Health Insurance Coverage Among Women in Zambia

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Abstract: **One of the factors affecting productivity among Zambian women is related to disease burden. Health insurance is meant to reduce costs when faced with costly medical attention. This study investigated factors that affected women in acquiring health insurance in Zambia. It employed the discrete choice models, called; Linear Probability, Logit and Probit Models to estimate the chances of a woman having health insurance. Instrumental variables were used to solve the problem of endogeneity with education. The results show that the level of education was the main driver and increased the probability of having health insurance. Age, marital status, being in a rural setup were all positively related to possessing a medical scheme. Further, women who have good communication in English were more likely to have health insurance.**

***Keywords*: Health insurance, Discrete choice models, Education, Endogeneity, English language**

I. INTRODUCTION

One of the major issues hampering productivity in many countries is the disease burden. When the workforce is healthy, it becomes productive. However, health itself, is not costless. Health care providers impose costs for the services provided. Therefore, *Health insurance* (also known as *medical insurance* or *healthcare insurance)* is meant to cover a portion of the cost of a policyholder's medical costs. How much the insurance covers (and how much is paid through coinsurance, co-pays, and deductibles) depends on the details of the policy, with specific rules and regulations that apply (healthinsurance.org, 2022).

Zambia's health insurance sector has seen a steady but slow growth in terms of coverage which can be categorised broadly as *non-life* and *life insurance*. Life (health) insurance sector only contributes 30% of the total insurance business which makes non-life insurance to be higher in terms of coverage (Zambia Insurance Industry Survey 2019, ZambiaInvest,2022).

Further scrutiny from the Zambia Demographic and Health Survey, 2014 report, showed that men access health insurance more than women. And among the women, notably, 99 per cent of girls aged 15–19 do not have health insurance (Zambia Demographic and health Survey Report, 2014). Further, the maternal mortality rate in the Southern African Development Community (SADC) where Zambia belongs, is quite high as compared to the global average (Leah, 2021). And one of the challenges that aggravates the problem is lack of financial services that could help them in the event of illness. FinScope (2015) Report found that almost 60% of Zambian women and men experience some level of financial inclusion, men have an advantage over women overall (61.2% of men were included versus 57.6% of women) and women are more excluded than men in every category. Hence, the need to scale up the provision of health insurance to women because their participation is still low.

From the 1990s, successive governments have tried to provide and grow the health insurance market. This has seen several private firms and banks come on board to complement the provision of quality health care. The earlier health schemes were voluntary, but recently, the Zambian government took an initiative by introducing the National Health Insurance Scheme (NHIS) in 2019, to provide medical insurance coverage to various groups including companies (National Health Insurance Scheme, 2022). Hence, the need to understand the factors influencing women participation in health insurance. *This study analysed the factors influencing women to have or seek for health insurance scheme (policy).*

II. LITERATURE REVIEW

Several scholarly works have been done in many different countries, to try and establish what really propels people to have or seek for health insurance. Tsai and Chin (2002) investigated the factors that led to an increase in demand of private health insurance in Taiwan using a two-part (hurdle) model. Logit and OLS regressions were used to examine the factors influencing the probability and amount of private health insurance purchased. Generally, *higher income* and *education levels* were found to be the many drivers associated with increased probabilities and larger purchases of private health insurance. The *married females*, the *employed*, and the *heads of households* who worked in government parastatals were more likely to purchase private insurance than their counterparts. People *living in cities* were more likely to have private health insurance than those in *rural areas*. An increase in *age* and *larger family sizes* also increased the likelihood of purchasing the insurance cover. However, this study never addressed the causal models across time like in panel data so that we can establish effects of variables across time. The study also focussed on both sexes (men and women)

Another paper by Dewar (1998) conducted a comparative study that analysed whether people with *more education* than others have better insurance opportunities. The study utilized a *Probit* model to establish the impact of education and other covariates on the likelihood of having an *employer sponsored health*

insurance. The sample only comprised employed individuals who only differed in *education attainment levels*. It was established that the likelihood of employer sponsored coverage was not only determined by education alone but more strongly by the *type of industrial class* that one belonged. Respondents with college education were found to have small families, have family income and unmarried and were more likely to have insurance coverage as compared with those with lower education. However, this paper only included respondents who are in the range 18 to 62, thereby excluding some economically active individuals between 15 to 17 as indicated by the International Labour Organization guidelines (ILO, 2022). The study is similar to Tsai and Chin (2002) in terms of the sample constituents i.e. considering men and women in the sample.

Adisu etal (2021) conducted a cross-country study in ten East African countries, namely, Burundi, Comoros, Ethiopia, Kenya, Malawi, Mozambique, Tanzania, Uganda, Zambia, and Zimbabwe. The study assessed the health insurance coverage and its associated factors among reproductive-age group (RAG) women in East Africa. Using the multilevel generalised linear model, the research found that, insurance coverage was high among the *educated*, those in *active employment* and *rich RAG women*. However, the coverage among those in *rural* areas was low. It was also found that, women who had *media exposure*, *visited by field workers*, and *visited health facilities* had a higher chance of having health insurance. Following a cross-country analysis, the study assumes *parameter constancy* for individual countries. However, the effects could be different if we analysed the within-country variations.

III. METHODOLOGY

This study used secondary data from FinScope Survey for 2015 which has 8,479 respondents. The dataset reflects the recent demographic developments and financial inclusion for both men and women as it is sampled from all the 10 provinces of Zambia. Though the estimates could be consistent, some biasedness is also expected as the number of those that have insurance among women themselves is disproportionally low (see Table 2 and Table 5). This problem was solved using probability weights (see Appendix B in the Appendices for weighted estimates, though the results are not very different from the unweighted estimates). When discrete choice regressions are done on the subgroup of women, the sample reduces to 345 observations. On the other hand, the dataset did not have some key variables like income. Including such variables and increasing the sample size could just improve the fit of the model and unbiasedness of the marginal effects (change in probabilities). However, the findings are still valid as they just indicate the probability of a woman having health insurance or not.

Since the dependent variable is binary, the study mainly utilized the discrete choice models namely, Linear Probability, Logit and the Probit models. These are necessary to compare the probability estimates. The study could not just rely on Linear Probability Model only due some problems of giving probabilities that may be less than 0 and greater than 1(Pedace, 2013). Since the dependent variable is categorical, Y=0 if the woman has no medical insurance and Y=1 if she has. To get the log odds, the modelling took the following form:

$$Y_i^* = ln\left(\frac{p}{1-p}\right) = a + \boldsymbol{X_i\beta} + \mu_i,$$

$$\forall\, i = 1, \dots, n$$

where $\boldsymbol{X_i}$ is a vector of covariates that are dummy and continuous explanatory variables (Gujarati and Porter, 2009).

The marginal effects indicated the probability that a certain woman has health insurance or not and these were estimated by finding the marginal change using:

$$\frac{dp_i}{dX_j} = f(Y^*)\beta_j$$

All the descriptive statistics and quantitative data analysis were performed in a statistical software package called STATA.

The vector of explanatory variables comprised of age, marital status, educational level, employment status, place of residence, household size, gender, and other interesting variables. Most of these variables have been used in previous studies (Adisu etal,2021, Dewar,1998) except for the *language of communication* between the researcher and the respondents. See Table 1 below for the detailed description of the variables.

Table 1: Description of the Variables

Variable	Type	Coding	Description
Insurance	Binary/dummy	insur	1 if insured or 0 otherwise
Female	Binary	female	1 if female or 0 otherwise
Education	Ordinal and continuous	Educ2	0=no formal education 1=primary education 2=secondary education 3=tertiary education 4=higher education (degree and above)
Rural	Binary	rural	1 if in the rural or 0 otherwise
Household size	Continuous	hhsize	Number of household members
Age	Continuous	age	Number of years lived or how old somebody is
banked	Binary	banked	1 if someone has a bank account or 0 otherwise
English	Binary	english	1 if a person speaks English or 0 otherwise
Employment status	Binary	emp	1 if full-time or 0 otherwise
Marital status	Binary	mst2	1 if married or 0 otherwise (single, widowed, separated and cohabiting were grouped together)
Informed	Binary	Informed	1 if the respondent heard about insurance or 0 otherwise
Owing money	Binary	owe	1 if the individual owes money to any institution or individual

IV. DISCUSSSION OF RESULTS

Description of the Sample

The sample contained 8, 479 respondents of which 62% (representing 5,257) were women while 38% (representing 3,222) were men (see Table 2 below in the row for "total"). An analysis of those who have medical insurance, 56% are men while 44% are females. Among females only a poultry of 2% are insured while the largest share of 98% is uninsured. For the men, only 4% are covered while the 96% are not. Generally, the results show that most of the people are uninsured, standing at 97% while only 3% are insured (both men and women).

Table 2: Statistical Comparisons of the Subgroups

Key

frequency
row percentage
column percentage

1 if they have insur or 0 otherwise	female 0	1	Total
0	3,085 37.46 95.75	5,151 62.54 97.98	8,236 100.00 97.13
1	137 56.38 4.25	106 43.62 2.02	243 100.00 2.87
Total	3,222 38.00 100.00	5,257 62.00 100.00	8,479 100.00 100.00

Testing for Equality of the Averages between men and women

To empirically test for differences in participation between men and women, a Two-sample t-test was conducted. Table 3 below shows the differences in their means, that is, 0.04 for men and 0.02 for women. It clearly shows that there is a notable difference in terms of health insurance participation by men and women as the results are significant at 95% level of confidence or the p-value is less than 0.05. Therefore, on average, men are more likely to have a health insurance coverage than women. This entails that women are still underrepresented when it comes to health insurance coverage.

Table 3: Two-sample t-test with equal variances

Two-sample t test with equal variances

Group	Obs	Mean	Std. err.	Std. dev.	[95% conf.	interval]
0	3,222	.0425202	.0035552	.201804	.0355494	.0494909
1	5,257	.0201636	.0019388	.140573	.0163627	.0239644
Combined	8,479	.028659	.001812	.1668562	.025107	.0322111
diff		.0223566	.0037255		.0150536	.0296595

diff = mean(0) - mean(1) t = 6.0009
H0: diff = 0 Degrees of freedom = 8477

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

Marginal Effects of Gender on Health Insurance

The study used three models to estimate the change in probabilities when there is a change in the given covariate. Below are the estimates of the regression. Using simple regression of the Linear Probability (LPM), Logit and Probit models, the study revealed that females(women) were 2% less likely to having health insurance than their male counterpart (*See Table 4*). The findings are in line with the Zambia Demographic Health Survey Report (2014) and FinScope Report (2015) which stated that females are under-represented in health insurance coverage. Hence, the participation levels of men are higher as compared to women.

Table 4: Impact of Gender on Insurance

	(1)	(2)	(3)
VARIABLES	LPM - OLS	LOGIT	PROBIT
female	-0.0224***	-0.0213***	-0.0212***
	(0.00405)	(0.00384)	(0.00374)
Constant	0.0425***		
	(0.00356)		
Observations	8,479	8,479	8,479
R-squared	0.004		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The Impact of Education, Age and English language

Many studies have shown that education is the key determinant in influencing individuals to obtain health insurance. In this study the results are not different. *See Table 5 below.* To solve the problem of endogeneity, where the main variables of interest maybe correlated to the error term, a few variables were used as instruments for education, namely, *age, ownership of a bank account, employment status, being informed* of health insurance and *owing money* to others or lending institutions.

Table 5: Impact of Education, Age and English Language

	(1)	(2)	(3)
VARIABLES	LPM - OLS	LOGIT me	PROBIT me
Education	0.329***	0.633***	0.605***
	(0.0362)	(0.0736)	(0.0712)
Age	0.00380*	0.00842***	0.00815***
	(0.00208)	(0.00229)	(0.00221)
Household size	-0.000617	0.000503	0.00102
	(0.00761)	(0.00763)	(0.00719)
Marital status	0.0363	0.0375	0.0354
	(0.0384)	(0.0391)	(0.0371)
Rural	0.127***	0.0573	0.0561
	(0.0455)	(0.0371)	(0.0366)
English	0.0837**	0.0678*	0.0684*
	(0.0376)	(0.0376)	(0.0362)
Constant	-0.751***		
	(0.0986)		
Observations	345	345	345
R-squared	0.259		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

After controlling for the named instruments, the impact of education even becomes bigger (See Table 5 and compare it to the magnitude of the same variable in the *Appendix A)*. The main influencer of seeking health insurance is education. An increase in the level of education increases the probability of having health insurance coverage by 60 - 63% among women (using the Logit and Probit results). These results are in line with the findings Tsai and Chin (2002) and Dewar (2000) who argued that those with higher educational levels were more likely to purchase or have health insurance than those with lower education attainment levels. Therefore, increasing the education levels of women, makes them to be more informed and understand the importance and risks involved without insurance. This explains why those who speak and communicate in English are likely to have insurance coverage because they can understand the information from *agents* than those who can only communicate in local languages. The results of the LPM showed that, those who communicated in English were 8.4% more likely to have health insurance than the non-English speakers. On the other hand, the Probit and Logit estimates showed roughly, a 7% higher chance of having insurance for the English communicators.

An increase in age also increased the chances of having insurance ranging from 0.4% in the linear probability model to about 0.8% in the non-linear models. Hence, an increase in age increases the chances of someone acquiring health insurance scheme. This is expected because, as people grow older, they are more likely to be vulnerable in terms of contracting ailments while the young can still be without medical insurance because of, seemingly, lower risks of contracting diseases.

The married females were more likely to acquire insurance than the non-married ones. The non-married (the singles, separated, divorced, and widowed). However, the results are statistically insignificant. The results are like Tsai and Chin (2002). However, the results are in contrast with Dewar (1998) who found that the unmarried are more likely to have health insurance than the married. However, this difference in findings could arise from country specific values and norms as marriage could be perceived as a social contract by one country while others could regard it as a permanent union that could result in permanent planning of insurance coverage by households.

Using the Logit model results, those in the rural had a higher probability (6%) of having insurance than their urban counterpart (see column 2 of Table 5). The results contrast with Adisu, etal (2021) and Tsai (2002) who found that those in the rural were less likely to have health insurance than those in the urban setup. Further, Table 4 shows that, an increase in household size barely increases the probability of having health insurance (as seen in the Probit and Logit model), though the results are not significant. However, the increase could be logical, as the family size increases, the risk of having high medical costs increases, hence, the need to seek for medical insurance per adventure many household members fell sick at the same time.

In terms of how well the model fit the data, the R-squared and the Pseudo R-squared went above 30 to 40% after instrumenting for education. However, this does not really matter when it comes to non-linear models.

V. CONCLUSION

This study analysed factors that influence women to have health insurance. Discrete binary choice models were employed to estimate the probability of a woman having health insurance (whether public or private), though it would have been better to have a sample that show the two types of insurance distinctly. It has been established that, the main drivers of women having/seeking health insurance scheme are education, age, place of residence and being able to communicate in English. Improving the education system that capture more women would increase their participation in having or purchasing health insurance policies. Agents of different insurance policies should find other effective methods of marketing their products to the less-educated women so that those who may find it difficult to understand the *technical language*, can be motivated. A lot of women may not be participating due to lack of understanding the technicalities of different types of insurance schemes.

VI. RECOMMENDATION

a. Improving the education levels of women would increase their participation in health insurance market.

b. Marketing strategies should tailor their messages in local language for uneducated women to fully comprehend and understand the different health policies.

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APPENDICES

Appendix A: showing the impact of education which is not instrumented

	(1)
VARIABLES	Logit
Education	0.0321***
	(0.00356)
Age	0.000698***
	(0.000121)
Household Size	-0.000731
	(0.000716)
Marital status	0.0102***
	(0.00388)
Rural residence	0.00650
	(0.00431)
English	0.0138***
	(0.00434)
Observations	5,215

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix B: Weighted Least squares

	(1)	(2)	(3)
VARIABLES	Logit	LOGIT Wgt	PROBIT Wgt
educ2	0.0321***		
	(0.00356)		
age	0.000698***	0.00901***	0.00868***
	(0.000121)	(0.00243)	(0.00239)
hhsize	-0.000731	-0.000490	9.84e-05
	(0.000716)	(0.00809)	(0.00814)
mst2	0.0102***	0.0308	0.0300
	(0.00388)	(0.0391)	(0.0375)
rural	0.00650	0.0492	0.0473
	(0.00431)	(0.0399)	(0.0395)
english	0.0138***	0.0895**	0.0893**
	(0.00434)	(0.0422)	(0.0405)
educ2hat		0.638***	0.605***
		(0.0973)	(0.0918)
Observations	5,215	345	345

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1