African Journal of Social Issues 7 (1): 2024
Available online at https://Ajosdemar.com;
https://www.ajol.info/index.php/ajosi

DOI: **https://dx.doi.org/10.4314/ajosi.v7i1.20**
p-ISSN 2672 – 5142; e-ISSN 2734 – 3324
Original Research

ANALYSIS OF THE EFFECT OF FERTILITY ON MATERNAL HEALTH STATUS IN NAMIBIA

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ABSTRACT
The study investigates the impact of fertility on maternal health in Namibia, utilizing data from the 2013 Namibia Demographic and Health Survey. First, a Zero-Inflated Poisson model is applied to analyze how socio-economic factors affect fertility. Second, a Linear Probability Model is utilized to assess the correlation between fertility and maternal health status. To address potential endogeneity in the fertility variable within the maternal health model, instrumental variable methods are employed, specifically, Two-Stage Least Squares (2SLS) and a Heteroscedasticity-based Instrumental Variable Approach. Contraceptive usage is utilized as an instrumental variable for fertility in the 2SLS, and the Heteroscedasticity-based Instrumental Approach is used for robustness checks. The findings indicate that factors such as mother's age, marital status, household size, and contraceptive usage are positively linked to fertility. Conversely, urban residency, education, and radio listenership exhibit negative associations with fertility. Regarding maternal health status, the results suggest that higher fertility elevates women's body mass index and decreases the likelihood of being underweight. The study recommends investing in maternal education and promoting family planning awareness programs in Namibia.

Keywords: Fertility, Maternity, Body Mass Index, Underweight, Underweight, Namibia

INTRODUCTION
Background
Healthcare plays a vital role in the advancement of public health, as emphasized by Edeme et al., (2017), and investing in the health sector provides an avenue for individuals to improve their well-being. According to Edeme et al., (2017), private healthcare spending remains stagnant in developing nations, leading to persistently high rates of infant mortality, communicable diseases, income poverty, and inequality. Undertaking measure in the healthcare sector can have enduring and substantial effects on both the social and economic spheres. On the flip side, poorly implemented health measures can result in disastrous consequences. Hence, it is crucial that decision-making in the health sector is infused with robust analytical skills and grounded in the most reliable and proven information and

knowledge (Dussault & Dubois, 2003). Typically, enhancements in health and decreases in mortality have been linked with a decrease in fertility, a rise in human capital, and economic growth. Decreasing maternal mortality diminishes the healthcare costs of pregnancy and extends a woman's productive lifespan, thereby enhancing the returns on human capital (Albanesi, 2012).

In many developing countries, women of reproductive age constitute approximately one-fifth of the total population. Given the insufficient medical and health resources and prevailing socioeconomic conditions, women in these nations face significant risks of mortality related to pregnancy (Albanesi, 2012). To accomplish Sustainable Development Goal 3.1, aiming to decrease the global maternal mortality ratio to 70 per 100,000 live births, it is crucial for countries to significantly lower their maternal mortality rates (World bank, 2019).

The World bank (2019) also reports a slow progress in reducing Namibia's maternal mortality ratio. From 2007 (306 deaths per 100,000 live births) to 2017 (197 deaths per 100,000 live births), Namibia's maternal mortality ratio decreased by 36%. As highlighted in the Sustainable Development Goal report, both the world and Namibia are failing to fulfill their commitment to universal health coverage (United Nations, 2020). Due to its high maternal mortality ratio, Namibia is far from achieving universal access to essential health services for all individuals. Consequently, many mothers continue to perish from preventable causes related to pregnancy. This underscores the suboptimal quality of obstetric and neonatal care services and the barriers pregnant women face in accessing essential health services due to the distance from health facilities (WHO, 2019).

Fertility trends in Namibia

Bongaarts (2020) showed that over the past century, numerous countries have witnessed a significant decline in fertility rates. However, Sub-Saharan Africa (SSA) stands as an exception, where both population growth and fertility rates remain high. The study further revealed that the SSA region had a total fertility rate (TFR) of 4.7 children per woman between 2015 and 2020, more than twice the level observed in other regions. According to the 2013 Namibia Demographic and Health Survey, the total fertility rate in rural areas is higher, at 4.7 children per woman, compared to 2.9 children per woman in urban areas. This notable disparity in fertility rates between urban and rural areas may stem from differences in the socioeconomic characteristics of women. Rural areas tend to have a higher proportion of uneducated and unemployed women, as indicated by the Ministry of Health and Social Services (MoHSS and ICF International, 2014). Figure 1 shows trends in Fertility rates in Namibia.

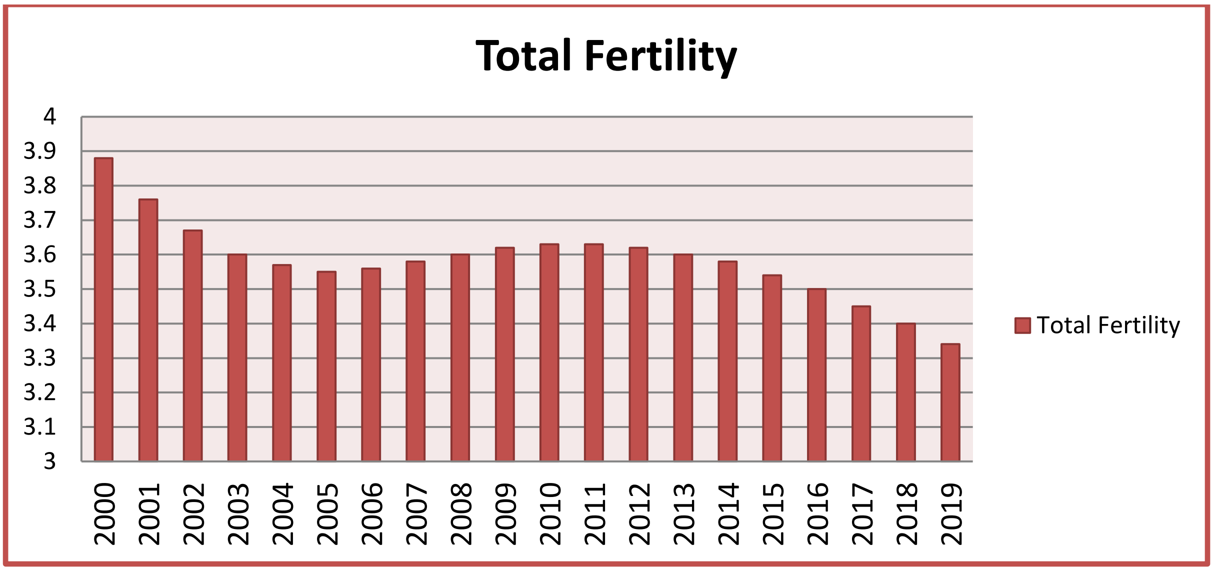

Figure 1.1: Total Fertility Rate in Namibia (2000-2019)

Despite the consistent decline in fertility rates, data indicates that approximately one-third (33.3%) and more than one-quarter (26%) of teenage girls aged 15-19 in Namibia have initiated childbearing by the ages of 19 and 18, respectively (MoHSS and ICF International, 2014). This prevalence is significantly high and concerning because infants born to very young women are at a heightened risk of illness and mortality. Likewise, teenage mothers face elevated risks of complications during pregnancy and maternal mortality (Zhang et al., 2020).

Maternal Health in Namibia

The global maternal mortality ratio decreased by 38%, from 342 deaths to 211 deaths per 100,000 live births, between the years 2000 and 2017, resulting in an annual reduction of 2.9% during this period (WHO, 2019). Namibia reported a maternal mortality ratio of 285 deaths per 100,000 live births in 2013, decreasing to 195 deaths per 100,000 live births in 2017 (WHO, 2019). However, despite this notable progress, the WHO (2019) notes that this decline falls short of the 6.4% rate required to achieve the targeted Millennium Development Goal of 70 maternal deaths per 100,000 live births. Namibia, as part of Sub-Saharan Africa, has grappled with a high maternal mortality rate, recording 231 deaths per 100,000 live births according to the 2013 Namibia Demographic and Health Survey. This is attributed to lower-level healthcare delivery services lacking adequately trained personnel to provide neonatal care and emergency obstetric services (MoHSS and ICF International, 2014). Figure 2 shows trends of maternal mortality ratio for the period of 2000-2017.

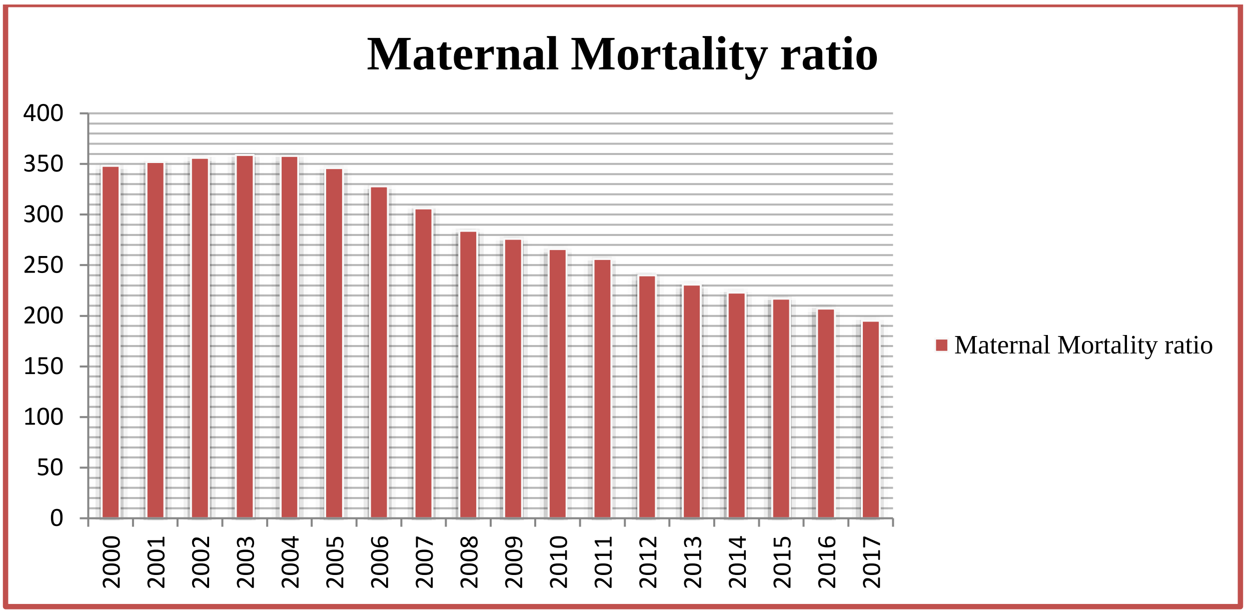

Figure 1.2: Maternal Mortality Ratio in Namibia (2000-2017)

While maternal health serves as a crucial indicator of fertility, there remains a notable gap in understanding the relationship between these two concepts in the existing studies conducted in Namibia(Indongo & Pazvakawambwa, 2012; Palamuleni, 2010). It is against this backdrop that the present study aims to address this gap within the Namibian context. Thus, the overarching objective of this study is to examine the impact of fertility on maternal health status in Namibia. Specifically, the study seeks to investigate the influence of socio-economic factors on fertility in Namibia, as well as to analyze how fertility affects maternal health. Recognizing the interconnectedness of maternal health and fertility is pivotal not only for understanding population dynamics but also for comprehending the socio-economic and political landscape of the country. Drawing from the limited empirical research on maternal health status, fertility, and mortality in Namibia, this study contributes to the existing body of evidence in this area and sets the stage for further exploration of fertility and maternal health-related issues.

LITERATURE REVIEW

The study draws upon literature concerning fertility and health production functions, as well as reviews empirical studies on fertility and maternal health. Ayele (2015) found that socio-economic, demographic, and geographic factors exerted a significant influence on fertility over the past five years in Ethiopia. Specifically, the study revealed that women with no education exhibited higher fertility rates compared to women with an education. In Ghana, Bhasin et al., (2009) found a positive relationship between contraceptive use and fertility, suggesting incorrect usage of contraceptives. Conversely, Lihawa (2016) identified a negative correlation between contraceptive use and fertility in Tanzania. In Namibia, Palamuleni (2017) applied Bongaarts's framework of proximate determinants to explain factors contributing to fertility decline. The findings indicate that marriage exerts a more significant effect on fertility compared to other determinants, with contraception ranking second and post-partum infecundability being of least significance.

Girum and Wasie (2017) found a positive correlation between maternal mortality and maternal mortality rates in 82 developing countries. In Iran, Bakhshi et al., (2008) noted that the likelihood of obesity increased with the number of children, indicating that women's weight is more prone to increase with each additional child. Additionally, several studies identified factors such as place of residence, concentration of wealth, and level of education as influencing the accessibility of healthcare services (Hamal et al., 2020; Rosário et al., 2019). In Namibia, hemorrhage emerged as the most common direct cause of maternal mortality, while maternal mortality varied across different age groups (Mulama, 2015). The study observed a lower maternal mortality ratio in urban areas compared to rural areas of Namibia.

METHODOLOGY

The study employs the household utility maximization theory, as outlined by Rosenzweig and Schultz, (1983), to conceptualize fertility and maternal health outcomes in Namibia. This theory outlines a basic household model in which utility is maximized through a health/production function for maternal health, taking into account the income constraints. The utility theory is specified as follows:

$$U = U(C, X, Y, Z, H_m) \quad (1)$$

where C is the number of children (fertility), X is the consumption of health neutral goods, Y is the consumption of the health-related goods, and Z is the health investment goods and H_m is the mother's health status (Maternal status). Therefore, the maternal health model is expressed as: $H_m = f(Y, Z, \mu)$. The theory makes maternal health production a function of consumption of health-related (Y), heath investment (Z) goods and the unknown variable μ.

Empirical Model Specification

Due to the presence of excess zeros and over dispersion in the fertility variable, the study estimated the Zero-Inflated model (ZIP) for the first objective. The ZIP regression integrates the Poisson distribution which estimate count data and the logit distribution which accounts for the count data that exhibit excess zeros (Baudin, 2015). These models are expressed as:

The Poisson regression: $\Pr\left[c_i = {}^{0}\!/_{v_i}, p_i\right] = \Omega, (1 - \Omega) \Pr\left[c_i = {}^{0}\!/_{v_i},\ G^0 = 1\right]$ (3)

The logit distribution model: $\Pr\left[c_i = j > {}^{0}\!/_{v_i}, p_i\right] = (1 - \Omega) \Pr\ [c_i = j > {}^{0}\!/_{v_i},\ G^0 = 0$ (4)

where Pr is the probability, $c_i = 0,1,2, \ldots$ is the number of children, v_i is the covariates of fertility G^0 denotes the number of women with no children which implies that fertility is 0, making the probability that a woman has no children ($G^0 = 1$).

These two equations make up the Zero inflated model and given the specific variables that the study intends to analyze the ZIP equation can be expressed as follows:

$$Fertility = \beta_0 + \beta_1 Age + \beta_2 Agesq + \beta_3 Employed + \beta_4 Education + \beta_5 Maritalstatus + \beta_6 Contra + \beta_7 Residence + \beta_8 Household + \beta_9 Wealth + \beta_{10} Radio + \varepsilon_i \quad (5)$$

The study used the Linear Probability Model (LPM) to achieve the second objectives making use of Body Mass Index as the dependent variable. the BMI identifies whether on individual is underweight, of normal weight or overweight. Specifically, the study measures maternal health status using woman's BMI when the woman is underweight, because women who are underweight are at a greater risk of premature births or pregnancy related deaths (Lihawa, 2016).

The LPM is expressed as follows:

$$Prob\ (Y_i = 1/x_i) = \hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 x_1 + \cdots + \hat{\beta}_k x_k + \varepsilon_t \quad (6)$$

The equivalent empirical model for equation will be expressed as:

$$Y_i = \hat{\beta}_0 + \hat{\beta}_1 Fertility + \hat{\beta}_2 Age + \hat{\beta}_3 Agesq + \hat{\beta}_4 Residence + \hat{\beta}_5 Employmntstatus + \hat{\beta}_6 Maritalstatus + \hat{\beta}_7 Wealthindex + \hat{\beta}_8 Education + \hat{\beta}_9 Hhsize + \hat{\beta}_{10} Contraceptives + \hat{\beta}_{11} Radio + \varepsilon_t \quad (7)$$

Where Y is a binary variable determining if a woman is underweight or not

$$Y_i = \begin{pmatrix} 1 \ \ if\ a\ mother\ is\ underweight \\ 0 \ \ otherwise \end{pmatrix}$$

Equation 1 is estimated using the Linear Probability Model to determine the effect of fertility on maternal health status. However, the LPM cannot address the issue of endogeneity which arises when fertility is determined with maternal health status (BMI). Estimates from the LPM would to be inconsistent and biased in the presence of endogeneity(Tingum & Kuponiyi, 2020). Generally, this issue is addressed using the Two Stage-Least Squares (2SLS) techniques. However, the 2SLS approach is limited when it comes to identifying the appropriate instrument in the dataset. Considering this limitation, the employs the Lewbel (2012) approach. The approach uses heteroscedastic covariance restriction which generates an internal instrumental variable that can be estimated to obtain estimates of maternal health status, and can only be estimated given presence of heteroscedasticity in the model(Baum et al., 2013).

The model is specified as follows:

$$Y_1 = X_1\beta_1 + Y_2\gamma_1 + \varepsilon_1 \qquad \varepsilon_1 = \alpha_1 U + V_1 \quad (8)$$

$$Y_2 = X_1\beta_2 + \varepsilon_2 \qquad \varepsilon_2 = \alpha_2 U + V_2 \quad (9)$$

where Y_1 is fertility, Y_2 is maternal health status, X_1 are exogenous explanatory variables, U is the observed ability, V_1 and V_2 are idiosyncratic errors.

Data Sources

The study utilizes cross-sectional secondary data sourced from the 2013 Namibia Demographic and Health Surveys to examine the impact of fertility on maternal health status. This survey collects data on demographic, socioeconomic, and health aspects in Namibia, including detailed information on fertility, family planning, child health, and maternal health. The survey was conducted and stratified in two stages. The 2013 DHS marks the fourth iteration of the nationally representative DHS surveys conducted in Namibia, succeeding previous surveys conducted in 1992, 2000, and 2006. The survey encompassed interviews with 10,473 women aged 15 to 49 years, 4,495 men aged 15 to 64 years, and 15,730 individuals under the age of 15. It constitutes a nationwide household-based survey that spanned all 13 regions of the country, with a total of 9,849 households successfully interviewed. The survey data was collected and stratified in two stages. In the first sampling stage, 554 enumeration areas (EAs) were selected, comprising 269 in urban areas and 285 in rural areas. Subsequently, in the second stage, a fixed number of 20 households were selected from each urban and rural cluster using an equal probability systematic sampling method. To achieve the study objectives, a sample of 10,018 women aged between 15 and 49 years was utilized. The 2013 DHS represents the sole recent dataset available for addressing the research objectives, as it is the only secondary source in Namibia containing all the necessary microdata for the study.

RESULTS AND DISCUSSIONS

Descriptive statistics

Table 1 presents the descriptive statistics for both discrete and continuous variables. The statistics reveal that Namibian women, on average, have 2 children (1.96), while the sampled women had an average age of 30 years (29.11), with a variation of approximately 9 (9.68) years. Additionally, the average body mass index (BMI) for women surveyed was 24 (24.33) weight per height in meters square (kg/m^2), with a minimum BMI of 14 (13.48) kg/m^2 and a maximum of 59 (59.33) kg/m^2. The average household size was estimated at 6 (5.68) members per household, with a maximum of 15 members per household.

Table 1: Summary Statistics for the Discrete and Continuous Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
Fertility	9,164	1.96	1.98	0	10
Body Mass Index	5,155	24.33	6.01	13.48	59.33
Age of mother	9,176	29.11	9.68	15	49
Age of mother square (years)	9,176	941.22	602.91	225	2401
Household size	9,844	5.68	2.98	1	15

Table 2 presents the descriptive statistics for categorical variables. The summary indicates that 15 (14.96) percent of women in the survey are underweight, with a BMI below 18.5. Additionally, approximately 52 (51.54) percent of women reside in urban areas, while 49 (48.46) percent reside in rural areas. The statistics also reveal that 21 (21.23) percent of surveyed women are married, whereas 79 percent are not. Furthermore, 42 percent of surveyed women are reported to be employed, while 58 percent are unemployed.

Furthermore, the statistics reveal that 7 percent of the women lack any formal education, 23 percent have completed primary education, 62 percent have attained secondary education, and only 8 percent have achieved higher education. Table 2 also illustrates that 50.41 percent of surveyed women were using contraceptives, compared to 49.59 percent who were not. The data further indicates that 35 percent of the women were classified as poor, 20 percent as middle-income earners, while 45 percent fell into the rich category. Lastly, 71 percent of the women had access to news via the radio, while 29 percent had no access to information or news.

Table 2 Summary Statistics for Categorical Variables

Variables	Measurement	Observations	Percentage
	1 if underweight	634	14.96
Mother's Underweight (bmi1)	0 otherwise	3,603	85.04
Place of Residence	1 if urban	5,163	51.54
	0 otherwise	4,855	48.46
Education	0 = no education	725	7.24
	1 = primary	2,300	22.96
	2 = secondary	6,241	62.3
	3 = higher	752	7.51
	1 if yes	4,145	41.61
Employment status	0 otherwise	5,816	58.39
Wealth quintiles	0 = poor	3,461	34.55
	1 = middle	2,048	20.44
	2 = rich	4,509	45.01
	1 if using contraceptives	4,626	50.41
Contraceptives	0 otherwise	4,550	49.59
	1 if married	2,127	21.23
Marital status	0 otherwise	7,891	78.77
Radio	1 if yes	6,888	70.86
	0 if otherwise	2,833	29.14

RESULTS

The effect of socio-economic factors on fertility in Namibia

Table 3 presents the results of the Zero-Inflated Poisson analysis examining the impact of socioeconomic factors on fertility. The model incorporates variables such as mother's age, place of residence, education, employment status, wealth index, contraceptive use, household size, and radio listening habits. The findings indicate that mother's age, marital status, and household size are statistically significant and positively associated with fertility, consistent with previous studies(Ewemooje et al., 2020; Lihawa, 2016). Interestingly, contraceptive use was also positively related to fertility, suggesting that women adopt contraceptives once they have achieved their desired number of children, aligning with findings from Bhasin et al., (2009). Moreover, urban residence, mother's employment status, secondary and higher education, as well as radio listening, were all statistically significant and negatively associated with fertility, consistent with the results of (Ushie et al., 2011).

Table 3: Socio-economic determinants of fertility using Zero-Inflated Poisson Model

Variables	Marginal Effects	Std. Error	P-value
Mothers age	0.364***	0.011	0.000
Mothers age square	-0.004***	0.000	0.000
Place of residence (urban)	-0.093***	0.029	0.002
Primary Education	-0.064	0.056	0.252
Secondary Education	-0.622***	0.054	0.000
Higher Education	-0.994	0.068	0.000
Employed	-0.047*	0.026	0.07
Marital status	0.312***	0.030	0.000
Contraceptives	0.164***	0.024	0.000
Wealth index: Middle	-0.179***	0.036	0.976
Wealth index: Rich	-0.364***	0.038	0.955
Household size	0.059***	0.004	0.000
Radio	-0.092***	0.026	0.001
Zero observations	2,540		
Non-zero observation	6,133		
No. of observation	8,673		
LR Wald chi2 (13)	4,621.45		

4.2.2. The effect of fertility on Maternal Health status in Namibia

The second objective of the study focuses on investigating the impact of fertility on maternal health status in Namibia. Initially, the results were estimated using the Two-Stage Least Squares (2SLS) approach. For additional verification of the findings, a heteroscedasticity-based instrumental variable approach was employed. Firstly, the study employs Body Mass Index (BMI) as the dependent variable, calculated by dividing the mother's weight (in kilograms) by the square of the mother's height (in meters). Secondly, the mother's weight status (whether she is underweight) is incorporated as a binary dependent variable, where 1 denotes being underweight and 0 otherwise. Table 4 presents the outcomes from both the BMI and Underweight models.

Table 4: The Effect of Fertility on Maternal Health (Two Stage Least Squares and Heteroscedasticity based Instrumental Variable Estimates)

	Body Mass Index (BMI)		Underweight	
Variable	2SLS	ivreg2h	2SLS	ivreg2h
Fertility	2.614***	0.157**	-0.166**	-0.005
	(-0.894)	(-0.061)	(-0.082)	(-0.005)
Age	-0.318	0.397***	0.021	-0.028***
	(-0.282)	(-0.062)	(-0.026)	(-0.005)
Age Square	0.003	-0.004***	0.000	0.000***
	(-0.003)	(-0.001)	0.000	0.000
Residence	0.494**	0.311	-0.009	-0.001
	(-0.233)	(-0.191)	(-0.017)	(-0.015)
Employed	0.990***	0.634***	-0.068***	-0.043***
	(-0.239)	(-0.18)	(-0.02)	(-0.014)
Contraceptives		0.520***		-0.028**
		(-0.161)		(-0.013)
Marital status	0.469	1.777***	0.034	-0.063***
	(-0.538)	(-0.219)	(-0.053)	(-0.018)
Household size	-0.278***	-0.074***	0.017***	0.005**
	(-0.079)	(-0.027)	(-0.006)	(-0.002)
Radio	0.714***	0.344*	-0.025	0.002
	(-0.251)	(-0.18)	(-0.021)	(-0.014)
Primary Education	-0.037	-0.601*	0.047	0.059**
	(-0.461)	(-0.361)	(-0.032)	(-0.028)
Secondary Education	2.571***	0.144	-0.130*	0.01
	(-0.945)	(-0.35)	(-0.076)	(-0.027)
Higher Education	4.100***	0.488	-0.217*	-0.005
	(-1.391)	(-0.474)	(-0.113)	(-0.038)
Middle wealth index	1.925***	1.241***	-0.070**	-0.023
	(-0.363)	(-0.227)	(-0.031)	(-0.017)
Rich wealth index	3.815***	2.711***	-0.110***	-0.044**
	(-0.487)	(-0.235)	(-0.039)	(-0.018)
Constant	21.934***	13.384***	-0.006	0.590***
Breuch Pagan				
Chi2 (14)	435.17		301.15	
Prob>Chi2	0.000		0.000	
Observations	4,141	4,141	3,487	3,487

The heteroscedasticity-based instrumental variable approach assumes the presence of heteroscedasticity in the model, which is evaluated using the Breusch-Pagan test (Breusch & Pagan, 1979). The results from both models indicate significance, indicating rejection of the null hypothesis of no heteroscedasticity.

The findings presented in Table 4 reveal a positive correlation between fertility and Body Mass Index (BMI). According to these estimates, an additional child is projected to increase BMI by 2.6 points in the 2SLS approach and by 0.2 points in the ivreg2h approach, holding other factors constant. It is widely acknowledged that women tend to gain weight during pregnancy, and these results align with those reported by (Bakhshi et al., 2008).

While the Two Stage Least Squares estimates indicate a negative coefficient for fertility in the underweight model, the relationship appears insignificant in the ivreg2h approach. Notably, the ivreg2h approach yields more favorable results regarding the age coefficient compared to the 2SLS method in both the BMI and underweight models. According to the 2SLS estimates, an increase in maternal age results in a 0.4-unit rise in maternal BMI, citeris paribus, whereas a rise in maternal age decreases the likelihood of the mother being underweight. These findings are consistent with those reported by (Lihawa, 2016).

Regarding urban residence, the study unveils that women residing in urban areas have a BMI 0.49 points higher than those in rural settings. This disparity can be attributed to the fact that women in urban areas typically have better access to nutrition and healthcare facilities compared to their rural counterparts. Similar findings were reported by (Siddiqui & Donato, 2016).

Furthermore, the results demonstrate a positive correlation between a mother's employment status and BMI. According to the 2SLS estimates, an employed mother exhibits a BMI 0.99 points higher than an unemployed mother, all else being equal. Similarly, the ivreg2h estimates suggest that an employed mother's BMI is 0.63 points higher than that of an unemployed mother. These results align with those reported by (Achieng, 2014). Conversely, the results also reveal a negative association between a mother's employment and the likelihood of being underweight. These findings mirror those of (Amugsi et al., 2020).

The results also indicate that as household size increases, there is a corresponding decrease in women's BMI, with reductions of 0.2 and 0.07 in the 2SLS and ivreg2h approaches, respectively. Additionally, the presence of an additional member in the household increases the likelihood of a woman being underweight by 0.02 and 0.005 in the 2SLS and ivreg2h methods, respectively. These findings align with those of (Dahiya & Viswanathan, 2015). Moreover, the study considers the use of contraceptives, radio listening habits, women's education level (secondary or higher), and their wealth quintile (middle or rich) as significant determinants of BMI in Namibia.

CONCLUSION AND POLICY RECOMMENDATIONS

The primary objective aimed to assess the impact of socioeconomic factors on fertility in Namibia. Drawing from the findings derived from the 2013 Namibia Demographic and Health Survey (NDHS) dataset, the study affirms that numerous socioeconomic factors exert a notable influence on fertility levels in Namibia. Among women aged 15-49, it was observed that as women grow older, they are more likely to have a higher number of children. Likewise, the study revealed that married women tend to have more children compared to their unmarried counterparts. Additionally, women with access to education, residing in urban areas, or frequently tuning in to radio broadcasts tend to have fewer children. This suggests that these women may possess greater awareness and knowledge regarding family planning methods compared to their counterparts. However, the study noted a trend where contraceptive use increases alongside fertility levels, possibly indicating instances of incorrect or unsuccessful contraceptive usage.

The study also examined the impact of fertility on maternal health status in Namibia. Utilizing instrumental variable estimation (2SLS), the research provided evidence indicating that an increase in the number of children reduces the likelihood of a mother being underweight. This association can be attributed to the tendency for mothers to gain weight after childbirth, thereby decreasing the likelihood of being underweight. Lastly, the study suggests investing in maternal education, promoting awareness programs on family planning, and fostering female empowerment in Namibia to enhance women's understanding of their weight status.

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