An Explanatory Study On The Effect Of Education On The Demand For Preventive Healthcare Among Malaria Patients: A Case Study Of Asonomaso Hospital

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ABSTRACT:
Malaria accounts for about 90% of the global clinical cases each year. It is estimated that about 9% of overall mortality in Ghana is caused by malaria infections. Among the malaria deaths, 40% occurred among infants and children under the age of five. Due to the colossal unenthusiastic impact malaria is posturing to the socio-economic lives of the inhabitants of sub-Saharan Africa. Stakeholders have launched special public health programmes to help salvage the situation. In view of that the study sought to find out the effect of education on demand for preventive healthcare good against malaria infection. The study used a sample size of 800 respondents across the inhabitants of Kwabre East District in Ashanti Region. The study sampled healthcare facility users of Asonomaso Government Hospital (i.e. patients from Kasaam, Ntonso, Bonwire e.t.c.). The study adopted a recursive analysis since both descriptive and quantitative methods were used for the data analysis. A random sampling method was used to solicit for malaria outpatients respondents in the study area. The study find out that education level has a positive effect on the demand for preventive healthcare good. The further find out that the social media such as radio and television stations are the main source of information. The recommended that The various stakeholders should intensify the media advert on the use of the preventive care and the need to use such care. The education curriculum should be structured in such a way that part of the physical education syllabus should give a basic knowledge on the use of preventive care in order to fight causes of disease rather fighting symptoms in Africa.

Key words: Mosquito [MQ], Sanitation, Demand, Malaria, Healthcare and Education.

INTRODUCTION

Malaria is a focal menace in the developing world especially in Sub-Saharan Africa. Malaria accounts for about 90% of the global clinical cases each year and leads to over one million deaths annually (WHO, 2005). Averagely, about one (1) in every twenty (20) children dies from malaria disease and its related consequences like anaemia (www.malariasite.com). In Ghana, it evidenced that malaria is the principal cause of several mortality in healthcare institutions across the country and even more malaria cases are been diagnosed frequently at the Out Patient Department (OPDs) nationwide than any other illness (Mockenhaupt *et al.*, 2004).

According to Cruz et al. (2006) malaria is responsible for about 9% of overall mortality in Ghana. Among the malaria deaths, 40% occurred among infants and children under the age of five. Due to the colossal unenthusiastic impact malaria is posturing to the socio-economic lives of the inhabitants of sub-Saharan Africa; many stakeholders have launched special public health programmes to help salvage the situation. The methods of prevention outlined by the are stakeholders (WHO, US government, NGOs e.t.c.) includes indoor residual spraying with effective insecticides at highly affected areas, free distribution of insecticide-treated mosquito nets (ITN) to pregnant women and children below the age of five (5) and offering of intermittent preventive treatment for pregnant women (PMI, Ghana Profile, 2008). The success of these preventive cares depends largely on the knowledge (i.e. education) base of the people and how effectively they can put into practices the various malaria prevention and treatment cares. In view of that the study sought to assess the effectiveness of education on demand for preventive care against malaria.

LITERATURE REVIEW

According to Hay et al. (2005) parents and caregivers in urban population are better able to access health facilities and consequently their wards suffer lower malaria morbidity and mortality (i.e. due to good sanitation).

A study done by Binka, Kubaje and Adjuik (1996) on the impact of permethrin impregnated bed nets on child mortality in Kassena-Nankana district, Ghana: A randomized controlled trial. The study used a sample size of 150 individuals, in the Kassena- Nankana and Builsa districts of the upper east region. The study focused broadly on how the people perceive malaria; including definition and beliefs about its etiology, health-seeking behaviour and prevention typically in relation to bed net use. Information collected on the causes and symptoms of malaria in the survey showed that 79% of respondents attributed the cause of malaria to mosquitoes. The number of respondents who attributed the cause of malaria to mosquitoes was higher in the two areas with active programs in the Kassena-Nankana efficacy trial area and also the one in the UNICEF program area in the Bulsa district. The reason was that many people were not sleeping in the mosquito nets.

1. METHOD AND MATERIALS

The study used primary source of data with a sample size of 800 respondents across the inhabitants of Kwabre East District in Ashanti Region. The study sampled healthcare facility users from Asonomaso Government Hospital. The study adopted a recursive analysis since both descriptive and quantitative methods were used for the data analysis. A random sampling method was used to solicit for malaria outpatients respondents in the study area. The study used questionnaires and interviews to retrieve all the relevant information needed for the study. The study used SPSS and Minitab software's in the processing and interpretation of the data gathered from the field. A probit model was used to assess the effect of education on the demand for preventive healthcare goods.

Model Design

A conceptualized probit model was used to assess the effect of education on the demand for preventive healthcare goods. The dependent variable is qualitative/ binary variable which takes into accounts yes or no responses. It would be useful to capture the dependency of Y on X as a simple function, particularly when there are several explanatory variables. For example, in ordinary multiple regressions, the link function is called the identity link since

$$g(\mu_i) = \mu_i \quad \text{and so} \quad \mu_i = \eta_i, \quad \text{or}$$

$$E(y_i) = x_i'\beta = \mu_i = \eta_i$$

The usual assumption

$$Y_i = \beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k + \varepsilon_k$$

where $\varepsilon_k \sim N(0, \sigma_\varepsilon^2)$ and ε_i and ε_k are independent for $i \neq k$. The expectation of Y i.e
$E(Y_i) = E(\beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k + \varepsilon_k)$ and so
$\pi_i = \beta_0 + \sum \beta_k X_k$

For this reason, the regression model to a dummy response variable is called the probability model. For a Probit model

$$P_r(Q = 1) = \phi^{-1}(p_i) = \sum_{k=0}^{k=n} \beta_k X_{ik} = \phi(X'\beta)$$

Hence the probit model for the study is given as;

$$P_k(Q_i = 1) = \Phi(\beta_0 + \beta_1 Age + \beta_2 Gender + \beta_3 Price + \beta_4 INC + \beta_5 BSC/JHS + \beta_6 SHS + \beta_7 TRE + \varepsilon_k)$$

Where Q_i = Qualitative dependent variable: if respondents demand or use malaria preventive healthcare good =1; if not=0. The dependent variables ranges from one (1) to three (3) for where 1= the use of mosquito nets, 2= the use of mosquito insecticide spray and 3= good sanitation (i.e. cleaning of environment).

Gender = Dummy variable (if female =1, otherwise (male) =0)

INC = Monthly Income

BSC/JHS = Dummy variable (if at basic education=1, otherwise=0)

SHS = Dummy variable (if at senior high education=1, otherwise=0)

TRE = Dummy variable (if at tertiary education=1, otherwise=0)

Φ= Cumulative standard normal distribution function

ε=Error-term

2. STUDY HYPOTHESES

According to Grossman (2000) knowledge (i.e. education level) is positively related to health status of an individual. This implies that as people attain higher level of education they become more concern about their health by consuming more healthcare through regular exercise, demanding more preventive care e.t.c. Again, age and income are also expected to be positively related to demand for preventive care if it is a normal good to the inhabitants. However, the price of the preventive healthcare good such as gym, mosquito net, and insecticide pray e.t.c. are expected to be negatively related to the demand for preventive healthcare goods.

In consideration to an output revealed from our analyses (see from table 2), we test the appropriateness or otherwise of each of the model parameters such that one of the coefficient of the

$$\beta_i \neq 0 \quad \text{for at least one } i.$$

The appropriate hypothesis is given as

$$H_0: \quad \beta_1 = \beta_2 = \beta_3 \dots = \beta_k = 0 \text{ against the alternative that}$$

$$H_1: \quad \beta_i \neq 0 \quad \text{for at least one } i$$

At $\alpha = 0.01, 0.05$ and 0.1 *level of significance respectively*

Where β_i are the model parameters (independent variables).

1.0 EMPIRICAL RESULTS
1.1 Descriptive Analysis

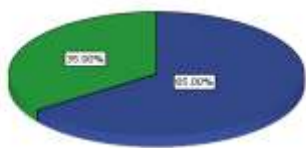*Figure 1:The Share Of Gender In The Demand Of Malaria Preventive Healthcare Good.*

Source: Field data, June/July, 2015

From figure 1, the fields data obtain revealed that majority of the respondents were females where the males were used as a control group for the analysis. Theoretically, females access more healthcare facilities than males. From the empirical results, 65% of the respondents were females (i.e. treatment group) and 35% of the respondents were males (i.e. control group).
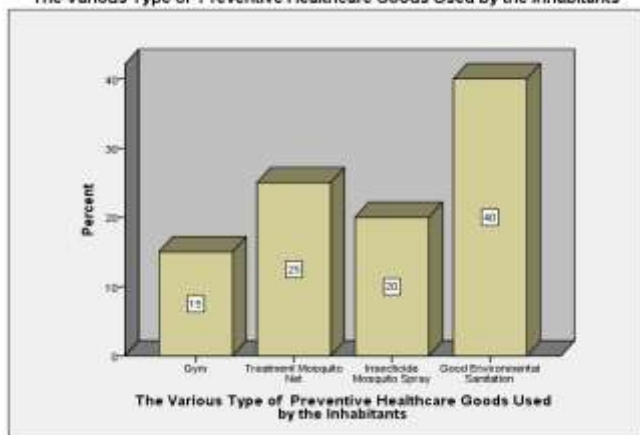

Figure 2: The Various Type Of Preventive Healthcare Goods Use By The Inhabitants

Source: Field data, June/July, 2015

Figure 2, empirically revealed the various types of preventive healthcare goods been demanded or used by the

respondents. Per the interview, the respondents were complaining about funds to afford items like Gym centers, treatment mosquito net and the mosquito spray. However, the respondents were happily choosing cleaning and weeding (i.e. as good environmental sanitation) as their main preventive healthcare good they can afford. From the data, about 40% of the respondents were able to demand good environmental sanitation, follow by the used of treatment mosquito net which form about 25% of the total respondents. The major users of the treatment mosquito net were the pregnant women since the hospitals give to them free of charge and few educated people who were able to afford them also used treatment mosquito net. Also, about 20% of the respondents used treatment mosquito net as a preventive mechanism. However, only 15% of the respondents have registered with a gym facility to do regular exercise. The reason was that, the fee charge for the various gym facilities are very expensive and so they cannot afford them.
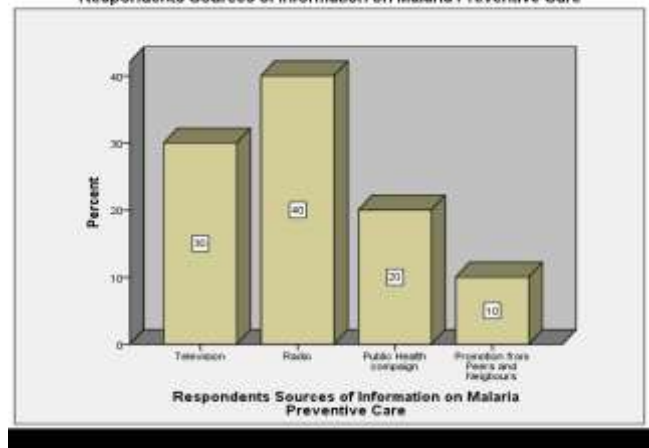

Figure 3: Sources Of Information On Malaria Control/Prevention

Source: Field data, June/July, 2015

Figure 3 reveals the respondents source of information on malaria preventive healthcare. Empirically, the data reveals that, majority of the respondents got their information on the various preventive healthcares against malaria through the mass media specifically on radio stations. About, 40% of the respondents heard their news on preventive healthcare against malaria through radio stations. This is due to the fact that radio is the commonest, very portable and cheaper source than the others. About, 30% of the respondents heard their news on preventive healthcare against malaria through television, 20% of the respondents heard their news on preventive healthcare against malaria through public health campaign. This is because the community-based health education is not well managed and accessed. Lastly, about 10% of the respondents heard their news on preventive

healthcare against malaria through the promotions from their peers and neighbours actions.
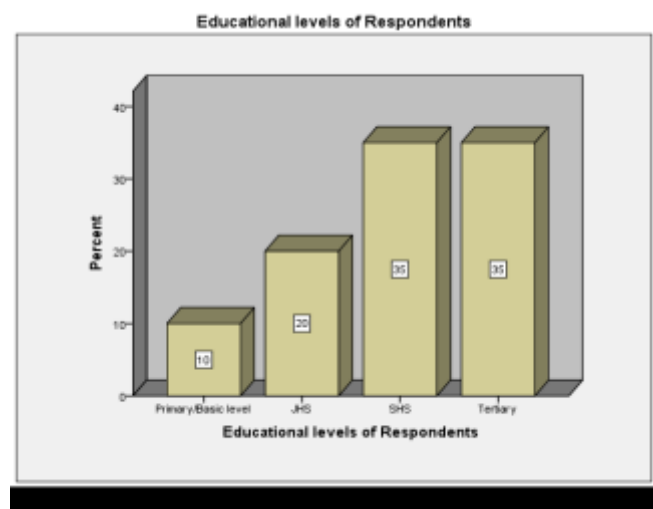

Figure 4: Educational Groupings For Demand For Preventive Healthcare Against

 Source: Field data, June/July, 2015

Figure 4, reveals the extent to which education influences the demand for preventive healthcare goods against malaria infections. The empirical data has proven beyond doubt that education has a great influence on the demand for preventive healthcare. This even assert Grossman (2000) hypothesis on education and health status of an individuals. Grossman explains that education is positively related to health status of an individual thus an educated person always invest into his/her health stock for a longer life span. From the data, about 70% of the respondents who have attained a higher education ranging from senior high school to tertiary education expressed the need and relevant to demand a preventive healthcare good against malaria infection. However, 30% of the respondents were having lower education which ranges from primary school to junior high school. These respondents were reluctant to demand preventive healthcare against malaria due to inexperienced on the part of low level of education of the respondents.

3.2 The Quantitative Analysis of the Probit Regression Results For Demand for Preventive Healthcare Good Equation

Table 2: Probit Results for the Demand for Preventive Healthcare Good Equation

VARIABLES	MOSQUITO NET	INSECTICIDE SPRAY	GOOD SANITATION
AGE	0.0101617*** (0.0010113)	0.0203887*** (0.0047517)	0.0207104*** (0.0038126)
PRICE	-0.0315388** (0.00970216)	-0.0396001** (0.01661092)	-0.0281612** (0.00818072)
GENDER			
MALE (CONTROL GROUP)	-	-	-
FEMALE (TREATMENTGROUP)	0.0658111** (0.01243102)	0.0567112** (0.01263202)	-0.0003432 (0.0011032)
EDUCATIONAL LEVEL			
BASIC EDUCATION	- 0.0778111** (0.02283202)	- 0.0778111** (0.02283202)	-0.0000731** (0.0001041)
SENIOR HIGH EDUCATION	0.0415388** (0.00870216)	0.0476001** (0.01661201)	0.0381412** (0.00713042)
TERTIARY EDUCATION	0.0214388** (0.0097021)	0.03663001** (0.00661042)	0.0311313** (0.00618031)
OBSERVATION	800	800	800
R-Squared	0.7580	0.7604	0.7583

*Note: Standard errors are presented in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.* **Source: Field data, June/July, 2015**

Table 2 summarizes the computations for parameter estimates for the probit working correlation assumptions with respective to *Demand for Preventive Healthcare Good Equation.* A parameter estimates that is asterisked (*) shows a statistical significance effect of its estimation in the model at 10%, 5% and 1% level of significance respectively. Standard errors are presented in parentheses. Figures that has been asterisked (*), (**) and (***) denote significance at the 10%, 5% and 1% level, respectively for each model. The independent variables (age, gender and educational level) with respect to specific time points interaction with respondents responses on whether they sleep in mosquito nets, uses mosquito spray or ensure good sanitation in their residences were all tested to be significant at $\alpha = 0.1 \ and \ 0.05$ respectively. About 76% of the data points were explained and taken into consideration for our analyses as seen from our R-squared estimate of 0.76 to 1d.p (76%). This implies that about 76% fluctuation in the preventive healthcare model was explained by the changes in the independent variables.

The parameter estimates for the models are approximately the same for all the assumptions when we consider estimation at 1 decimal point. However, age was realized to have the most significant parameter estimate at all alpha (α=0.1, 0.05 and 0.01) considered in the analyses. The standard error that is asterisked (***) was age with all the three responses representing model-based standard error tested to be significant at $\alpha = 0.01$. All computations are approximated to seven (7) decimal places to increase effective comparison of computed parameter estimates for all variables considered for this study. The abbreviations follow the same way as explained in table 3.

The relationship between Price and all dependent variables (MQ net, MQ spray and sanitation) seems to have a negative and inverse correlation. The ability of respondents to afford buying Mosquito nets, sprays and labour cost for sanitation is weak and inversely proportional. In the same way, low educational level (respondents having Basic education) is tested to be significant with negative relationship to the dependent variables whereas those with higher education background (Tertiary) have positive correlation with the least standard error estimate of 0.006. Thus, level of education have influence on people of Asonomaso's awareness and literacy rate in understanding the need to use Mosquito net, spray and Sanitation.

The proceeding sub-sections discusses the policy recommendations based on afore discussed findings.

Policy recommendation
Based on the findings, the study strongly recommends the following;

1. The various stakeholders should intensify the media advert on the use of the preventive care and the need to use such care.
2. The education curriculum should be structured in such a way that part of the physical education syllabus should give a basic knowledge on the use of preventive care in order to fight causes of disease rather fighting symptoms in Africa.
3. The public health in collaboration with the community healthcare practitioners should go to the grassroots patients in the various communities to promote the use of the preventive care and their relevant to them through informal education.
4. The government should subsidies the various malaria preventive healthcare instruments in order to enhance affordability. In doing this will reduce the prevalence rate as well as the hazard rate.

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