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"THE HIDDEN HUNGER": UNDERSTANDING THE BURDEN OF ANAEMIA AND ITS DETERMINANTS AMONG PREGNANT AND NON-PREGNANT WOMEN IN ETHIOPIA

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ABSTRACT

Anaemia is a global public health problem associated with increased mortality and morbidity. The highest prevalence of anaemia exists in the developing world where its causes are multi-factorial. The objective of the study was to assess the burden of anaemia and its determinants among pregnant and non-pregnant women in Ethiopia. The 2005 Demographic and Health Survey data of Ethiopia were used. Permission to download and analyze the data was granted from ORC Macro, in Calverton, USA. SPSS v10.0 was used to analyze the data. Both univariate and multivariate analysis were carried out. Trend analysis was done using the stat-calc programme on Epi-info 2002. For all statistical tests, significance level was set at p-value of 0.05. A total of 5960 women of child bearing age were included in the analysis. The mean haemoglobin was 12.72g/dl (95%CI: 12.66, 12.78g/dl). The general prevalence of anaemia among women was 27.7% (95%CI: 26.6, 28.9%). The prevalence of anaemia was 33.0% (95%CI: 28.7, 37.2%) and 27.3% (95%CI: 26.1, 28.4%) among pregnant and non-pregnant women respectively. The chi^2 for linear trend test revealed a significant negative association between prevalence of anaemia and women's educational status, grouped altitude of residential places and household wealth index categories ($p<0.05$, for all three variables). The prevalence of anaemia was positively associated with past five years fertility level (chi^2 for linear trend=35.2, df =2, $p<0.0001$). Not possessing any toilet facilities (OR 1.85 95%CI: 1.66, 2.1), being resident of rural area (OR 2.02 95%CI: 1.75, 2.32) and not using contraceptive methods (OR 1.63 95%CI: 1.34, 1.98) were also associated with prevalence of anaemia among women. Logistic regression showed toilet possession to be the only independent predictor of prevalence of anaemia among pregnant women (Adj OR 2.17 95%CI: 1.28, 3.85). However, regression analysis among non-pregnant women revealed not having any toilet facilities (Adj OR 1.20 95%CI: 1.02, 1.42), lowering altitude categories of residential areas and not using contraception methods (Adj OR 1.39 95%CI: 1.13, 1.72) to be independent predictors of prevalence of anaemia. In conclusion, anaemia is a moderate public health problem among women in Ethiopia but there exist significant differences in magnitude by socio-economic status of women and their families and where they live. Interventions designed to address maternal anaemia should pay attention to both nutritional and non-nutritional intervention strategies that may include environmental sanitation, de-worming, and provision and promotion of family planning methods.

Key words: anaemia, women, Ethiopia, determinants, burden

INTRODUCTION

It is estimated that around 1.62 billion people are affected by anaemia globally. This absolute number of cases is translated into prevalence rate of 24.8% (95% CI: 22.9-26.7%) worldwide. Anaemia prevalence is highest among pre-school age children and adult women [1].

Globally, Iron Deficiency Anaemia (IDA) alone causes 841 000 deaths and 35 057 000 Disability Adjusted Life Years (DALYs) lost. The highest prevalence of anaemia exists in Low Income Countries (LIC). They bear more than 90% of the global burden. Africa and parts of Asia alone bear 71% of the global mortality burden and 65% of DALYs lost, whereas North America bears only 1.4% of the global burden [1, 2].

There is an established relationship between anaemia and maternal mortality. Iron deficiency anaemia alone was estimated to be an underlying factor for 22% of maternal deaths around the world. Severe anaemia is a major contributor to maternal deaths. In addition, mild and moderate anaemia can also increase the risk of death when compared with normal haemoglobin levels [3-6].

Anaemia plays an important role in socio-economic development of nations. This effect of anaemia could be attributed to reduction in school performance, physical weakness, fatigue, and reduction in work capacity among affected individuals [7, 8].
Women are at increased risk of becoming anaemic due to several physiologic or socio-cultural factors. Significant iron loss occurs in women during menstruation. Median monthly loss of blood during menstruation is estimated at 35 ml which is equivalent to more than 12 mg of iron [9].

Because of women's greater iron requirements, and also because they usually consume less food than men, women's daily iron intake tends to be marginal. This is especially true in many developing countries where general food consumption is reduced because of poverty [10].

Anaemia is a common problem in Ethiopia which has been recognized for decades. Using mathematical models, WHO (World Health Organization) estimated the prevalence of anaemia in Ethiopia to be 62.7% (95% CI 31-86.7)] and 52.3% (95% CI 24.9-78.4%) among pregnant and non pregnant women respectively [1]. However, the DHS (Demographic and Health Survey) of 2005 reported anaemia prevalence of 26.6% among women in Ethiopia [11].

The aim of this paper was to estimate the burden of anaemia and identify its determinant factors among pregnant and non-pregnant women in Ethiopia.

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METHODOLOGY

Sampling technique

The 2005 DHS data of Ethiopia were used. The sample was stratified, clustered and selected in two stages. The first stage was to select the 540 clusters (145 urban and 395 rural) from enumeration areas of population and housing census sample frame. Then between 24 and 32 households were systematically selected from each cluster. Participants were selected from all 9 regions of Ethiopia, namely: Tigray, Amhara, Afar, Benishangul-Gumuz, Gambella, Harari, Oromia, Somali and Southern Nations, Nationalities**,** and People**'**s Region (SNNPR) and 2 chartered cities: Addis Ababa and Dire Dawa.

Data collection

Ethiopian DHS 2005 data were collected through questionnaires and blood specimens. There were separate questionnaires for women and households in general. Haemoglobin testing was done using the HemoCue system. The data were collected from April to August, 2005. Detailed procedure for data collection was described on the Ethiopian DHS 2005 report and is available *online* [11].

Ethical clearance

A request to download and analyze the data was made through e-mail to ORC Macro in Calverton, Maryland, USA. Permission to download and analyze the data was granted. The Ethiopian DHS, 2005 repost shows that participants consent was sought as follows: A consent statement was read to the eligible woman and to the parent or responsible adult of young children and women age 15-17. This statement explained the purpose of the test, informed prospective subjects tested and/or their caretakers that the results would be made available as soon as the test was completed, and requested permission for the test to be carried out, as well as consent to report their names to health personnel in the local health facility if their haemoglobin level was severe [11].

Data Analysis

Data were analyzed using SPSS version 10.0. For running trend analysis, the stat-calc programme on EPI-info 2002 was used.

Both univariate and multivariate analysis were carried out. Logistic regression model was run using the 'enter' method to identify independent predictors of anaemia. The model was run for pregnant and non-pregnant women separately. For all statistical procedures applied, level of significance was set at alpha of 0.05.

To adjust haemoglobin values for altitude, the Centre for Disease Control (CDC) Atlanta method was used and is expressed as follows [12]:

- Haemoglobin = -0.32 x (altitude in metres x 0. 0033) + 0.22 x (altitude in metres x $0.0033)^2$

The definitions used for clinical anaemia and its public health significance are displayed in table 1.

RESULTS

The 2005 Ethiopian DHS included a total of 14,070 households for interview. Haemoglobin test was planned to be conducted once in every two households for women and children. A total of 6,812 women were selected for haemoglobin test. Finally, 5963 women gave blood for haemoglobin test. However, only 5960 women were considered for analysis; three were removed due to extreme values.

The median age of the respondents was 26.0 years (Interquartile Range 22-37 years). The age group 15-19 years took the highest share, accounting for 23.4% of the study population. Similar to the population distribution based on type of residence in the country, majority of the study population were rural dwellers; around three out of four women were rural dwellers in this study population (Table 2).

Further analysis of characteristics of respondents and non-respondents did not show any significant variations. Grossly, the rural residents responded better (88.7%) than urban residents (80.1%). Response rate linearly decreased with educational status; the well educated were less likely to give blood for the test.

Prevalence of anaemia

Mean haemoglobin concentration was 12.72g/dl (95%CI: 12.66, 12.78g/dl) with $\pm$ 2SD of 3.96 g/dl. The general prevalence of anaemia was 27.7% (95%CI: 26.6, 28.9). Out of the total 5960 women, eighty two (1.4%), and 465 (7.8%) were having severe and moderate anaemia, respectively. The prevalence of anaemia was 33.0% (95%CI: 28.7, 37.2%) and 27.3% (95%CI: 26.1, 28.4%) among pregnant women (PW) and non-pregnant women (NPW), respectively (Table 3). The prevalence was significantly higher among PW than among NPW (P_{PW}-P_{NPW}=5.7% 95%CI: 1.3, 10.1%).The prevalence of moderate to severe anaemia was 16.9% (95%CI: 13.5, 20.3%) and 8.5% (95%CI: 7.7, 9.35%) among PW and NPW, respectively.

Anaemia is a significant public health problem among women in all regions. Three regions: Afar, Somali and Gambella were identified as having a severe public health problem of anaemia among women. The remaining regions had a moderate public health problem except Addis Ababa where it was mild.

Factors associated with prevalence of anaemia

Type of place of residence

Out of the total 4324 rural women, 31.2% (95%CI: 29.9, 32.6%) were anaemic. The odds of being anaemic were twice as many in rural women than in urban women OR=2.02 (95%CI: 1.75, 2.32). This effect of type of residence maintained the direction of association but failed to achieve statistical significance in multivariate analysis for both PW and NPW.

Moreover, the prevalence of moderate to severe anaemia was 11.0% (95%CI: 10.0, 12.0%) among rural women where as it was 4.5% (95%CI: 3.5, 5.5%) among urban women. The odds of having either moderate or severe anaemia was 2.64 (95%CI: 2.03, 3.42) times higher among rural women than urban women.

When the analysis was further carried out, only for PW, all the 80 (16.9%) PW with moderate to severe anaemia were rural dwellers; this difference by place of residence was statistically significant using one sided Fischer's exact test (p=0.001).

Altitude

The prevalence of anaemia was higher in the lower altitude group than in the higher altitude groups.

The odds of being anaemic were 2.7 times higher among women living below altitude of 1000 metres than the group living at an altitude range of 2000-2500 metres (OR=2.70 95%CI: 2.22, 3.33)**.** Similarly the odds of being anaemic was 0.64 (95%CI: 0.51, 0.81) and 0.56 (95%CI: 0.45, 0.68) times lower in the altitude category 1000-1500 metres and 1500 to 2000 metres, respectively when compared with the lowest altitude category (less than 1000 metres). Multivariate analysis also confirmed the same pattern for NPW but failed to attain statistical significance for PW.

The linear trend analysis through chi^2 test showed that there was a statistically significant trend association between the category of altitude and prevalence of anaemia (chi^2 for linear trend=85.3, P<0.0001). The trend was similar even after further running cluster analysis by area of residence; however, rapid fall in the prevalence of anaemia was seen in the urban settings when compared with the rural setting (figure 2*)*.

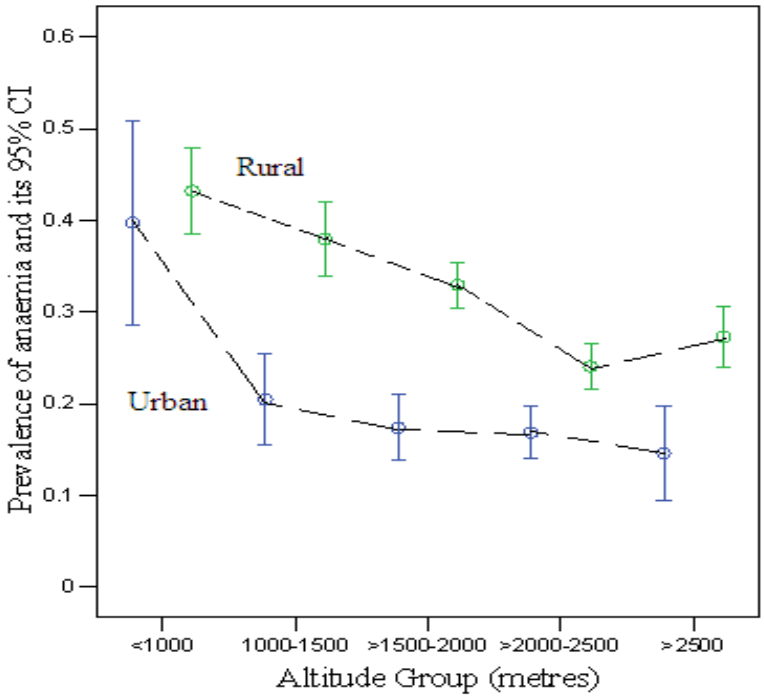

Figure 2: Prevalence of anaemia among women by altitude and clustered by type of place of residence, EDHS 2005

Possession of toilet facilities

The prevalence of anaemia was 33.4% (95% CI 31.8, 35.1%) for women who live in households with no any type of toilet facility and 21.2% (95% CI 19.7, 22.8%) for women who live in households with any type of toilet facility. The odds of being anaemic was 1.85(95%CI 1.66, 2.10) times higher among those not having toilet than those having any type of toilet. Possession of toilet is the only variable that maintained level of significance in multivariate analysis for both PW and NPW.

Use of contraception and fertility level

In the survey, women were asked whether they use any contraception methods. Out of the 5960 women selected for haemoglobin testing, 706 (11.9%) were using at least one type of contraception methods. Injections were the commonly used contraception method (451/706, 63.9%).

The odd of being anaemic was significantly higher among women not using any type of contraception than those using at least one method (OR 1.63 95%CI: 1.34, 1.98). Logistic regression analysis revealed similar finding for NPW (Adj OR 1.39 95%CI: 1.13, 1.72).

Number of births in the past five years was also considered as predicting variable in the analysis. Out of 5960 women considered for analysis 27.0% (1607/5960) had given birth once in the past five years.

The odd of being anaemic was higher among those who gave birth once (OR 1.47 95%CI: 1.28, 1.68) or ≥ two times (OR 1.47 95%CI: 1.27, 1.69) in the past five years than those who did not give birth. However, the association failed to attain statistical significance for both PW and NPW in logistic regression analysis.

Educational level

Out of 3635 women who had not attained any level of education, 31.8% were anaemic (95%CI: 30.3, 33.3%) where as out of 1325 women who completed primary schooling 24.5% (95% CI: 22.2, 26.9%) were anaemic.

The odds of being anaemic was 2.5 higher in the non educated group than among the group who had attained higher educational level and it was approximately twice as large as among the group who attained secondary educational level. The association was statistically significant OR 2.6 (95% CI: 1.64, 4.17) and OR 2.2 (95%CI: 1.82, 2.63), respectively. A similar pattern was observed with multivariate analysis for NPW but not for PW.

The prevalence of anaemia decreased with increase in the highest educational level attained by the women. The linear trend analysis through chi^2 test showed that there was a statistically significant trend association between highest educational level attained by the mother and prevalence of anaemia (chi^2 for linear trend=90.9, P<0.0001).

Wealth index

The prevalence of anaemia ranges from a level of 36.3% (95%CI 33.5, 39.0%) in the poorest wealth index group to 18.6% (95%CI 16.9, 20.3%) among the richest wealth index group.

The prevalence of anaemia decreased when moving up through wealth index categories. The odds of being anaemic were 2.5 times more likely in the poorest wealth quintile than the richest wealth quintile and it was statistically significant (OR=2.5, 95%CI: 2.13, 2.94). The linear trend analysis through chi^2 test showed that there was statistically significant trend association between wealth index and prevalence of anaemia (chi^2 for linear trend=127.1, P<0.0001).

DISCUSSION

In the analysis, the prevalence of anaemia among pregnant and non-pregnant women was found to be lower than WHO estimates. Even though the 95% CI limits estimated by WHO include the prevalence in this paper, the point estimate is by far bigger than the estimates in this paper. This might have happened due to the fact that the model that WHO uses to estimate prevalence of anaemia is likely to be prone to overestimate anaemia prevalence. In addition, other small-scale studies conducted in different parts of the country have always reported overall prevalence rate that is lower than 30% [13-16].

Again the prevalence reported in this paper is around one percent higher than that reported in DHS document. This might have happened due to two reasons. First, the prevalence reported in the DHS document is the weighted prevalence where as in this analysis no weight was applied to the data set. Second, extreme values were trimmed out in this analysis whereas the DHS document states nothing about extreme values.

In the analytic part, several variables that may explain the distribution of anaemia among women in the country have been observed. Most of the residents in the regions with high prevalence of anaemia live in lowland areas categorized as below 1000 metres; for instance, 60.8% of study participants in Afar region lived in this altitude range. In line with this, another variable that might explain the variations in anaemia prevalence by altitude and type of place of residence is the wealth index. In regions where the prevalence of anaemia is fairly low, the wealth index exhibits high weights for the upper quintiles. On the contrary, in regions where the prevalence of anaemia was very high, the highest weight was shared by the poorest quintile. Similarly, around 90% of the urban participants live in households where wealth index was in the highest quintile where as only around 15% of rural participants lived in the highest wealth quintile.

What direct causes of anaemia can relate those demography related variables to anaemia? One possible hypothesis is to assess the link between hookworm infections and malaria with these distant variables. In general, those regions with high prevalence of anaemia are lowlands and coastal regions where the soil is sandy. Sandy soils are known to allow greater hookworm mobility. The high temperature at low lands is also another environmental factor that supports hookworm life cycle. Due to these facts, residents of such low land places can exhibit high hookworm endemicity [17, 18]. In addition, agriculture is still the main source of living for this population especially in rural areas. Historically, hookworm has been a major occupational hazard for agricultural labourers due to the fact that they are highly in contact with soil, which is a requirement for the transmission of the parasite [18].

Several studies have also confirmed a significant association between wealth index and hookworm infection. A multi-country study revealed that the prevalence of hookworm is negatively associated with wealth index [19].

Possession of toilet, that retained its significance even after running logistic regression model, could also be associated with the variations in prevalence of anaemia. The proportions of women who live in households with any type of toilet range from 12.4% to 32.7% among highly affected regions. Though toilet possession does not necessarily translate into its appropriate utilization, it can still give an insight to disposal mechanisms of human wastes that could play important role in the transmission of the worm. Inadequate sanitation and the deposition of human faeces on soil propagate the lifecycle of hookworm [18, 20]. In fact, lack of access to toilet can also predispose people to other soil-transmitted helminthiasis and schistosomiasis which can also lower haemoglobin level [18]. Though wearing of shoes was not considered as a variable in the analysis, it can also contribute to high prevalence of hookworm infection [21].

The other hypothesis is to look at the effect of altitude on the prevalence of malaria. In general, the situation in Ethiopia is that the *Dega zones* [1](altitude above 2500 metres) with a mean annual temperature of 10-15 degree Celsius and much of the *Woinadega* zones[2] (altitude 1500-2500 metres) are malaria-free. Malaria usually occurs below an altitude of 2000 metres with short lived transmission following the rains. A linear decrease in the prevalence of malaria was also observed in another study conducted in Oromia, Amhara and SNNP regions with increase in altitude [22].

According to UNICEF's malaria map, the regions with high anaemia prevalence are subject to seasonal malaria with stable transmission of more than three months, leading to acquired immunity among people; such kind of transmission can gradually result in degraded haemoglobin levels [23,24]. Though altitude can be used to describe the general distribution of malaria, other variables of importance are humidity, rainfall and temperature [25].

The third reason could be the household food security status of the population living in those regions. According to the report from FEWS NET, food insecurity levels were also high in these three regions in 2005. Major rural parts of Afar and Somali regions were identified as hot spot areas and in Gambella, the proportion in need of food assistance was more than 75% in 2005 [26].

The link observed between type of residence and severity of anaemia among pregnant women is another main issue identified. In this study, it was observed that almost all pregnant women with severe or moderate anaemia live in rural areas. The direct link between this type of anaemia and maternal mortality, coupled with the poor health seeking behaviour, poor transportation facilities and a weak health system that is not able to expand its services to the rural areas, reveal the need to address anaemia as a key strategy towards reducing maternal mortality.

Past fertility levels were also found to be associated with anaemia among women. This could happen because frequent fertilities might lead to a degraded haemoglobin level in mothers. It might also be linked with the competing nutritional demands in households with many children.

The linear trend observed between anaemia prevalence and educational status of women has been repeatedly observed in studies [27-29]. This might be happening because educated women are likely to have better income, to consume diversified diets, and more likely to utilize the health system for early treatment of diseases than uneducated women. The better living environment and access to health facilities by educated women might also contribute to the observed differences.

[1] Dega zone is cool and humid

[2] Woinadega zone is cool semi-arid

From this study, it can be concluded that anaemia is a moderate public health problem among women in Ethiopia, but there exist significant differences in magnitude by socio-economic status of women and their families. The social determinants of health go even beyond macro level health problems and extend to affect the distribution of micronutrient deficiencies. Affecting the intelligence and productivity of women anaemia plays an important role in facilitating the poverty trap.

Interventions designed to address maternal anaemia should pay attention to both nutritional and non-nutritional strategies that may include environmental sanitation, de-worming, and promotion of family planning methods.

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Table 1: Classification of clinical anaemia and public health significance

Type	Definitions	Pregnant women (g/dl)	Non pregnant women (g/dl)	Prevalence (%)
Clinical anaemia	No anaemia	>11.0	>12.0	
	Mild anaemia	10.0-10.9	10.0-11.9	
	Moderate anaemia	7.0-9.9	7.0-9.9	
	Severe anaemia	<7.0	<7.0	
Public Health significance	No public health problem			<5.0
	Mild public health problem			5.0-19.9
	Moderate public health problem			20.0-39.9
	Severe public health problem			>40.0

Source: WHO, CDC [1]

Table 2: Back ground characteristics of study participants, EDHS 2005

S.No	Variables		Frequency	
			Number	Percent
1	Age 5-year groups	15-19	1395	23.4
		20-24	1089	18.3
		25-29	1109	18.6
		30-34	725	12.2
		35-39	689	11.6
		40-44	514	8.6
		45-49	439	7.4
2	Altitude category (in metres)	Less than 1000	520	8.7
		1000-1500	833	14.0
		>1500-2000	1822	30.6
		>2000-2500	1867	31.3
		>2500	918	15.4
3	Type of place of residence	Urban	1636	27.4
		Rural	4324	72.6
4	Highest educational level	No education	3635	61.0
		Primary	1325	22.2
		Secondary	861	14.4
		Higher	139	2.3
5	Wealth index	Poorest	1211	20.3
		Poorer	951	16.0
		Middle	930	15.6
		Richer	887	14.9
		Richest	1981	33.2
6	Pregnancy status	Not Pregnant*	5487	92.1
		Pregnant	473	7.9
	Total *(similar for all sub groups)*		5960	100

***Not pregnant includes also women who responded pregnancy status as unknown*

Table 3: Prevalence of anaemia based on pregnancy duration, breast feeding and pregnancy status of women, EDHS 2005

Groups		Anemic	
		No	% (95%CI)
Pregnancy trimester	First	28	28.9 (19.8, 38.0)
	Second	84	32.9 (27.2, 38.7)
	Third	44	36.4 (27.7, 45.0)
Total		156	33.0 (28.7, 37.2)
Breast feeding status	No	1037	25.9 (24.6, 27.3)
	yes	615	31.4 (29.3, 33.4)
Total		1652	27.7 (26.6, 28.9)
Pregnancy status	No	1496	27.3 (26.1, 28.4)
	Yes	156	33.0 (28.7, 37.2)
Total		1652	27.7 (26.6, 28.9)

Table 4: Logistic regression of factors associated with anaemia among women in Ethiopia, EDHS 2005

Variables	Prevalence% (95%CI in %)	Crude OR (95%CI)	Adjusted OR (95%CI)	
			PW	NPW
Type of residence				
Urban	18.4 (16.5, 20.3)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Rural	31.2 (29.9, 32.6)	2.02(1.75,2.32)*	1.12 (0.23, 5.40)	1.13 (0.89, 1.45)
Possession of toilet				
Yes	21.2 (19.7, 22.8)	1.0 (reference)	1.0 (reference)	1.0 (reference)
No, use open field	33.4 (31.8, 35.1)	1.85(1.66,2.10)*	2.17 (1.28, 3.85)*	1.20 (1.02, 1.42)*
Altitude (metres)				
<1000	42.7 (38.4, 47.0)	1.0 (reference)	1.0 (reference)	1.0 (reference)
1000-1500	32.4 (29.2, 35.6)	0.64(0.51,0.81)*	1.13 (0.48, 2.65)	0.77 (0.60, 0.98)*
1500-2000	29.3 (27.2, 31.3)	0.56 (0.45, 0.68)*	0.63 (0.29, 1.40)	0.65 (0.52, 0.81)*
2000-2500	21.4 (19.6, 23.3)	0.37 (0.30, 0.45)*	0.54 (0.24, 1.24)	0.46 (0.37, 0.58)*
>2500	24.7 (21.9, 27.5)	0.44 (0.35, 0.55)*	0.85 (0.35, 2.03)	0.48 (0.38, 0.62)*
Wealth index				
Poorest	36.3 (33.5, 39.0)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Poorer	33.2 (30.2, 36.2)	0.88 (0.73, 1.05)	1.74 (0.97, 3.14)	1.01 (0.83, 1.23)
Middle	28.5 (25.6, 31.4)	0.70(0.58, 0.84)*	1.18 (0.64, 2.18)	0.90(0.73, 1.11)
Richer	29.7 (26.6, 32.7)	0.74 (0.62, 0.89)*	1.50 (0.76, 2.99)	1.02 (0.82, 1.27)
Richest	18.6 (16.9, 20.3)	0.40(0.34, 0.47)*	0.73 (0.27, 1.93)	0.76 (0.57, 1.02)
Educational status				
No education	31.8 (30.3, 33.3)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Primary	24.5 (22.2, 26.9)	0.70(0.60, 0.81)*	0.76 (0.43, 1.34)	0.91(0.77, 1.08)
Secondary	17.5 (15.0, 20.1)	0.46 (0.38, 0.55)*	0.24 (0.03, 2.16)	0.83 (0.65,1.05)
Higher	15.1 (9.1, 21.1))	0.38 (0.24, 0.61)*	0.77 (0.06, 9.97)	0.73 (0.44, 1.23)
Use of contraception				
Yes	19.8 (16.9, 22.8)	1.0 (reference)	NA	1.0 (reference)
No	28.8 (27.6, 30.0)	1.63 (1.34, 1.98)*	NA	1.39 (1.13, 1.72)*
Parity (past 5years)				
None	23.9 (22.4, 25.4)	1.0 (reference)	1.0 (reference)	1.0 (reference)
One birth only	31.5 (29.3, 33.8)	1.47 (1.28, 1.68)*	1.64 (0.92, 2.93)	1.21 (0.98, 1.48)
Two or more births	31.5 (29.1, 34.0)	1.47 (1.27, 1.69)*	1.23 (0.63, 2.40)	1.10 (0.85, 1.41)

PW (Pregnant Women): adjusted for age group, wealth index, altitude group, pregnancy duration, toilet possession, educational status and type of residence;

NPW (Non-Pregnant Women): adjusted for age group, wealth index, altitude group, toilet possession, use of contraception, level of fertility, educational status, toilet possession, and type of residence
NA: Not Applicable
** Association is significant*

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