points as a high level of decision-making.

Concerning the second indicator, ownership of assets, in the original recode file ownership of land, title deeds to land, ownership of a house, and title deed to house are coded as zero for no ownership and one if the woman owned the asset alone or jointly with the husband/partner. In our analysis, an indicator for ownership of assets was generated by summing land ownership, house ownership, land title deed

ownership, and house title deed ownership. By virtue of the coding of the parameters used to determine asset ownership, the overall assets ownership values ranged between zero and four. Thereafter, a sum of zero was coded as no ownership, 1-2 as moderate ownership, and 3-4 as full ownership.

Socioeconomic predictors in our study included women's age, place of residence, level of education, religion, age of household head, spousal age difference, ownership of a mobile phone, use of the internet, health insurance, marital status, and partner and respondent occupation. In the ZDHS, age was determined by asking interviewed women their age at their last birthday. Respondents were asked their highest level of school attended: primary, secondary, or higher. They were also asked what their religion was: traditional, Roman Catholic, Protestant, Pentecostal, Apostolic sect, other Christian, Muslim, none, or other. In this study, religion was classified into Apostolic, Christian, or other. Christians included Roman Catholic, Protestant, Pentecostal, or other Christian. Women affiliated with Muslim, other, or no religion were classified as being of other religion.

Ownership of a mobile phone was ascertained through the question, "Do you own a mobile phone?" The question had a yes or no response. The ZDHS also asked women whether they had ever used the internet. For those who had used it, the frequency of internet use in the previous 12 months was also asked. Occupation categories were determined based on the International Standard Classification of Occupations (ISCO-08). Occupations in ISCO level 1 were classified as unskilled or other, level 2 as moderately skilled, and levels 3 and 4 as highly skilled.

In this study the outcome was child health, measured through vaccination and treatment of diarrhea. Children were considered to have had basic vaccinations if they had received all of the following vaccines: Bacille Calmette Guerin (BCG), three doses of pentavalent vaccine, three doses of oral polio vaccine, and one dose of measles vaccine. Vaccination status was calculated for children age 12-23 months. According to the Zimbabwe Immunization Code, the above-mentioned vaccines are complete by age 18 months.

The other outcome measure was treatment for children under age 5 with diarrhea symptoms in the last two weeks before the survey. Treatment of diarrhea meant getting health care and advice from formal referrals, which exclude pharmacy, shops, or traditional practitioners. The unit of analysis was children within the vaccination age (12-23 months) and children under age 5 who developed diarrhea within two weeks before the survey.

### **3.3 Statistical Analysis**

Weighted descriptive statistics and cross-tabulations were computed for all variables for each analysis sample for the child health outcomes. Cross-tabulation was also done between demographic variables and the mother's empowerment variables, which included the 5,145 mothers in the child recode file. Before fitting any regression, pairwise correlation was conducted to identify the variables to be included in the multivariate models. Predictors with a pairwise correlation value above 0.5 were not used in the ultimate regression. For this reason, place of residence (for its collinearity with the wealth index), number of children (for its collinearity with the mother's age), and age of the woman's husband or spouse were removed from the final regression models. Adjusted logistic regressions were conducted for mother's empowerment and the two child health outcomes controlling for socioeconomic variables. All analyses accounted for complex survey sampling design. Data was analyzed using STATA version 15.

## 4 RESULTS

### 4.1 Sample Characteristics

Table 1 provides a description of the two samples used for the analysis—one for the vaccination outcome and the other for the diarrhea treatment outcome. There were 1,263 children age 12-23 months in the vaccination sample, with a mean age of 17.4 months; 76% of the children received basic vaccinations. The diarrhea sample included 1,010 children under age 5 who had diarrhea in the two weeks before the 2015 ZDHS; 42% received treatment for it.

Among children age 12-23 months (the age for childhood vaccination), slightly more boys (51%) than girls (49%) were vaccinated. About half of the mothers (49%) were age 25-34, and 12% were older than their spouses or of equal age. About two-thirds (63%) had attained a secondary education, 64% owned a mobile phone, but 81% had never used the internet. Wealth was generally evenly distributed across the wealth quintiles, but with 25% of households in the poorest quintile and 15% in richest. Only 7% of mothers had health insurance, and 68% had visited a health facility in the previous 12 months. For children under age 5 who had had diarrhea before the survey, the demographic characteristics were similar to those for children between 12-23 months of age (see Table 1).

**Table 1 Demographic characteristics of children and their parents among children age 12-23 months and among children under age 5 with diarrhea**

Variable	Children age 12-23 months		Children under age 5 with diarrhea	
	Percentage	Frequency	Percentage	Frequency
<b>Sex of child</b>				
Male	51.3	648	53.0	535
Female	48.7	615	47.0	475
<b>Birth order of child</b>				
1-4	84.0	1,061	86.6	875
5-10	16.0	203	13.1	133
11-14	0.0	0	0.3	3
<b>Age of mother</b>				
15-24	35.7	451	36.6	370
25-34	49.3	622	49.6	501
35-49	15.0	190	13.8	139
<b>Mother's place of residence</b>				
Urban	28.9	365	31.4	318
Rural	71.1	898	68.6	693
<b>Mother's level of education</b>				
No education	1.1	14	1.6	16
Primary	32.3	408	32.9	332
Secondary	62.6	791	63.1	638
Higher	4.0	51	0.2	24
<b>Religion of mother</b>				
Apostolic	51.5	650	51.4	519
Christian	40.7	514	41.0	414
Other	7.9	99	7.7	78
<b>Age of father</b>				
15-24	8.0	87	8.7	75
25-34	45.7	486	5.2	45
35-49	41.0	444	49.8	432
50+	5.3	57	36.3	315

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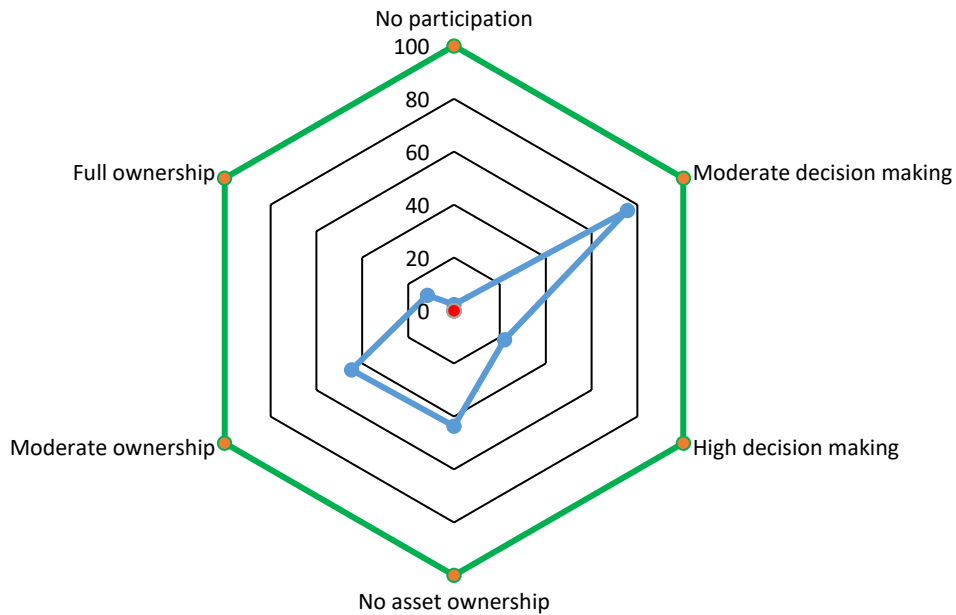
**Table 1—Continued**

Variable	Children age 12-23 months		Children under age 5 with diarrhea	
	Percentage	Frequency	Percentage	Frequency
<b>Age of household head</b>				
15-24	9.7	122	9.6	97
25-34	34.0	430	31.4	317
35-49	38.8	490	37.9	383
50+	17.5	222	21.1	214
<b>Sex of household head</b>				
Male	61.6	778	65.6	663
Female	38.4	486	34.4	348
<b>Age difference between mother and father</b>				
Mother older	3.1	34	3.0	26
Equal age	9.0	98	7.0	61
Mother 2-5 years younger	41.4	448	43.2	375
Mother 6-9 years younger	25.8	280	25.3	220
Mother 10+ years younger	20.7	224	21.4	186
<b>Ownership of mobile phone by mother</b>				
Yes	63.7	805	62.0	627
No	36.3	458	38.0	384
<b>Internet use by child's mother</b>				
Never	80.6	1,018	81.0	819
Yes	19.4	245	19.0	192
<b>Wealth quintile of mother</b>				
Poorest	25.0	316	25.2	254
Poorer	20.1	254	19.1	193
Middle	17.5	221	16.4	166
Richer	22.4	283	24.7	249
Richest	15.0	190	14.7	148
<b>Number of children born to child's mother</b>				
1-3	69.8	882	69.6	704
4-7	29.0	366	28.8	291
8-14	1.2	15	1.6	16
<b>Visit to health facility in past 12 months</b>				
Yes	68.3	863	70.1	709
No	31.7	401	29.9	302
<b>Health insurance</b>				
Yes	7.4	94	4.2	43
No	92.6	1,170	95.8	968
<b>Occupation of father</b>				
Unskilled and other	23.8	256	22.9	197
Moderately skilled	68.6	740	70.7	609
Highly skilled	7.7	83	6.4	55

## 4.2 Mother's Empowerment

Figure 2 shows a description of the variables used to construct the mother's empowerment variable. This description is based on the 5,145 mothers who are married and with children under age 5. Generally, mothers were somewhat more empowered in decision-making compared with their ownership of assets. Still, most mothers exercised only moderate decision-making power. Only 16% of mothers with children under age 5 had high participation in decision-making, while 58% had moderate participation, and 31% had no participation. Only 13% of the mothers had a high level of ownership of assets, while 49% had moderate ownership, and 39% had no ownership of assets.

**Figure 2** Mother's empowerment



As Table 2 shows, mother's empowerment indicators differ by background characteristics. Statistically significant correlates of mother's participation in decision-making include place of residence, level of education, sex of household head, ownership of mobile phone, household wealth quintile, health insurance, and husband's occupation. Table 2 also shows that most demographic variables had statistically significant associations with ownership of assets, except sex of household head, inter-spousal age difference, health insurance coverage, and spouse's occupation. The largest proportion of mothers with no ownership of assets, at 60%, were in the richer wealth quintile, followed by the richest wealth quintile, at 47%. Mothers in the poorest wealth and poorer wealth quintiles were more likely to have high ownership of assets compared with mothers in the richest and richer quintiles.

**Table 2** Mother's empowerment and background characteristics

Variable	Participation in decision-making				Ownership of assets and title deeds			
	No	Moderate	High	Chi-square p value	No	Moderate	High	Chi-square p value
<b>Age</b>								
15-24	2.2	77.0	20.7	0.078	51.7	39.9	8.4	< 0.001
25-34	2.4	78.3	19.3		37.0	50.1	13.0	
35-49	3.2	72.3	24.5		26.9	56.3	16.8	
<b>Place of residence</b>								
Urban	1.2	74.6	24.2	0.010	57.7	33.3	8.9	< 0.001
Rural	3.1	77.7	19.2		30.6	55.3	14.1	
<b>Mother's level of education</b>								
No education	4.1	72.4	23.5	< 0.000	30.4	61.5	8.1	< 0.001
Primary	4.6	75.3	20.1		32.4	55.4	12.2	
Secondary	1.5	77.4	21.1		42.8	44.7	12.5	
Higher	0.6	79.3	20.1		37.1	48.2	14.7	
<b>Mother's religion</b>								
Apostolic	3.8	77.4	18.8	0.004	32.5	54.0	13.5	< 0.001
Christian	1.1	76.2	22.7		45.4	42.8	11.7	
Other	1.5	74.7	23.7		48.6	42.1	9.3	
<b>Age of father</b>								
15-24	1.9	79.0	19.0	0.007	61.8	33.8	4.4	< 0.001
25-34	1.6	78.4	20.0		46.0	44.5	9.6	
35-49	2.8	75.9	21.3		30.7	53.6	15.8	
50+	7.1	68.1	24.8		23.3	57.7	18.9	
<b>Age of household head</b>								
15-24	2.2	78.7	19.1	0.003	49.4	40.5	10.2	< 0.001
25-34	3.9	75.6	20.4		39.3	49.1	11.5	
35-49	1.8	78.7	19.5		31.4	53.6	15.0	
50+	0.9	73.2	25.9		52.1	38.0	9.8	
<b>Sex of household head</b>								
Male	2.1	79.2	18.7	< 0.000	38.2	49.2	12.6	0.522
Female	3.3	71.4	25.3		40.6	47.1	12.3	
<b>Age difference between child's mother and father</b>								
Woman older	4.1	74.5	21.4	0.002	38.2	49.7	12.1	0.096
Equal age	1.8	73.5	24.6		43.8	46.0	10.2	
Woman 2-5 years younger	1.8	78.7	19.4		41.2	47.0	11.8	
Woman 6-9 years younger	1.6	78.6	19.8		38.7	48.8	12.5	
Woman 10+ years younger	5.1	71.9	22.9		32.9	52.2	14.9	
<b>Ownership of mobile phone by mother</b>								
Yes	2.0	76.3	21.7	0.053	40.1	47.2	12.7	0.233
No	3.4	77.8	18.8		36.7	51.3	12.0	
<b>Internet use by mother</b>								
Never	3.0	76.9	20.1	0.001	35.9	50.8	13.3	< 0.001
Yes	0.5	76.0	23.6		51.8	39.1	9.1	
<b>Wealth quintile</b>								
Poorest	3.1	78.8	18.1	0.073	22.3	63.2	14.5	< 0.001
Poorer	3.2	76.2	20.6		30.0	55.9	14.0	
Middle	3.4	76.5	20.0		37.2	49.5	13.3	
Richer	2.0	75.3	22.7		60.0	32.2	7.8	
Richest	0.4	76.7	22.9		46.5	40.1	13.4	
<b>Number of children born to child's mother</b>								
1-3	1.6	77.8	20.6	0.000	45.2	44.7	10.1	< 0.001
4-7	3.0	76.2	20.8		27.7	55.2	17.1	
8-14	19.9	56.6	23.4		29.4	58.0	12.6	
<b>Visit to health facility in past 12 months</b>								
Yes	1.4	76.5	22.1	0.000	39.7	46.7	13.5	0.032
No	4.8	77.2	18.0		37.5	52.1	10.4	
<b>Health insurance</b>								
Yes	0.2	84.0	15.8	0.000	40.5	46.0	13.5	0.777
No	2.7	76.0	21.3		38.8	48.8	12.4	
<b>Occupation of father</b>								
Unskilled and other	1.8	79.0	19.2	0.430	36.9	51.5	11.5	0.561
Moderately skilled	2.7	75.7	21.6		39.9	47.6	12.5	
Highly skilled	2.4	79.4	18.2		37.1	48.5	14.4	



### 4.3 Cross-tabulation of Selected Predictors of Uptake of Child Health Services

Among the sample, 76% of children received the basic vaccinations, and 61% of children who had diarrhea received treatment for it. For most sociodemographic characteristics, there was a generally similar pattern in the vaccination rate. Notable disparities occurred for some predictors of vaccination, however. As Table 3 shows, 92% of the children of mothers with no education and 90% of children of mothers with higher than secondary education received the basic vaccinations. Similarly, 86% of children in households in the middle wealth quintile and 90% of children whose mothers had health insurance received the basic vaccinations. On the contrary, only 27% of children whose mothers had 8-14 children received the basic vaccinations. Statistically significant predictors of receiving basic vaccinations were mother's level of education, internet use, number of children born, having visited a health facility in the past 12 months, and having health insurance.

Treatment for diarrhea was generally low—overall, 36% and 55% of children with recent diarrhea received treatment at a formal health center. The statistically significant predictors of treatment of child diarrhea were: age of household head, inter-spousal age difference, internet use, number of children, and visit to a health facility in the past 12 months.

**Table 3** Cross-tabulation of sociodemographic variables, mother's empowerment, and uptake of child health services

Variable	Completed the basic vaccinations		Received treatment for diarrhea	
	%	Chi-square p value	%	Chi-square p value
<b>Age</b>				
15-24	75.0		42.2	
25-34	76.5		38.5	
35-49	76.3	0.895	35.5	0.500
<b>Place of residence</b>				
Urban	79.5		40.6	
Rural	74.4	0.173	38.9	0.728
<b>Level of education</b>				
No education	91.5		52.3	
Primary	69.5		32.5	
Secondary	77.9		42.3	
Higher	90.2	0.002	49.7	0.097
<b>Religion</b>				
Apostolic	72.6		37.7	
Christian	79.1		42.3	
Other	80.0	0.110	35.2	0.417
<b>Age of husband</b>				
15-24	78.4		38.2	
25-34	75.3		37.0	
35-49	79.7		41.5	
50+	64.4	0.212	39.6	0.954
<b>Age of household head</b>				
15-24	76.4		35.9	
25-34	76.6		37.8	
35-49	75.1		56.1	
50+	75.7	0.977	40.7	0.024
<b>Sex of household head</b>				
Male	77.3		37.4	
Female	73.6	0.258	43.4	0.100

(Continued...)

Table 3—Continued

Variable	Completed the basic vaccinations		Received treatment for diarrhea	
	%	Chi-square <i>p</i> value	%	Chi-square <i>p</i> value
<b>Age difference between woman and husband</b>				
Woman older	81.8		50.5	
Equal age	73.6		38.5	
Woman 2-5 years younger	81.8		33.3	
Woman 6-9 years younger	72.1		47.6	
Missing	70.6	0.037	42.5	0.058
<b>Ownership of mobile phone</b>				
Yes	77.9		40.2	
No	72.5	0.076	38.1	0.598
<b>Internet use</b>				
Never	74.5		36.5	
Yes	81.4	0.042	52.0	0.002
<b>Wealth quintile</b>				
Poorest	70.8		34.7	
Poorer	69.4		40.1	
Middle	85.6		38.8	
Richer	77.9		38.1	
Richest	78.8	0.009	49.6	0.205
<b>Number of children born</b>				
1-3	79.6		41.2	
4-7	68.7		37.5	
8-14	27.3	< 0.001	0.0	0.032
<b>Visit to health facility in past 12 months</b>				
Yes	81.0		42.1	
No	64.4	< 0.001	33.3	0.034
<b>Health insurance</b>				
Yes	90.2		55.4	
No	74.7	0.009	38.7	0.077
<b>Occupation of husband</b>				
Unskilled and other	73.3		37.4	
Moderately skilled	77.3		39.2	
Highly skilled	84.2	0.400	38.9	0.927
<b>Participation on decision-making</b>				
No participation	79.3		62.1	
Moderate	74.8		40.1	
High	77.8	0.422	37.2	0.813
<b>Ownership of assets</b>				
No ownership	80.8		41.1	
Moderate	73.5		35.7	
Full ownership	76.3	0.072	45.1	0.279

#### 4.4 Regression Results

The study sought to determine the association between mother's empowerment indicators and uptake of child health services. Table 4 shows the adjusted odds ratios for predictors of vaccination and treatment for diarrhea. After controlling for the age, sex, birth order of the child, and other socio-demographic predictors, there was no statistically significant association between mothers' empowerment indicators and child health outcomes. As Table 4 shows, however, there were some statistically significant associations between background characteristics and child health outcomes. Predictors of completion of the basic childhood immunizations included being in the middle wealth quintile compared with the poorest quintile (AOR=2.3\*, 95% CI=1.2; 4.3), having visited a health facility in the past 12 months compared with not having visited (AOR=2.3\*\*\*, 95% CI=1.6; 3.3), and having health insurance compared with having none (AOR=3.1\*, 95% CI=1.1; 9.0). Higher birth order was associated with lower odds of receiving vaccination after controlling for other factors (AOR=0.3\*\*\*, 95% CI=0.2; 0.5).

Table 4 shows that the odds of receiving treatment for diarrhea for children whose mothers visited a health facility in the past 12 months were 1.5 times higher than for children whose mothers did not visit a health facility. The mother's use of the internet favored treatment for childhood diarrhea (AOR=2.1\*, 95% CI=1.2; 3.7). Odds of receiving treatment for diarrhea were lower for children with a household head age 25-34 compared with age 15-24 (AOR=0.3\*\*\*, 95% CI=0.2;0.6). Other statistically significant predictors of not receiving treatment for diarrhea among children under age 5 included birth order of 5-10 compared with 1-4 (AOR=0.5\*, 95% CI=0.3; 0.97); household head age 25-34 compared with age 15-24 (AOR=0.3\*\*\*, 95% CI=0.2 ;0.6); household head age 35-49 compared with age 15-24 (AOR= 0.4\*\*, 95% CI=0.2;0.8); and household head age 50 or older compared with age 15-24 (AOR=0.4\*\*, 95% CI=0.2;0.8).

**Table 4 Results of the multivariable logistic regression of uptake of child health services**

Variable	Completed the basic vaccinations		Received treatment for diarrhea	
	AOR	95% CI	AOR	95% CI
<b>Mother's participation in decision-making</b> (ref.: no participation)				
Moderate	2.4	0.8 - 6.8	0.7	0.2 - 2.2
High	2.8	0.9 - 8.7	0.6	0.2 - 2.0
<b>Ownership of assets by mother</b> (ref.: no ownership)				
Moderate ownership	0.8	0.5 - 1.1	0.9	0.6 - 1.3
Full ownership	0.9	0.5 - 1.7	1.3	0.7 - 2.2
<b>Age of child</b>	0.97	1.0 - 1.1	1.0	0.99 - 1.02
<b>Birth order number of child</b> (ref.: 1-4)				
5-10	0.3***	0.2 - 0.5	0.5*	0.3 - 0.97
<b>Sex of child</b> (ref.: male)				
Female	1.1	0.8 - 1.6	1.1	0.8 - 2.1
<b>Age of mother</b> (ref.: 15-24)				
25-34	1.3	0.7 - 2.2	1.3	0.8 - 2.0
35-49	2.2	1.0 - 4.9	1.5	0.7 - 3.2
<b>Inter-spousal age difference</b> (ref.: same age)				
Woman older	1.6	0.4 - 5.6	1.6	0.5 - 5.3
Spouse 2-5 years older	1.4	0.7 - 2.9	0.7	0.3 - 1.4
Spouse 6-9 years older	0.9	0.4 - 1.8	1.4	0.6 - 3.0
Spouse older by 10 or more years	1.1	0.5 - 2.2	1.01	0.4 - 2.4
<b>Age of household head</b> (ref.: 15-24)				
25-34	0.8	0.4 - 2.6	0.3***	0.2 - 0.6
35-49	0.98	0.4 - 2.6	0.4**	0.2 - 0.8
50-95	0.9	0.4 - 2.3	0.4**	0.2 - 0.8
<b>Mother's level of education</b> (ref.: no education)				
Primary	0.2	0.02 - 2.1	0.1	0.02 - 1.1
Secondary	0.3	0.03 - 2.6	0.2	0.02 - 1.4
Higher	0.3	0.03 - 4.3	0.1	0.008 - 1.04
<b>Religion of mother</b> (ref.: other)				
Apostolic	0.5	0.2 - 1.3	1.3	0.6 - 2.6
Christian	0.6	0.2 - 1.6	1.2	0.5 - 2.6
<b>Sex of household head</b> (ref.: male)				
Female	0.8	0.5 - 1.3	1.3	0.9 - 1.9
<b>Ownership of mobile phone by mother</b> (ref.: does not own a mobile phone)				
Yes	1.1	0.7 - 1.7	0.9	0.6 - 1.3
<b>Use of internet by mother</b> (ref.: does not use the internet)				
Yes	1.3	0.7 - 2.5	2.1*	1.2 - 3.7
<b>Mother's wealth index</b> (ref.: poorest quintile)				
Poorer	0.9	0.5 - 1.5	1.4	0.9 - 2.3
Middle	2.3*	1.2 - 4.3	1.1	0.6 - 2.0
Richer	1.03	0.5 - 2.1	0.8	0.4 - 1.6
Richest	0.6	0.3 - 1.2	1.4	0.7 - 2.8
<b>Visit to health facility in past 12 months</b> (ref.: no visit)				
Yes	2.3***	1.6 - 3.3	1.5*	1.01 - 2.2
<b>Health insurance cover</b> (ref.: no insurance coverage)				
Yes	3.1*	1.1 - 9.0	1.2	0.5 - 3.1
<b>Mother's husband or partner's occupation</b> (ref.: unskilled)				
Moderately skilled	0.9	0.6 - 1.5	1.02	0.7 - 1.6
Highly skilled	1.2	0.4 - 3.6	0.9	0.4 - 2.0

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

## 5 DISCUSSION

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This study sought to determine the levels of mother's empowerment and to assess the association between mother's empowerment and uptake of child health services in Zimbabwe, through a secondary analysis of data from the 2016 Demographic and Health Survey. Mother's empowerment was assessed by the extent of mother's decision-making power and asset ownership. Decision-making power was a composite variable, which was a weighted summation of mother's ability to decide on social visits, ability to decide on own health care, ability to participate in decision-making on household purchases, and ability to decide on husband's earnings. Asset ownership was also a composite variable, being a weighted summation of house and land ownership with or without title deeds. Uptake of child-care services was assessed through two indicators, namely basic vaccination status of children age 12-23 months and care seeking for treatment of diarrhea for children under age 5.

There was no significant association found between mother's empowerment variables and treatment of diarrhea. This can be explained by the fact that diarrheal diseases are generally not considered a serious condition by Zimbabwean women. Most women, regardless of their decision-making power, will use home remedies and other traditional therapies to try to manage diarrhea. Women will generally report to a health facility for professional care if the child has bloody diarrhea or chronic diarrhea, or when the child is severely dehydrated. Such poor health-seeking behaviors can be addressed by intensive community awareness campaigns on the danger signs of diarrhea and the importance of seeking prompt treatment.

The study hypothesized that mother's empowerment is determined by sociodemographic characteristics such as level of mother's education, age, inter-spousal age difference, partner's occupation, place of residence, age of household head, wealth index, and number of children born. These assumptions were supported by the study results, as these factors were associated with either mother's decision-making power or asset ownership, decision-making on household purchases, or ability to decide on husband's earnings. Some studies have also reported an association between sociodemographic characteristics and women's decision-making autonomy on health care (Pambe, Gnomou, and Kabore 2013). A study in Nigeria based on 2013 DHS data singled out place of residence, age, education, religion, wealth index, occupation, home ownership, and husband's occupation as independent factors associated with women's decision-making on health care (Corroon et al. 2014).

After controlling for sex of the child, age of household head, inter-spousal age difference, number of children, health insurance coverage, and respondent's occupation, significant predictors of mother's participation in decision-making were highest education level of the mother, religion, ownership of mobile phone, wealth index, and partner's occupation. Mothers in the lowest wealth quintile were less likely to participate in decision-making compared with mothers in higher wealth quintiles. A related study also reported a similar association between wealth quintiles and women's ability to use and decide on modern contraception (Kabeer 2012). In Zimbabwe, women who can make independent or mutual decisions on family matters often have a financial muscle and are able to pay for their own health services and their children's. Children from households in which women had no say on their husband's earnings were less likely to receive full basic vaccinations. Half of women in the survey were not working, so consequently their ability to spend husband's earnings was even more critical. A systematic review held in developing countries in 2016 reported a statistically significant association between women's empowerment and child

health outcomes such as child mortality, full vaccination and nutritional status of children (Pratley 2016). A study in Kenya reported similar results on women's empowerment and wealth. Female partner's participation in decision-making was associated with increased wealth in the rural regions (Upadhyay and Hindin 2005). There might be a great need to intensify awareness campaigns on gender equality and women's rights as stipulated in the Convention on the Elimination of All Forms of Discrimination and Violence against Women. This would improve child health outcomes.

Mothers whose husbands were not working were more likely to control household assets and husband's resources. This result clearly brings out the change of power dynamics in households when men's status goes down. Men who do not work have less financial power and less coercive power in the context of Zimbabwe. When the partner/husband is not working, the wife automatically takes the leading role and can demand that the husband declare what little income he gets. In African societies the financial burden for a household is entirely placed on the husband, and if the situation changes he become more vulnerable, and more likely to face a backlash from his wife and to exercise less independent power on spending.

In the study, mothers whose husbands were under age 34 were less likely to own assets compared with those whose husbands or partners were older, with the likelihood of asset ownership increasing with increasing age groups of partners. This can be explained by the socioeconomic status of the country. The majority of the young men and women in Zimbabwe are still dependent on their parents and relatives for survival owing to the country's high unemployment rate. This increases their probability of not owning any asset.

Diarrheal diseases among children under age 5 (0-59 months) had a prevalence of 17%. Of the children who had diarrhea in the preceding two weeks, only 42% received medical treatment from a professional service provider. This means that the majority of the children who had diarrhea were treated through other means than from a professional service provider (Zimbabwe Demographic Health Survey and ICF 2016). Such practices predispose children to further infection and increase the risk of conditions like environmental enteropathy, which have been associated with high levels of stunting in children age 0-59 months and poor development (Prendergast and Kelly 2016).

Although two-thirds of the mothers in the study had mobile phones, 79% had never used the internet. A lot of social marketing for positive behavior change is done on the internet and at times via smart phones. Lack of access to these services is disempowering to women. The results are a true reflection of the Zimbabwean rural women, who hardly have access to the internet. Those who have mobile phones usually possess an outdated version not compatible with new technologies. The study found that internet use increased the likelihood of treatment for diarrhea among children age 0-59 months compared with those whose mothers had no internet access. As for vaccination, this finding strengthens the importance of media and virtual social networks in social behavior change communication and promotion of good health care practices. This could also explain why women who visited a health facility in the last 12 months were more likely to use child health services, because they would receive information and education from the health providers at the facility.

Only 9% of the mothers in the study had health insurance coverage. This could partly be explained by the fact the half of the mothers were unskilled workers who relied on part-time jobs for survival. This was worsened by the fact that another 47% of the participants were not working at all. Failure to have insurance

coverage greatly increases the likelihood that women will not access health care services, and it has a negative bearing on child health outcomes, especially in cases of health emergencies. The government of Zimbabwe should consider introducing community health insurance models, since they have been proven elsewhere to be effective in enhancing community solidary-funding systems for health care in poor-resource settings.

The study found that having visited a health facility in the last 12 months increased the odds of having a child vaccinated by 130%. This shows that continuous interaction with the health facility is empowering to mothers on recommended health practices, and this has ripple effects on positive child health outcomes.

Women in the poorest wealth quintile were less likely to get their children fully vaccinated compared with those in the middle quintile. This could be due to problems of poor access that are financially related, including lack of cash for transport costs and a generalized fear of going to the clinic without appropriate clothing for themselves and the child. Women in the richest wealth quintile were less likely to have their children vaccinated due to a different reason. In Zimbabwe, women who are rich often do not prioritize vaccination because they do not want to queue in public health centers; as a result they get their health services from a private service provider. Most of the private health service providers do not prioritize child immunization services, since this is a free service offered in the public health sector, while the private sector focuses on profit-making health services. The governments in developing countries should monitor the implementation of vaccination programs in the private sector and also target the elite women with social behavior change strategies. A similar study reported that women's education, wealth quintile, and region are the most important determinants for the use of child health care services (Pambe, Gnomou, and Kabore 2013).

There was no significant association between mothers' empowerment variables and basic vaccination status of children age 12-23 months. A systematic review in 75 countries on gender empowerment also reported that child immunization status has no statistically significant association with women's decision-making power (Thorpe et al. 2016).

## **5.1 Limitations**

The study results only represented children of de facto mothers, leaving out other children who might also have had diarrhea and who were eligible for basic vaccinations in the same period. The sample size was also relatively small for the child health outcomes, especially treatment of diarrhea, which reduced the power to detect statistical significance. Finally, the measures of women's empowerment used for this study may not be good measures for Zimbabwe, and new ways of measuring women's empowerment could be employed in future studies.

## **5.2 Potential Policy Implications**

The governments in developing countries need to consider viable and sustainable health insurance coverage schemes for the general population. Approaches like the community health care funding schemes will go a long way not only in cushioning communities on health matters, but also in enhancing community ownership and accountability on their health matters.

### **5.3 Conclusion**

In this study, an association of mother's empowerment variables with uptake of child health services for vaccination and treatment of diarrhea was not found to be statistically significant after adjusting for other variables. However, both women's empowerment and uptake of child health care services were significantly associated with sociodemographic background characteristics. There is need for policymakers to strengthen internet-based social behavior change communication strategies, as this will be likely to increase uptake of child health services. Policymakers in low-income countries can consider promoting community-initiated health insurance programs, such as community revolving funds, to cover children's health care.



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