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Pelczar JR, Harley JP, Klein DA (1993). Microbiology: Concepts and Applications. McGraw-Hill Inc., New York, pp. 591-603.

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Journal of Public Health and Epidemiology

ARTICLES

Research Articles

Full Length Research Paper

Prevalent home management techniques and outcome among mothers of febrile children in Eastern Nigeria

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The magnitude of the consequences and the extent of problem associated with febrile illnesses in children have been shown to be associated to mothers' behaviour in treatment, decision making and prevention of childhood illnesses which are in turn influenced by social, cultural and intra-household relations. This study employed a cross-sectional survey design to assess the method employed by caregivers in the management of febrile conditions of their children in parts of Eastern Nigeria. About 100 women were sampled using multistage sampling techniques. Common actions taken by mothers and caregivers in the management of febrile include administration of home drug (32%), tepid sponging (4%), striping the baby naked (16%) and took baby/child to hospital (48%). Result from the study showed significant relationship between age of mother (p<0.05), educational attainment of mother (p<0.05), number of children (p<0.05) as well as occupation of mothers (p<0.05) and management action taken. Caregivers need to be properly aware of ill health conditions of their children and be properly equipped with prowess to manage them. There is also need for the governments through the primary health care system to improve their interaction with the grass root women and educate them more on integrated management of childhood illness.

Key words: Children, febrile, management techniques, outcome, Eastern Nigeria.

INTRODUCTION

Febrile illness refers to a feverish condition which is usually associated with malaria, measles, neonatal tetanus, pneumonia, whooping cough (Feyisetan et al., 1997; Ewoigbokhan, 2000).

Traditionally, malaria has been regarded as the most common and important febrile illness in Sub-Saharan Africa (Greenwood et al., 2005). However, many of the physicians' diagnosis of febrile conditions in children also include pneumonia, diarrhoea, and other medical conditions such as otitis media, anaemia and acute eye problems (Madubuike, 1997; Osikoya and Sebanjo, 2008).

A study on the magnitude of the consequences and the extent of problems associated with febrile illnesses in children reported that more than 4.4 million children die every year in sub-Saharan Africa (Black et al., 2003) and most children die from fever at home without receiving adequate therapy. Only a small number of children with fever are treated at health-care facilities.

A number of elements are critical to management of the

child with fever. The caregiver must recognize the illness and provide the appropriate supportive care. According to Chukwuocha (2011), diagnosis of malaria at home by caregivers was mostly by recognising symptoms such as constant fever, headache, coughing and pains, loss of appetite, etc.

An efficacious drug must be available either at home or nearby when the child becomes ill and the drug must be affordable for the caregiver. But these drugs are not readily available to the first calls of most caregivers (the Patent Medicine Dealers-PMDs) and even when available, they are usually of high cost (Chukwuocha et al., 2013). While some mothers in the community think that drugs provided in the community are very weak or of a lower quality, some believe that the drugs provided in the clinics and shops are better off, whereas others do not seek for drug treatment at all. This may be as a result of cultural or religious beliefs (Kidane and Morrow, 2000).

Earlier studies on home health care had pointed out that women assume the burden of the care for their children (Sims et al., 1992; Molyneux, 2002). And with issues surrounding pregnancy extremely viewed as women issues (Jhpiego, 2001; Nwakwuo and Oshonwoh, 2013), the health beliefs of these women can greatly influence the outcome of febrile illnesses in children such that action taken results in good or poor outcomes. Most mothers according to Nsungwa et al. (2007) become upset and aggressive in management of fever conditions, and these may be determined by their level of education, age of the mother, occupations, religion and other socio economic/cultural factors. However, the fact that some caregivers prefer handling the case at home before going to hospital for further treatment might be greatly influenced by their knowledge of necessary health management techniques.

Home treatment is a common practice among caregivers of under-five-year old children (Demming et al., 1999; Fawole and Onadeko, 2001; Olaogun, 2005). The finding of Ajibade (2013) affirms that caregivers of children play active role in the health care of these children. Thus, the challenge is to work on this natural tendency for self-treatment, as a means of ensuring early recognition of illness and ensure safe, prompt and appropriate action.

Further studies on home health care have also shown that behaviour in treatment, decision making and prevention of childhood illnesses are influenced by some factors such as social, cultural and intra-household relations (Feyisetan et al., 1997; Molyneux, 2002). This by implication indicates that the adequacy of care provided for the children is a reflection of capability of taking control of the difficulties associated with complexity and dynamism of these factors (Ajibade, 2013). This study intends to access the prevalent home management techniques and outcome among mothers of febrile children in Eastern Nigeria in relation to factors that influence the use of such techniques.

MATERIALS AND METHODS

This study employed a cross-sectional survey design to assess the methods employed by caregivers in the management of febrile conditions of their children.

Out of a total of 154 women of child bearing age permanently residing in Umuevu (resided in Umuevu in the 12 months), 100 respondents were selected. Using a multistage sampling technique, 3 villages that make up Umuevu in Eastern Nigeria were clustered and 100 women were randomly selected proportionate to the number of women of child bearing age in each cluster.

Questionnaire was used to seek information from mothers/ caregivers on their knowledge of signs and symptoms of ill health conditions among children, cultural dispositions and techniques and factors in their management.

The questionnaire was validated for both content and criterion by an expert and the reliability (0.78) of the questionnaire was assured through pilot study.

Data collected were collated and compiled into a spreadsheet. Raw data was analyzed using SPSS version 20 and tables and charts were presented. Fishers' exact and chi-square was used to provide inferential conclusion.

RESULTS

Table 1 shows the socio-demographic characteristic of the respondents. Greater percentages of the mothers are aged 18 to 30 years (48%), 31 to 42 years (42%) and 98% of them are of Christians background. About 54% of the respondents has attained a form of tertiary level of education with few (8%) having no formal education. The common occupations of the mothers are trading (38%) and civil service (46%) with few farmers (10%). Large number of the mothers in the study has one child (64%) with 26% having around 2 to 4 children. More febrile condition is reported for female children (54%) and is common around age 1 to 2 years (32%), 3 to 4 years (30%) and less than 1 year (20%).

Table 2 shows mothers' knowledge of the child's febrile condition. More febrile where noticed in prior four days to the study and most reported episode has occurred only but once (60%) with malaria remaining the common cause (64%), followed by pneumonia (28%). Although mothers and mother in-laws play greater role in the identification of febrile conditions (50%), husbands (22%) has been helpful with only 8% of conditions identified at the health care facility level by health workers.

Table 3 shows that 48% of mothers prefer taking children to hospitals, while 32% prefer to administer drugs at home. Greater percentage (50%) of actions taken by mothers is usually immediately a sign febrile is noticed with 40% taken in less than 24 h of the identify-cation of signs of febrile condition. Apparently, 88% of actions taken have resulted in improved health conditions and 43% intends to take children to the hospital in future occurrences, while 38% will prefer to give drug at home even if subsequent action is required.

From Table 4, mothers were shown to have identified febrile through loss of appetite 46 (24%), dullness 32 (16.7%), hand touching 30 (15.6%), shivery and

Table 1. Demographic characteristics.

Variable	Frequency	Percentage
Age of mother		
18 - 30 years	48	48.0
31 - 42 years	42	42.0
43 years and above	10	10.0
Religion		
Traditional Christian	80	80.0
Modern Christian	18	18.0
Traditionalist	2	2.0
Level of education of mother		
No formal education	8	8.0
Primary	6	6.0
Secondary	32	32.0
Tertiary	54	54.0
Occupation of mother		
Farming	10	10.0
Trading	38	38.0
Civil servant	46	46.0
Student	6	6.0
Number of children		
1 child	64	64.0
2 – 4 children	26	26.0
Above 4 children	10	10.0
Sex of febrile child		
Female	54	54.0
Male	46	46.0
Age of febrile child		
Less than 1 year	20	20.0
1 - 2 years	32	32.0
3 - 4 years	30	30.0
Above 4 years	18	18.0

restlessness 24 (12.5%).

Table 5 shows that 72 (35%) of causes of febrile are noticed by laboratory test, fever 54 (26.2%). Table 6 shows relationships between different variables and common actions taken by mothers and/or caregivers. A significant relationship was shown between age of mother and action taken (fishers exact, p=0.000) as younger mothers are more likely to administer drugs at home whereas elderly mothers tend to take their children to the hospital.

The relationship between educational attainment of mother and action taken (fishers exact, p=0.000) was also significant. Mothers with no formal education, primary and secondary educations are more likely to administer

home drugs aside other actions, whereas mothers with advance education go for hospitals as their first action for febrile children.

Also from the same table, a significant relationship was shown between the number of children and action taken (fishers exact, p=0.000). Mothers with single child prefer to administer drugs at home, tepid sponge or stripe the baby naked compared to those with more children (2 and above) who prefer to use the hospital.

Occupation of mother and/or caregivers was also significantly (fishers exact, p=0.000) related to their different action or actions taken. Farmers and traders are more likely to administer drug at home with formers tepid sponging and striping babies more. Figure 1 shows that the relationship between mother's monthly income and actions taken (fishers exact, p=0.000) is significant. Mothers with high income are more likely to take their children to hospitals.

DISCUSSION

Parents and care providers have in several studies identified "fever" as a significant indicator of illness in children (Osikoya and Sebanjo, 2008; Poirier et al., 2000; Akpede, and Akenzua, 2001). A number of malaria-related symptoms particularly fever, shivering, chills, loss of appetite and headache were presented, which taken together may approximate a clinical diagnosis of malaria although using these symptoms, particularly fever, as a proxy for malaria appears to be neither sensitive nor specific when compared with parasitologically confirmed diagnosis (Font et al., 2001; Amexo et al., 2004). This implies that fever dictates the needs of treatment and what mothers do.

Traditionally, malaria has been regarded as the most common and important febrile illness in sub-Saharan Africa (Greenwood et al., 2005). This study indicates that 64% of reported febrile illnesses are due to malaria. Only 28% is due to pneumonia.

Most children die from fever at home without receiving adequate therapy and although the recognition of illness and provision of the appropriate dose of drugs, together with supportive care is a critical element in the management of febrile, access to health services and the quality of care administered at all levels of health care have been considered as the central determinants of health outcomes (WHO, 2000). The survival of children in developing countries depends on the family's and community's ability to access basic needs of life (Nnebue et al., 2010).

Some studies have shown that home treatment is a common practice among caregivers of under-five-year old children (Demming et al., 1999; Fawole and Onadeko, 2001; Olaogun et al., 2005; Nwankwo et al., 2009). Other studies on home health care pointed out that women assume the burden of the care (Sims et al., 1992; Molyneux et al., 2002). The perceived illness severity, maternal recognition of certain signs and symptoms of
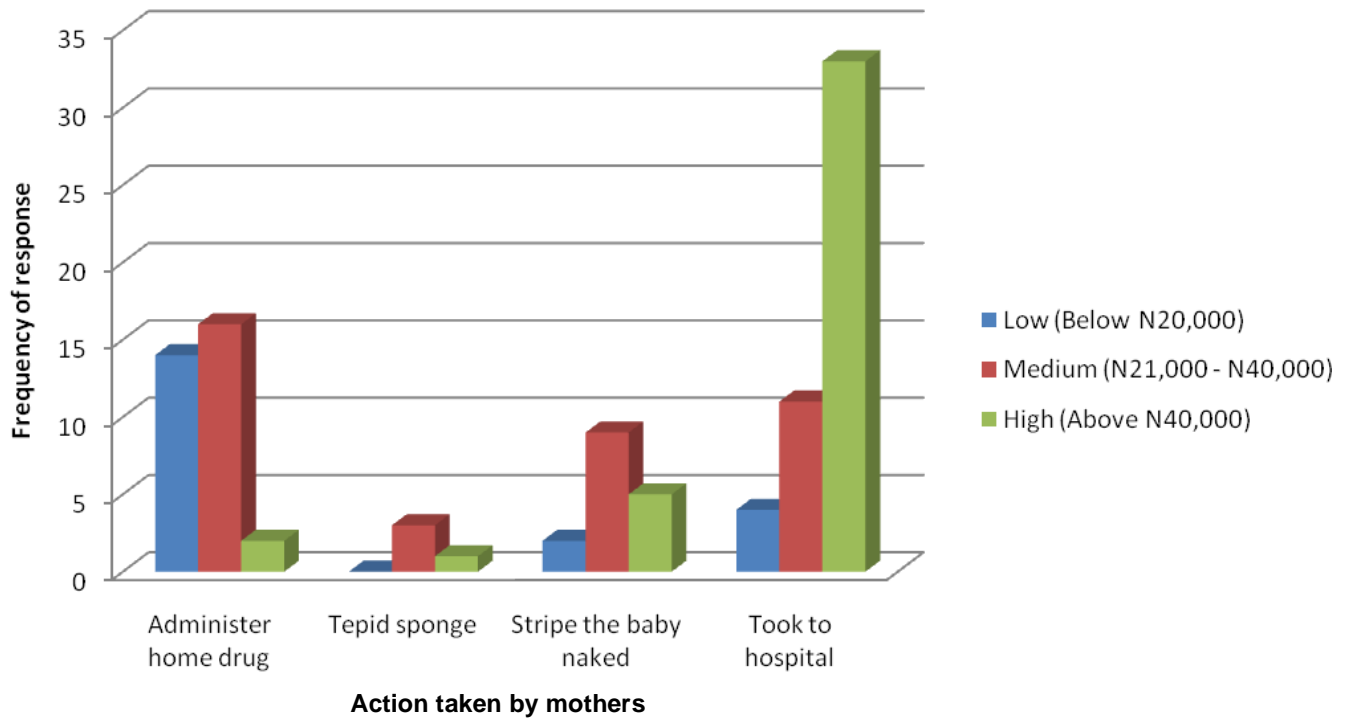
Figure 1. Relationship between monthly income of mothers and action taken (p=0.000).

Table 2. Mothers' knowledge of child's febrile condition.

Variable	Frequency	Percentage
When the child had febrile condition		
Last four days	30	30.0
Last one week	26	26.0
Last two weeks	20	20.0
Last one month	24	24.0
Frequency of episodes		
Just once	60	60.0
Two days interval	26	26.0
Three days interval	14	14.0
Cause of febrile condition		
Pneumonia	28	28.0
Malaria	64	64.0
Measles	8	8.0
Who noticed febrile condition if not mother		
Sister/sister in-law	8	8.0
Brother/Brother in-law	2	2.0
Mother/Mother in-law	50	50.0
Neighbour/friend	10	10.0
Husband	22	22.0
Health worker	8	8.0

Table 3. Mother's action during child's illness episode.

Variable	Frequency	Percentage
Action taken		
Administer home drugs	32	32.0
Tepid sponge	4	4.0
Striped the baby naked	16	16.0
Took to hospital	48	48.0
Time between sign and action taken		
Immediately	50	50.0
Action in less than 24 hours	40	40.0
Action more than 24 hours	10	10.0
Who informed action taken		
Sister/sister in-law	8	8.0
Brother/Brother in-law	2	2.0
Mother/Mother in-law	50	50.0
Neighbour/friend	10	10.0
Husband	22	22.0
Health worker	8	8.0
Confident of action		
Yes	84	84.0
No	10	10.0
Not sure	6	6.0
Result of action taken		
Condition improved	88	88.0
Condition remain the same	12	12.0
Action to be taken in future episodes		
Given drugs	38	38.0
Strip the body/baby naked	43	43.0
Take to hospital	19	19.0

of childhood illness were critical factors determining health care seeking behaviour.

Rural residence has been shown by several studies to have the highest risk factor for febrile illnesses in under fives (Yoder and Hornik 1996; D'Souza, 1999; Goldman and Heuveline, 2000; Amarasiri et al., 2001). Children of mothers in rural settings with lower levels of education are more likely to suffer from fever as compared to urban children with better educated women (Yoder and Hornik, 1996; D'Souza, 1999; Goldman and Heuveline, 2000; Amarasiri et al., 2001). But according to Olaogun et al. (2006), education was however insignificant at 5% level. This is in contrast with the report that educational status has a positive effect on the health status of the family (Nnebue et al., 2010). Another study has also reported a strong relationship between mothers' education and

health seeking behaviour (Nigeria Demographic and Health Survey, 2003) and this is consistence with the significant relationship (fishers exact=111.493, p<0.05) shown in this study between educational attainment of mother and action taken.

A study by Olaogun et al. (2006) in Osun State Nigeria showed that mothers' age was negatively correlated with under-fives mothers' action. In contrary, (Nnebue, Ifeadike, Nworah and Duru (2010) showed that the older the mothers' are, the more likely they would not take action when their under-fives develop febrile illness. This is study shows a significant relationship between age of mother and action taken (fishers exact=107.066, p<0.05) with younger mothers are more likely to administer drugs at home whereas elderly mothers tend to take their children to the hospital.

Further studies on behaviours in treatment decisions making and prevention of childhood illnesses are influenced by some factors such as social, cultural and intra-household relations (Feyisetan et al., 1997; Molyneux et al., 2002).

Occupation in this study was shown to be significantly (fishers exact=112.014, p<0.05) related with management action taken by caregivers. This is consistent with a positive correlation with under-five mothers' action reported in a study in Osun State (Olaogun et al., 2006) and the assertion by Hobbs and Blanks (1975) that occupation plays a major role in shaping the life style of individuals. Hobbs and Blanks (1975) reported increased women's access to resources and strengthens their bargaining power within the household and the workplace. The women's access to resources and their bargaining power within the household have a significant influence on their treatment seeking behaviour for their children (Nigeria Demographic and Health Survey, 2004).

Income according to Olaogun et al. (2006) was insignificant at 5% level. This result is contrary to the result of this study which shows a significant relationship (fishers exact=39.562, p<0.05) between monthly income of mothers and their action on management of children febrile conditions.

The findings from this study showed that about 48% of respondents took febrile children with 50% of decision taking, immediately febrile condition is noticed and 40% within 24 h. This is contrary to the findings by Olaogun et al. (2005) who found that only one respondent in their study reported to the clinic within 24 h of the child been sick (Olaogun et al., 2005).

Fever was the mostly mentioned sign observed by mothers in their sick children which prompted them to take action aside result from the laboratory. This finding affirms the reports from various studies that fever is a good sign for mothers or parents to seek for treatment of childhood febrile illnesses (Poirier et al., 2000; Agbolosu et a., 1997). Findings of this study affirm the several reports of the high prevalence of home treatment for under-five year children with febrile illnesses (Olaogun et al., 2005; Audu and Ogala, 1997; Lubanga et al., 1997).

Table 4. Mother's perception and understanding of child's febrile condition.

Variable	Frequency	Percentage
*How febrile condition was noticed		
Hand washing	30	30.0
Shivery	24	24.0
Uses of clinical thermometer	10	10.0
Restlessness	24	24.0
Loss of appetite	46	46.0
Dullness in movement	32	32.0
Joint/body pain	12	12.0
Rashes	4	4.0
Others	10	10.0

*Multiple responses

Table 5. Mothers knowledge of causes of febrile condition.

Variable	Frequency	Percentage
Causes of febrile conditions		
Fever	54	54.0
Laziness/dullness	26	26.0
Loss of appetite	32	32.0
Rashes	4	4.0
Convulsion	2	2.0
Joint/body pains	16	16.0
Laboratory test result	72	72.0

According to the reports of study carried out in Uganda, mothers gave modern drugs as action taken before coming to health facility. In Nigeria, reports showed that parents used more of herbs than modern drugs (Salako et al., 2001), but this study also indicates 32% admini- stration of home drugs by caregivers. Tepid sponging and use of orthodox drugs are two common practices of home management and patent medicine dealers remains the main source of drugs. The practices of home management have to be exploited so that childhood febrile illnesses could be controlled through appropriate treatment (Ajibade, 2013). The children would be highly benefited from pre-packaged drugs, and mothers from integrated management of childhood illness education.

Conclusion

The magnitude of the consequences and the extent of problems associated with febrile illnesses in children is enormous (Black et al., 2003).

Caregivers must therefore be able to recognize the illness so as to provide the appropriate supportive care and access to health services, since the quality of care administered at all levels of health care have been con- sidered as the central determinants of health outcomes (WHO, 2000).

Although this study shows a good relationship between ages, education, household size and occupation of mothers and the action taken on their children's health and the fact that greater percentage visits the hospital during febrile conditions. Younger mothers with low education are more likely to administer drugs at home or apply one prevention method or the other. Fever has been shown not to be the only way of recognizing febrile illness, but also loss of appetite, body pain and restlessness.

Further more, although greater actions taken by care- givers (mothers) resulted in improved health conditions, caregivers and mothers need to be properly aware of ill health conditions of their children and be properly equipped with prowess to manage them, because the adequacy of care knowledge for children will improve their capability of taking control of the difficulties associated with complexity and dynamism of factors influencing their decisions and improve integrated management of childhood illness.

LIMITATION OF STUDY

As most women of child bearing age in the community were not permanently residing in the village, it was dif- ficult to reach more respondents or increase the sample

Table 6. Relationship between variables.

Parameter	Action taken				
	Administer home drugs	Tepid sponge	Striped the baby naked	Took to hospital	Total
Age of mother and action taken: p=0.000					
Age of mother					
18 – 30 years	32 (66.7)	4 (8.3)	12 (25.0)	0 (0.0)	48 (100)
31 – 42 years	0 (0.0)	0 (0.0)	4 (9.5)	38 (90.5)	42 (100)
43 years and above	0 (0.0)	0 (0.0)	0 (0.0)	10 (100)	10 (100)
Level of education of mother and action taken: p=0.000					
Level of education					
No formal education	8 (100)	0 (0.0)	0 (0.0)	0 (0.0)	8 (100)
Primary	6 (100)	0 (0.0)	0 (0.0)	0 (0.0)	6 (100)
Secondary	18 (56.3)	4 (12.5)	10 (31.3)	0 (0.0)	32 (100)
Tertiary	0 (0.0)	0 (0.0)	6 (11.1)	48 (88.9)	54 (100)
Number of children and action taken: p=0.000					
Number of children					
1 child	32 (50)	4 (6.3)	16 (25)	12 (18.8)	64 (100)
2 – 4 children	0 (0.0)	0 (0.0)	0 (0.0)	26 (100)	26 (100)
Above 4 children	0 (0.0)	0 (0.0)	0 (0.0)	10 (100)	10 (100)
Occupation and action taken: p=0.000					
Occupation					
Farming	10 (100)	0 (0.0)	0 (0.0)	0 (0.0)	10 (100)
Trading	22 (57.9)	4 (10.5)	12 (31.6)	0 (0.0)	38 (100)
Civil servant	0 (0.0)	0 (0.0)	4 (8.7)	42 (91.3)	46 (100)
Student	0 (0.0)	0 (0.0)	0 (0.0)	6 (100)	6 (100)

size. Even the available women are either farmers or traders, thus difficult to reach except during antenatal clinics or vital clinic days.

Also, the difficulty of mothers and some women to recall any previous episode of febrile illness of their children and the fear to comment on their practices of self medication. There was also a low level of knowledge about integrated management of childhood illness.

RECOMMENDATIONS

Based on the findings of this study, the flowing recommendations have been proffered: the government through the primary health care sector has to improve their interaction with the grass root women and educate them more on integrated management childhood illness; provision of insecticide treated bed nets will also help reduce the prevalence of malaria among children especially the under five; emphasis should me made on seeking adequate health care for children to mothers during antenatal and postnatal care visits to health care workers especially to young and inexperience mothers; the health care providers, non governmental and support

organization should also help mothers with requisite preventive emergency techniques for management of febrile conditions at home/community level; and access to health care facilities should be at a reasonable proximity.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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Full Length Research Paper

Knowledge, perception and predictors of uptake of cervical screening among rural Nigerian women

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Cervical screening is effective in mitigating the morbidity and mortality of cervical cancer. However, the uptake of cervical screening is still unsatisfactory in many countries. The aim of this study was to assess the knowledge and perception of rural Nigerian women about cervical cancer and screening. The study also investigated the predictors of cervical screening. A survey with interviewer administered questionnaires was conducted on 800 Nigerian women recruited from households in Ogun State by a multi-staged sampling method. Participants were aged 25 to 64 years. Proportion of respondents with very poor knowledge and poor perception about cervical cancer were 93.9 and 94%, respectively. Hence, it is not surprising that the uptake of cervical screening is abysmally low (3.9%). Age, knowledge and perception about cervical cancer were related to uptake of cervical screening; however, only perception about cervical cancer was found to predict the uptake of cervical screening. There is a need for deliberate multi strategy program to enhance cervical screening. The strategy must include creation of awareness, health promotion and education about cervical cancer and screening. The strategies should target improving the perception of women about cervical cancer and screening.

Key words: Cervical cancer, uptake of cervical screening, knowledge, perception and predictors.

INTRODUCTION

Cervical cancer is a malignant neoplasm of the cervix uteri or cervical area. Cervical cancer is seen only in women, because men do not normally have cervix. Globally, there are nearly 1.4 million cases of clinically recognized cervical cancer (World Health Organization/Institut Català d'Oncologia (WHO/ICO), 2010). It is estimated that as many as 7 million women will have high-grade changes in the cervix (almost becoming cancer), globally, of which 80% of are in developing countries like Nigeria (WHO/ICO, 2010). It is the second commonest cancer of

women worldwide, trailing behind breast cancer. Cervical cancer remains the commonest genital tract cancer (Curado et al., 2007).

Industrialized countries have reduced its incidence by over 70% in the last 50 years; however, the burden seems to be on the rise in less developed countries (Curado et al., 2007). Several countries in North America and Europe have successfully achieved high screening rates and significant reductions of 20 and 60% in cervical cancer mortality with population-wide screening (Berg,

2003). However, studies show that the cervical screening rate is low in many other populations (Lee et al., 2008; Sairafi and Mohamed, 2009).

The most important risk factor for cervical cancer is in frequent screening or lack of accessible cervical screening services. Other risk factors are early age at sexual contact, exposure to human papilloma virus infection (HPV), early marriage (below age 20 years), multiple sex partners, polygamy, multiparty and lack of awareness of the disease itself (Kumar et al., 2007).

Early detection of cervical cancer will lead to a better prognosis resulting in a decrease in the mortality and health care costs. If undetected, individuals suffer and there are also adverse social effects on the families and the community (WHO, 2006). Cancer of the cervix can be prevented by providing widespread and regular cervical screening services for all women who have been sexually active. This is done by pap smear test or visual inspection of the acetic acid painted cervix (VIA) which is affordable and more sensitive. Vaccination against the HPV in women before the onset of sexual activity also prevents the disease. This is however very expensive at the moment. The One-Visit Approach–screening with VIA by trained personnel and provision of cryotherapy for obvious mild to moderate cervical dysplasia is recommended for developing countries (RTCOG, 2003).

It is likely that the uptake of cervical screening is related to the knowledge and perception about cervical cancer and screening and the perception of personal risk of cervical cancer. Although these factors have been widely studied among North American and European women, very few studies are reported among Africans and indeed Nigerians. It is not known whether these factors contribute to the low cervical screening rates in many other countries. This study examines the connection between the uptake of cervical screening rate and women's knowledge about cervical cancer and cervical screening as well as their personal risk perception.

Only about 15% of women aged 20 to 65 years in the South-West region of Nigeria have heard about the disease (Curado et al., 2007). The majority (60%) of this population live in rural areas with no access to cervical screening. Currently in Nigeria, less than 10% of women are screened (WHO/ICO, 2010), whereas 40 to 50% of women are screened in developed countries (Curado et al., 2007). In Hong Kong, the estimated percentage of women aged between 18 and 64 years that have been screened for cervical cancer was 62.0% in 2012 (Hong Kong Department of Health, 2008).

Nigeria has a population of 40.43 million women aged 15 years and older who are at risk of developing cervical cancer (WHO/ICO, 2010). Current estimates indicate that every year 14,550 women are diagnosed with cervical cancer and 9,659 die from the disease (WHO/ICO, 2010). Cervical cancer ranks as the 2nd most frequent cancer among women in Nigeria, and the second most frequent cancer among women between 15 and 44 years of age

(WHO/ICO, 2010). About 23.7% of women in the general population are estimated to harbour cervical HPV infection at a given time, and over 90% of invasive cervical cancers are attributed to HPVs 16 or 18. It is projected that in 2025, there will be 22,915 new cervical cancer cases and 15,251 cervical cancer deaths in Nigeria (WHO/ICO, 2010).

In the developing world, the burden of cervical cancer is huge. The incidence and mortality rates are in excess of the average worldwide rates of 15.3 per 100,000 women per year and 8.2 per 100,000 women per year, respectively (WHO/ICO, 2010). The age standardized incidence rate for cervical cancer in Nigeria is more than double of the world's average (WHO/ICO, 2010). Gambia, Mali, Uganda, and Zimbabwe have age standardized incidence rates of 32.5, 37.7, 47.5 and 47.4 per 100,000 women per year, respectively (Globocan, 2008). The age standardized mortality rate in Nigeria is 22.9 per 100,000 women per year, while that of Western Africa is 24.0 (WHO/ICO, 2010).

There is evidence to suggest that client factors influence the uptake of cervical screening by women as consistently reported among different populations including Asians, Caucasian and Latin-American women (Oscarsson et al., 2008; Eaker et al., 2001; McMullin, 2005). Such factors include women's knowledge, beliefs, and attitudes towards cervical cancer and screening (Twinn and Cheng, 2000).

Some demographic variables have been found to predict the uptake of cervical screening. For example Gupta et al. (2002) found that people in younger age groups and those with higher levels of education were more likely to have had cervical screening (Gupta et al., 2002). However, the decision by a woman to have cervical screening often involves a complex interplay of factors (Oscarsson et al., 2008).

This study was designed based on the Health Belief Model (HBM). HBM proposes that the perception of the severity of illness, susceptibility to illness and its consequences are the factors that predict the likelihood of a person taking recommended preventive health action (Ajzen and Fishbein, 1980; Hochbaum, 1958).

This study investigated the knowledge of cervical cancer and risk factors as well as the perception of risk of cervical cancer.

MATERIALS AND METHODS

Design and sample

This study used a cross-sectional design. Participants were women in Odogbolu and Ikenne Local Government Areas (LGA) of Ogun State in South-West Nigeria. The study was approved by the Scientific and ethical review committee of the Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria. A total of 700 women (350 in each LGA) were recruited in person by a multi-staged random sampling method from household in the communities. Eligible participants were invited to participate and the

Table 1. Knowledge and perception of participant abut cervical cancer and screening.

Parameter	Frequency	Percentage
Knowledge assessment		
Very poor	657	93.9
Poor	19	2.7
Good	10	1.4
Very good	14	2.0
Perception assessment		
Poor	658	94.0
Good	42	6.0

purpose of the study was explained. Consenting women were then interviewed by trained research assistants using a questionnaire which was designed, pretested and corrected for the purpose.

Instrument

A validated scale was used to assess women's knowledge about cervical cancer and screening and risk perception. The questionnaire contained open and close ended questions and was used to assess the demographics, awareness, knowledge, and perception of cervical cancer and screening. It also assessed the uptake of cervical screening. The questionnaire was pretested among 70 women Remo North LGA (a similar LGA to Odogbolu and Ikenne LGA) and necessary adjustments were made.

Data analysis

Knowledge and perception were scored by assigning one (1) mark for each correct answer in response to a related question. The maximum knowledge score was 40; scores from 0 to 14 were designated as 'very poor', scores from 15 to 19 were designated as 'poor', scores from 20 to 24 were designated as 'good' while scores greater than 24 were designated as 'very good'. The maximum perception score was 5; scores from 0 to 2 were designated as 'poor' while scores from 3 to 5 were designated as 'poor'.

The chi-squared test was used to examine the relationships between uptake of cervical screening and non-parametric variables, whereas the independent *t*-test was used to test the relationships between the uptake of cervical screening and continuous variables (knowledge and perception of cervical cancer and screening).

Pearson's correlation was performed to determine the relationships between the uptake of cervical screening and age, marital status, level of education, average monthly income, employment status, knowledge and perception of cervical cancer and screening itself.

Logistic regression was used to predict the uptake of cervical screening based on the knowledge and perception of cervical cancer as well as demographic factors that were found to be associated with the uptake of cervical screening. The factors included in the logistic model were age, marital status, level of education, average monthly income, employment status, knowledge of cervical cancer and screening and perception about cervical cancer. The Hosmer and Lemeshow χ^2 test of goodness-of-fit was used to test the overall fit of the logistic model. All statistical analyses were performed using SPSS version 16.0 with 95% level of significance.

RESULTS

Respondents' characteristics

A total of 700 questionnaires were analyzed. The mean and median ages of the respondents were 33.71±9.52 and 30 years, respectively. More than two-thirds (n=489, 69.9%) of the respondents are Christians. More than half of the respondents (n = 429, 61.3%) completed at least secondary school or higher level, while as much as 50 (7.1%) had received no formal education. The vast majority (n= 589, 84.1%) of the respondents were married, while 82 (11.7%) were single.

One hundred and nine (15.6%) respondents were aware of cervical cancer. While 58 (8.3%) had heard of cervical screening before, only 27 (3.9%) of the respondents had ever had cervical screening done.

Knowledge and perception of participant about cervical cancer and screening

Table 1 shows the assessment of the knowledge and perception of the respondents to cervical cancer and screening. The questions that were used to assess knowledge included those that determined whether the participant knew that HPV was implicated as a cause of cervical cancer, their knowledge of risk and protective factors, the knowledge of symptoms and knowledge about cervical screening. The knowledge and perception of the respondents was generally poor with an excess of 90% of them having very poor knowledge and poor perception scores.

Uptake of cervical screening was significantly associated with knowledge and perception scores. The mean total knowledge score was higher for screening than non-screening (t = 7.54, P= 0.000). The mean total perception score was higher among those who had done a cervical screening than those who had not (t= 8.77, P = 0.000)

Correlations of socio-demographic factors, knowledge and perception with uptake of cervical screening

Table 2 shows that uptake of cervical screening is positively correlated with age, knowledge and perception. The correlation with perception was stronger than knowledge which in turn was stronger than that with Age.

Predictors of uptake of cervical screening

Table 3 shows the odds ratio of the predictors of uptake of cervical screening. Hosmer and Lemeshow goodness-of-fit test indicated a good fit of the logistic model (χ^2 =5.967, df = 6, P = 0.427). Nagelkertke's R^2 was 0.227 which was an index of approximation to R^2 from OLS

Table 2. Correlations of socio-demographic factors, knowledge and perception with uptake of cervical screening.

Parameter	Screened (N= 27) n (%)/χ±SD	not screened (N= 673) n (%)/χ±SD	r	P value
Age groups (years)				
25-34	8 (29.6)	442 (65.7)		
35-44	10 (37.0)	141 (21.0)	-0.122	0.001
45-54	8 (29.6)	55 (8.2)		
55-64	1 (3.7)	35 (5.2)		
Marital status				
Single	2 (7.4)	80 (11.9)		
Married	24 (89.9)	566 (84.1)		
Divorced	1 (3.7)	4 (0.6)	0.001	0.979
Widowed	0 (0.0)	16 (2.4)		
Separated	0 (0.0)	7 (1.0)		
Occupation				
Student	0 (0.0)	37 (5.5)		
Unemployed	2 (7.4)	39 (5.8)		
Employed	8 (29.6)	64 (9.5)	0.014	0.705
Self-employed	16 (59.3)	521 (77.4)		
Retired	1 (3.7)	2 (0.3)		
housewife	0 (0.0)	10 (1.5)		
Level of education				
No formal education	1 (3.7)	49 (7.3)		
Primary school	13 (48.1)	208 (30.9)	-0.013	0.735
Secondary school	6 (22.2)	344 (51.1)		
Tertiary school	7 (25.9)	72 (10.7)		
Mean average monthly income	14,285.7±14,256.2	11,572.92±27,679.2	-0.019	0.656
Mean Age	39.1±9.4	33.5±9.5	-0.113	0.003
Mean knowledge score	9.7±11.7	1.6±5.1	-0.274	0.000
Mean perception score	2.4±1.8	1.1±0.7	-0.315	0.000

regression. The perception about cervical cancer was the only significant factor identified after controlling for all other factors in the model. Respondents whose perception about cervical cancer was rated to be good were likely to get a cervical screening done.

DISCUSSION

This study assesses the knowledge and perception about cervical cancer and screening. It also reports the determinants of uptake of cervical screening.

The awareness of cervical cancer and screening is very low; knowledge and perception about cervical cancer, poor. Hence, it is not surprising that the uptake of cervical screening is abysmally low just like in many other developing Asian and African countries (IARC, 2004). This is in spite of the fact that more than forty million Nigerians are at risk of cervical cancer and the existence of a huge morbidity and mortality from the disease (WHO/ICO, 2010; Zayyan, 2010). There is a need for deliberate creation of awareness, health promotion and education about cervical cancer and screening. This is especially important given the ease of prevention of the disease and the lack of capacity in the country to deal with advanced disease (WHO/ICO, 2010; Zayyan, 2010; Amotsuka, 2007).

Age, knowledge and perception about cervical cancer were related to uptake of cervical screening; however, only perception about cervical cancer was found to predict the uptake of cervical screening. A study among Hong Kong Chinese women also showed a similar increase

Table 3. Predictors of uptake of cervical screening.

Parameter	B	SE	P	OR	CI
Age Less than 45 years ≥ 45 years	1.152	0.593	0.052	3.164	0.990-10.110
Marital status Not married Married	-1.994	1.316	0.130	0.136	0.010-1.794
Level of education Less than secondary school At least secondary school	0.052	0.578	0.928	1.053	0.339-3.273
Average monthly income Less than 10,000 Naira ≥ 10,000 Naira	-0.308	0.529	0.560	0.735	0.261-2.070
Employment status Unemployed Employed	-0.594	1.277	0.642	0.552	0.045-6.747
Knowledge Poor Good	0.734	0.790	0.353	2.084	0.443-9.800
Perception Poor Good	3.219	0.670	0.000	25.007	6.721-93.042

in uptake and cervical screening with age (Leung and Leung, 2010). Studies conducted in other parts of the world have also demonstrated association between the uptake of cervical screening and knowledge, beliefs and overall perception about cervical cancer (Twinn and Cheng, 2000; Leung and Leung, 2010; Kemm and Close, 1995; Gu et al., 2012, 2013; Tacken et al., 2007). However, Leung et al. (2010) found that the patient's level of education to be related to uptake of cervical screening which is not the case in this study. The finding of perception about cervical cancer being a predictor of uptake of cervical screening is corroborated by studies among Chinese women (Leung and Leung, 2010; Kemm and Close, 1995). Leung et al. (2010) also identified other predictors as: age above 37 years, attendance of tertiary institution of learning and good knowledge of risk factors. Age, knowledge and levels of education were not found to be predictors in this study. There may be other factors which have not been considered in this study. Geographic accessibility has been found to be a barrier to uptake of screening services in many studies in Nigerian and indeed sub-Saharan Africa. The finding also supports the health belief model (HBM). It is therefore very important for policy makers and program managers to consider improving the perception of women as an integral part of any program aimed at ensuring that women have cervical screening done.

This study has limitations in the design. The study relied wholly on answers given by the women interviewed. The uptake of cervical screening was reported by the respondents without recourse to any objective record. The responses may be different from the actual situation.

Conclusion

This study found the awareness and knowledge of cervical cancer and screening to be very low with an accompanying low rate of cervical screening uptake. Although age, knowledge and perception of cervical cancer were found to be related to uptake, the perception of the women about cervical cancer and screening was the sole predictor of uptake that was detected. The perception of rural Nigerian women about cervical cancer and screening is therefore the vital element to increasing

the demand for cervical screening services.

There is a need for deliberate multi strategy program which must include creation of awareness, health promotion and education about cervical cancer and screening. The strategies should target improving the perception of women about cervical cancer and screening. There will also be need to ensure accessibility of the services.

Additional studies to determine the effect of measures aimed at improving the perception of women about cervical cancer and screening on the upake of cervical screening in Nigeria are recommended. Other possible predictors like accessibility, traditional and religious beliefs should also be assessed.

Conflict of interest

The author reports no conflicts of interest in this work.

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Full Length Research Paper

Academic achievement among radiography students in a Nigerian university: Does program interest count?

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This research assessed the relationship between the level of interest and academic achievement among Radiography students in a Nigerian University, and implications for career counseling. From the population of all the Radiography students (65) in the third, fourth and fifth (final) years, a sample size of forty students was drawn through stratified sampling technique. The ex-post facto research survey method was adopted. The program interest inventory (PII) was developed, validated and used for the study. Data analysis was done through descriptive, correlation coefficient and t-test statistics at 5% level of significance. A significant relationship between students' academic performance and the level of interest in Radiography program was revealed. Consequently, students with higher interest levels performed better in cognitive test than their counterparts with low interest level. Gender is considered an important factor, as this study revealed a significant difference in the interest levels of female and male students. The study confirms that the interest level of students in a Radiography program significantly influences their academic performance. The study recommended a targeted counseling service to help students develop genuine interest and love for their chosen careers and to avoid academic failure.

Key words: Career counseling, radiography students, program interest, academic achievement, Nigerian university.

INTRODUCTION

Career decisions among students can often be tedious and dependent upon personal and environmental variables. In the Nigerian school system, career decisions are made by the adolescent on the basis of their personal interests, parental wishes and peer group pressures (Ode 2008). Accordingly, the decisions arrived at are hardly in consonance with their ability or interest and therefore may impact negatively on eventual performance.

In our experience, many Nigerian radiography students attempt to change their program as well as university probably due to lack of interest or as a result of difficulty in coping with the academic requirements of

the Radiography program. The National Centre for Educational Statistics admits that more than one third of high school graduates admitted into post-secondary institutions leave within two years without any degree (National Centre for Education Studies 2001). This was attributed to academic deficiency anchored on lack of interest. Besides, academic environments vary in the way they reinforce patterns, interest and implement an individual's self-concept (Allen 1996). Whereas individuals actively seek environments that are congruent with their interests (Holland 1997), a students' performance in a particular subject is closely linked to interest (Ukwueze 2009). Some authors have dealt with the level of interest in specific disciplines such as Science and Technology education (Balogun 1985), and Organic chemistry (Chartrand et al., 1992), but none looked into the relationship between interest and academic achievement among Radiography students in any known Nigerian university. This is the justification for the present study.

Generally speaking, students' performance in their chosen programs is dependent on a number of factors such as self efficiency, interest congruence and commitment (Ezeudu 1998; Tranberg et al.,1993), and may vary with gender (Tranberg et al., 1993). A previous study had opined that medical studies at University impose serious both physical and psychological challenges on students; which invariably dampen some students' interest and ability (Balarable 2009). From our observations, many students who initially applied for Medicine and Surgery as a major, but admitted into paramedical programs such as Radiography, tend to show little or no interest in their programs.

It is therefore worthwhile to find out if interest has anything to do with Radiography students' academic performance during their course of study. The present study will be useful in carreer guidance, as well as planning of adaptive mechanisms for students seeking entry into health related disciplines such as Radiography.

Research question

Does the interest level of Radiography students affect their academic performance?

METHODOLOGY

This study employed the ex-post facto research survey method since the researchers were interested in the relationship between an independent variable (interest level), and the dependent variable (academic achievement). The population used for the study included all the 65 Radiography students' in the third, fourth and fifth (final) years at the Nnamdi Azikiwe University, Nnewi Campus, Nigeria. Through stratified sampling, a total of forty students made up of twelve (12) third year students, seventeen

(17) fourth year students and eleven (11) final year students were used for the study. The choice of third to fifth year students is based on the fact that core radiography subjects are introduced from the third year in Nigerian Radiography curriculum. The first and second year subjects are mainly basic medical sciences and general science studies, and students may be allowed to change programs to allied medical courses. In the third year, change of programs may no longer be possible; and thus represent a threshold to assess the students' genuine interest in their respective domains.

In all, a total of twenty eight males and twelve females made up the study group. The research instrument (Appendix 1) is the programme interest inventory (PII). The PII was developed by the researchers to ascertain the interest level of the respondents. This instrument contains a modified form of Likert responses with four response levels. It originally contained twenty five items that were later reduced to fifteen by three experts of Educational psychology who validated the instrument. A test re-test that was subjected to correlational analysis yielded a score of 0.76 to attest to the reliability of the instrument. The PII has a maximum of sixty scores out of which anything less than thirty is scored low.

The scores on a course titled "Psychology for Radiographers" written by the students was used to ascertain their cognitive level in their programs. The choice of this course was based on the fact that it was a compulsory course for the three categories of students used in the study embracing both the clinical and academic aspects of radiography. Some specific topics include: Students approach to diagnostic and therapeutic radiography, critical and reflective thinking in diagnostic medicine, cognitive behavioral therapy and application in radiotherapy, psychosocial progression in pregnancy and applications in obstetric sonography, emotional adjustment, and stress management in radiography practice and many others. Moreover, the course contents include an assessment of students' adaptability and interpersonal relationship within the hospital/clinical environment. All categories of students have commenced clinical attachment in hospitals where core radiography duties are undertaken. The scores were based on 100%. The usual pass mark for such courses in the medical school is fifty percent (50%).

RESULTS

The research questions were answered using descriptive statistics. The data (Table 1) show that 21 candidates (57.5%) with high academic scores (50 and above) and may be inferred to have high interest in their program while three candidates (7.5%) with low interest, have high academic scores. In all, twenty four candidates (60%) have high interest in Radiography while sixteen candidates (40%) have low interest in the program. From Table 2, the r-calculation (0.82) is greater than the critical r-value of 0.304 at 0.05% level of significance. This indicates that a significant relationship exists between the academic performance and interest levels of Radiography students. From Table 3, the t-calculation (7.78) is greater than the critical t-value (1.96) at 0.05% level of significance thus suggesting that the academic scores of students has a relationship with high interest in Radiography. The data in Table 4 indicate that female Radiography students with higher academic score on the

Table 1. Academic scores and interest level of Radiography students.

Candidate	Academic scores (100)	PII scores (60)	Interest level
1	49	30 (5%)	High
2	41	18 (30%)	Low
3	47	20 (33.3%)	Low
4	52	31 (51.7%)	High
5	41	14 (23.3%)	Low
6	64	36 (60%)	High
7	40	14 (23.3%)	Low
8	43	19 (31.7%)	Low
9	53	28 (46.7%)	Low
10	45	24 (40%)	Low
11	55	32 (53.3%)	High
12	43	21 (35%)	Low
13	52	30 (50%)	High
14	52	31 (51.7%)	High
15	55	36 (60%)	High
16	41	22 (36. 7%)	Low
17	62	38 (63.3%)	Low
18	45	25 (41.7%)	Low
19	39	13 (21.7%)	Low
20	60	30 (50%)	High
21	37	18 (30%)	Low
22	51	31 (51.7%)	High
23	59	36 (60%)	High
24	59	38 (63.3%)	High
25	63	40 (66.7%)	High
26	63	38 (63.3%)	High
27	64	36 (60%)	High
28	68	40 (66.7%)	High
29	54	31 (51.7%)	High
30	60	30 (50%)	High
31	65	34 (56.7%)	High
32	39	30 (50%)	High
33	63	29 (48. 3%)	Low
34	61	31 (51.7%)	High
35	45	31 (51.7%)	High
36	65	38 (63.3%)	High
37	57	30 (50%)	High
38	31	15 (25%)	Low
39	51	25 (41.7%)	Low
40	28	26 (43.3%)	Low

the average (54.42%) equally have higher program interest (29.58) than their male counterparts with a mean of 50.32% and 28 for academic performance and program interest, respectively. Generally, we can infer that low interest of the Radiography students (28.79) is likely to be responsible for their "little-above-average" performance (50.37%) in academic test.

DISCUSSION

Ordinarily, students in tertiary institutions are expected to

Table 2. Relationship between academic performance and program interest of Radiography students.

Variable	N	Mean	SD	r- cal	r- val
Academic performance	40	51.55	10.15		
Program interest	40	28.48	7.62		

Table 3. The t-test analysis of academic scores of Radiography students with high and low interest levels.

Interest level	N	Mean	SD	r- cal	r- val
high interest	24	57.3	7.05	7.78	
Low interest	16	43	8.3	1.96	

Table 4. Academic achievement and interest of Radiography students on gender basis.

Variables	Gender	N	Mean	SD
Academic Test	Male	28	50.32	10.79
Interest	Female	12	54 .42	7.77
Total		40	50.37	9.28
Academic Test	Male	28	28.00	7.53
Interest	Female	12	29.58	7.63
Total		40	28.79	7.58

pursue their programs of study with a lot of enthusiasm and with hope of future prospects. This cannot be generalized to Radiography students at Nnamdi Azikiwe University. Using our assessment platform (PII), the degree of interest largely correlates with the academic performance. Students with high PII were shown to have a better performance than their counter parts. This is largely in agreement with the findings of other authors (Ukwueze 2009; Balogun 1985; Ogboji 2005). Although these studies did not focus on Radiography students, we can infer that radiography students' academic performance in any achievement test, is a function of their level of interest.

Furthermore, the authors consider a forty-three percent (43%) low performance as significant and in agreement with another work by which noted a low academic performance among students of Nnamdi Azikiwe University (Nwokolo et al., 2009). The study has also revealed a significant difference between the academic scores of students with high interest and those with low interest in Radiography programme. This result follows the pattern described for other disciplines (Ode 2008; Ogboji 2005). It is also possible that the marginal

improvement in performance by female radiography students may be due to their higher interest levels. The South Eastern region prides itself with commercial and trading activities and has often witnessed declining enrollment of male students in higher institutions who preferred to engage in commerce after secondary education.

Implications for counseling

Counsellors are needed not only in secondary schools but also in the University system where late adolescents (youths) are found. The findings of this study have several implications for career counseling in Nigerian Universities. Since career decisions hinge on interest and abilities, professional counselors need to be close to Nigerian undergraduates to assist students in making the right choice of career. Furthermore, counselors owe it as a professional duty to educate matriculating students during the orientation program on the need to develop sincere interest in their chosen careers, as a pre-requisite to academic excellence. Through individual and group counseling, the gender issue in relation to choice of career, interest and abilities could be stressed.

Conclusion

A significant relationship exists between Radiography students' program interest and academic performance. Furthermore, academic achievement depicted by students' scores is a function of their level of interest in Radiography program. Furthermore, female Radiography students appear to have a marginally greater interest than their male counterparts, a factor which influenced their academic performance. Nigerian undergraduates therefore need counseling services to enable them

develop enable them develop appropriate interest for effective career decision and to excel in their academic pursuit. Based on the findings of this work, the following recommendations are made:

1. Pre-entry counseling should be introduced in Nigerian education system for students seeking admission into higher institutions. This should be done before pros-pective candidates for the unified Tertiary Matriculation Examinations (UME) are allowed to fill their entry forms.
2. Selection of students for admission into various courses in Nigerian Universities should be based on interest and ability. They should not be placed into any program just to fill the vacancies.
3. Group and individualized counseling is necessary and there is need to sensitize appropriate agencies, parents and individuals on issues of career aspirations irrespective of gender.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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APPENDIX 1

Students' academic programme satisfaction index (SAPSI)

Instruction: This instrument is designed to obtain data on students' satisfaction with their academic programmes. Kindly supply your information with the highest degree of honesty and truth in you. Mark X against each statement under any of SA (Strongly Agree), A (Agree), D (Disagree) and SD (Strongly Disagree)

Section A: Personal data

Name of University/School_____
Reg. Number: _____Course:_____
Level: _____ Age: _____Gender:_____

Section B: Level of satisfaction.

S/N	Item statements	Response category			
		SA	A	D	SD
1	I wish I hadn't gotten into my course				
2	I feel good about my course				
3	I feel like changing my course				
4	I would have been happier in another course				
5	Self-actualization is guaranteed in my course				
6	My personal qualities are in agreement with my course				
7	I often feel satisfied with my examination scores				
8	I am enjoying all the satisfactions of my course				
9	My course does not give me any joy				
10	I feel good because my course will lunch me into a brighter future				

Programme interest inventory (PII)

Instruction: This instrument is designed to ascertain students' interest in their academic programmes in Nigerian Universities. Please supply your answers faithfully. Mark X against each statement under any of SA (Strongly Agree), A (Agree), D (Disagree) and SD (Strongly Disagree)

Section A: Personal data

Name of School / University:_____
Reg. Number: _____ Course:_____
Level:_____ Gender:_____

Section B: Interest level

S/N	Item statements	Response category			
		SA	A	D	SD
1	I enjoy every aspect of my course				
2	I don't enjoy the practical aspect of my course				
3	Activities involving demonstration are interesting to me				
4	I always feel bored each time I have lecture				
5	My course makes me feel I have a bright future				
6	The theoretical aspect of my course is boring				
7	I enjoy spending my free time reading materials related to my course				
8	My interest in my course is fading gradually				
9	I don't like my course because of the risks involved in practicing it.				
10	I have no interest at all in my course				
11	I often feel reluctant to do my assignment.				
12	Research activities in my course are fascinating				
13	I cannot go into teaching my course				
14	I don't like to discuss my course with people				
15	I am studying my course just to satisfy my parents				

Full Length Research Paper

Mothers' health seeking behaviour and socio-economic differentials: A factor analysis of full childhood immunization in South-Western Nigeria

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As many countries have achieved 85% full childhood immunization coverage with a sharp drop in the incidence of six major diseases, the situation in many other countries especially in Nigeria still call for concern and thereby suggesting that this indicator may not have been responding to prior policy and technical interventions. Globally, mothers play a major role in determining the health of their children. Thus, the influence of mothers' health seeking behaviour and their socio-economic differentials on childhood immunization status was examined. Data on 4,519 women aged 15 to 49 years with at least a child within the last five years were extracted from the 2008 Nigeria Demographic and Health Survey (NDHS) kids-recode data set for this study and complemented with In-Depth Interviews (IDIs). The study found that 36.2% of the mothers did not receive any antenatal care, 6.9% received antenatal care at home, 30.0% of them delivered at home as 63.2% did not receive any postnatal care. Overall, only 36.5% of children aged 12 to 23 months were fully immunized, 51.0% received partial vaccination, while 12.5% did not receive any vaccine. The study revealed that mothers' place of antenatal care, place of delivery, level of education, type of occupation, place of residence and wealth quintile significantly influence childhood vaccination status (p<0.05).

Key words: Health Behaviour Socio Economic Childhood Immunization Antenatal Delivery Postnatal Nigeria.

INTRODUCTION

Studies in Africa have shown that about 3 million children in developing countries still die and many more are crippled, blinded, or otherwise disabled from six major diseases that are preventable through immunization (World Health Organization (WHO)/United Nations Children's Fund (UNICEF), 2010). These six diseases are measles, pertussis (whooping cough), tetanus, polio, tuberculosis, and diphtheria. Meanwhile, for all these six diseases, vaccines and the means to provide them are readily available, relatively inexpensive, and of proven effectiveness

in saving lives. According to the WHO (2010), one goal of the Global Immunization Vision and Strategy 2006 to 2015 is for each country to reach at least 90% coverage nationally and 80% in every district or equivalent administrative unit by 2015. In 2009, only 122 member states had reached national-level coverage of 90%. The slow progress or even lack thereof, in some countries with large birth cohorts affects global coverage, while coverage was estimated to be less than 80% in 36 countries, and 6 countries (Chad, Equatorial Guinea, Gabon, Nigeria,

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Palau and Somalia) failed to achieve 50% coverage level (WHO/UNICEF, 2010). Globally, evidences from studies have shown that of all the child survival interventions, the greatest gains have been achieved in immunization (WHO, 2009). At the beginning of the 1980s, immunization coverage against the six target diseases was about 20%. During the past decade many programs have expanded coverage greatly and some countries have now reached over 70% coverage while the reported incidence of these diseases has dropped sharply in some countries (Centers for Disease Control and Prevention (CDC), 2006, 2009). However, despite the successes in some countries, coverage levels in many other countries remain low. Coverage averages below 40% in some acquired immunodeficiency syndrome (AIDS) assisted countries which includes many of the world's poorest nations with the least developed health systems (AIDS, 2010). In Nigeria, despite the effort to increase full childhood vaccination coverage, the situation over the years has not improved. For instance, the 1999 Nigeria Demographic and Health Survey (NDHS) found that full immunisation coverage had dropped to 17% from 30% in 1990 (National Population Commission (NPC) and ORC Macro, 2004), with a marked decline in the northern parts of the country (in 1999, coverage was 7.5% in the north-east and 4.3% in the north-west). In 2008, coverage was found to be approximately 23% which is almost double that of 2003 (NDHS, 2003, 2008).

Currently, Nigeria is among the ten countries in the world with vaccine coverage rates below 50% (WHO, 2010), having been persistently below 40% since 1997 (WHO, 2003). Efforts to prevent these childhood diseases dated back as far as 1979 when the Federal Government established the Expanded Programme on Immunisation (EPI) in 1979. In 1997, this programme was renamed the National Programme on Immunisation (NPI) and was charged with the responsibility of effectively controlling, through immunisation and provision of vaccines, preventable diseases by the end of 2005 and 2015 as target years (NPI, 2000). The realization of these goals faced many setbacks as more than half of the children aged 12 to 23 months in 2004 were not vaccinated and the ratio of unimmunised children against each of the diseases was inconsistent (Onwu, 2004). Nigeria operates the immunization schedule of the EPI which prescribes five visits to receive one dose of Bacille Calmette Guerin (BCG), four doses of oral polio vaccine, three doses of diphtheria, pertussis and tetanus vaccine, three doses of hepatitis B at birth, at six weeks of age, and at 14 weeks of age and measles vaccine at nine months of age (Federal Ministry of Health, 1995; WHO, 2010). The standard measure of vaccination coverage is the percentage of children who have received the requisite number of vaccine doses irrespective of the age at receipt of the vaccine (Luman et al., 2005). However, for maximum protection against vaccine-preventable diseases, a child should receive all immunizations within

recommended intervals (Glauber, 2003). Receipt of vaccines at recommended ages and intervals ensures that the child is adequately protected from target diseases at all times.

To ensure the adequate receipt of the recommended vaccines and to increase the vaccination coverage, UNICEF in collaboration, with the Nigerian Government started supporting the implementation of an Accelerated Child Survival Development intervention (ACSD) in Nigeria in 2006. The strategy focused on the use of low cost and high impact intervention packages such as strengthening routine immunisation, Vitamin A supplementation, exclusive breastfeeding, oral rehydration therapy (ORT) and the use of insecticide treated nets (ITNs). These interventions are integrated at facility, community and family levels, targeting pregnant women and under-five children and accessing the hard-to-reach in order to ensure that the impact is sustainable and equitable (UNICEF, 2008). Despite all these intervention programmes, the country situation is still a matter of concern as coverage was found to be approximately 23%, while these vaccine preventable diseases still account for 22% of child death in Nigeria, amounting to over 200,000 deaths per year (NPC & ORC Macro, 2008; WHO, 2010). Though, in 2008 Nigeria recorded a drop in under-five mortality from 201 deaths per 1,000 live births to 157 against the millennium development goals (MDGs) 2015 targets of 63 per 1000 births. Currently, 75 children per 1,000 live births are still dying before their first birthday (NPC and UNICEF, 2009), which represents a slight decrease from 100, eight years ago.

Worldwide, and most especially in developing countries, discussion of vaccination demand is often reduced to narrow issues of knowledge, services and education. Missing is a deeper understanding of the mother's health seeking behaviour that influences its acceptance, use and effectiveness. Maternal health seeking behaviour has a huge impact not only on lives of mothers, but also on the lives of their children. Substantial body of health seeking behaviour work directed specifically at women typically highlights that mothers' demand for and utilization of maternal health services depends on numerous factors, many beyond a woman's direct control, including the physical accessibility of facilities to her home; direct and indirect costs of obtaining services; provision of quality care; demonstrating cultural sensitivity to her needs, and the availability of the needed essential drugs and vaccine supplements (Lashman, 2006).

These service quality factors and access to the facility has limited impact when compared with factors within mothers' direct control (that is, her health-seeking behaviour) regarding her decision on modern health care utilization for antenatal care and delivery services. The impact of their health seeking behaviour is particularly higher among pregnant mothers as majority of them do resort to the use of traditional medical practitioners, mission houses and spiritual healers as alternative

providers of health care services during pregnancy and childhood health care (El-Sefly, 2001; Mairiga, 2003). This was clearly reflected in the 2008 NDHS report as many mothers did not attend antenatal care; many of those that attended delivered at home, while majority did not seek postnatal care to immunize their children. Based on the findings from studies that mothers' utilization of health care services during pregnancy and delivery is a precondition that mothers will seek subsequent care after delivery (Phathammavong et al., 2010), and the fact that it is the women that bear the brunt of the responsibility in the case of immunization. It is therefore vital to examine those aspects of their health seeking behaviour during pregnancy, delivery and after delivery as well as their socio-economic differentials that really influence childhood immunization.

METHODOLOGY

Study area

This study was conducted in Southwestern Nigeria. The South West region straddles a range of diverse climates, from the Guinea Savannah in its northern parts to the coastal climate in the south. It has large areas of tropical rainforest. The southwest geo-political zone comprises six states namely, Lagos, Ogun, Oyo, Osun, Ondo and Ekiti with their total population put at 27.7 million, which is about 20% of the entire population of the country according to the 2006 NPC figure (NPC, 2006). Majority of the inhabitants of this region are Yoruba speaking people with shared religious affiliations such as Christianity, Islam and traditional religion. Apart from the state and local administration, each town in the region has an Oba (king) and chiefs who manage the affairs of their subjects. The region has the highest number of educated people in the country.

Sample design

The NDHS kids recode dataset was used for this study. The survey was cross-sectional. It was designed to provide specific information on population and health indicators at the national, zonal, and state levels. Information collected includes birth histories, in-depth demographic and socio-economic information on illnesses, medical care, immunizations, and anthropometric details of children. The sampling frame used for the 2008 NDHS was the 2006 Population and Housing Census of the Federal Republic of Nigeria conducted in 2006, provided by the NPC.

This study makes use of both quantitative and qualitative data. The 2008 NDHS collected a nationally representative data on 33,385 women of ages 15 to 49 and 15,486 men of ages 15 to 59 in the entire country. However, the target population in this study were mothers of children aged 12 to 23 months residing in the Southwestern part of Nigeria at the time of the 2008 NDHS survey. Therefore, from the sampling frame of 5,025 (women interviewed in the southwest region), after excluding women who have not had at least a child within the last five years among women of ages 15 to 49 years and applying weighting factors to the sampling frame, we were left with sample size of 4,519.

Besides the household questionnaire, there are two other questionnaires used in the 2008 NDHS. The women questionnaire questionnaire for currently married men aged 15 to 59 years. The women questionnaire collected information on the background characteristics (Age, education, women's occupation, etc.), first

time of antenatal visits, place of antennal care, place of delivery, family planning method, reproductive history and fertility preferences, etc. The men's questionnaire also collected much of the same information found in the women's questionnaire with exception to detailed reproductive history or questions on maternal and child health or nutrition (NPC & ORC Macro, 2008). Therefore, variables relevant to this study were selected and defined "mothers' health seeking indicators and mothers' socio-economic factors".

Qualitative method of data collection

In addition to the quantitative data, primary data were obtained through in-depth interviews (IDI) of currently married women that have had at least a child within the last five years. The in-depth interview focused on mothers of children between the ages of 12 to 23 months. Multi-stage sampling technique was used: simple random sampling technique was used to select two states out of six states in Southwest Nigeria. From each of the selected state, two local government areas (LGA) were selected, and from each of the selected LGAs, one rural areas and one urban center were purposively selected. The locations that were eventually selected are Egbeda and Ibadan (in Oyo State), Sekona and Osogbo (in Osun State). Three in-depth interviews were conducted in each of the four locations.

The research instrument used was in-depth interviewers' guide developed by the author based by drawing some specific questions from NDHS questionnaires based on its methodology in order to be consistent with data used and to ensure its validity. The guide permits greater depth of meaning and seeks detailed and open ended responses to questions. The guide contained outlines of topics and a set of general questions; and details that are not brought out initially are sought through follow-up questions or probes. Information on vaccination coverage was obtained in two ways, from vaccination cards, and from mothers' verbal reports. All mothers were asked to show the interviewer the health cards in which immunisation dates are recorded. If a card is available, the interviewers check and noted 'full or non-full', based on the vaccination status of the child. In a situation where a child never received a health card or the mother was unable to show the card to the interviewer, the vaccination information for the child was based on the mother's verbal report only. In such cases, questions were asked for each vaccine type. Mothers were asked to recall whether the child had received BCG, Polio, DPT, and measles vaccinations. If the mother indicated that the child had received the Polio or DPT vaccines, they were also asked about the number of dose received by the child and also check for the scar at the solder of the child to confirm. Appropriate general questions were also asked under each topic. The guide was translated into Yoruba, the local language in Southwestern parts of Nigeria.

Data analysis

Having obtained the dataset and extracted the eligible respondents, the data was analyzed using STATA 12 software. The analysis involved three stages. The first stage is univariate analysis. The bivariate analysis involved comparison of two variables (dependent and one independent). The second stage, involved the multivariate analysis which further analyses the relationships and patterns between independent and dependent variables. At this stage, logistic regression models were used.

The general logistic regression model used for this study according to Newman (2001) is:

$$P(Y = 1/\beta) = \frac{e^{\beta_0 + \beta_1 X_1 + \ldots + \beta_n X_n}}{1 + e^{\beta_0 + \beta_1 X_1 + \ldots + \beta_n X_n}}$$

which gives the probability that the response variable Y is 1 subject to the covariate vector X = (x_1... x_n) and parameter vector β = ($β_{....}β_n$).

The following regression models were developed to predict the likelihood of full childhood immunization.

Model I (Model built with socio – economic factors)

$$\log(P/1-P) = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + ...b_n X_n$$

where P is the probability of having full childhood vaccination, a is the intercept, b_i's are the slopes, X_1 is the respondents level of education, X_2 is the respondent's type of occupation; X_3 is the respondents place of residence, X_4 is the respondents wealth quintile (n = 4).

Model II. (Model built with mothers` health care seeking indicators)

$$\log(P/1-P) = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + ...b_n X_n$$

Where P is the probability of having full childhood vaccination, a is the intercept, b_1'^{s} are the slopes, X_1 is respondents` time of first ANC visit; $X_2$ is respondent`s number of ANC visits; X_3 is respondents` place of ANC care received; $X_4$ is respondent`s place of delivery; X_5 is respondent`s place of postnatal care received. n = 5.

All the analysis was done at 95.0% significant level (p-value < 0.05).

Ethical consideration

This study used secondary data in large part. NDHS 2008 has already taken care of ethical issues; hence, there was no risk of breaking any interviewee confidentiality or associated consideration as all participants' identifiers have been removed. For the in-depth interview, participants were informed of the nature of the study and participation was voluntary. Informed consents were obtained from all the participants prior to their participation in the survey. The code of ethics for research relating to sensitivity and confidentiality of information provided was followed. Interviews were conducted in an environment where privacy was ensured and the anonymity and confidentiality of information given was assured.

RESULTS

Findings from the in-depth interviews are integrated "where necessary" to complement and strengthen the result of this study.

Socio-demographic characteristics of respondents

The total number of women extracted for this study having applied the weighting factor is 4,519. Mother's age ranged from 15 to 49 with mean age of 30.4 and standard deviation of 6.3. A significant number of them (56.9%) are within the age bracket of 25 to 34 years. More than 94.0% of the mothers are currently married, while the percentage of those who are never married, living together, widowed, divorced and not living together constitute only 5.2%. Residentially, 55.2 and 44.8% of the mothers are urban and rural residents, respectively

with more than half of them (60.7%) being Christian, while about one-third (38.7%) are Muslim (Table 1). Analysis based on the mother's level of education revealed that 14.9% of the mothers interviewed had no formal education, about 12.2% had tertiary education while others, 44.0 and 28.9% had secondary and primary education, respectively. By type of occupation, 14.1% of them were full house wives at the time of the survey, more than half 55.0% were into sales and services, 22.5% were into agriculture/unskilled manual jobs, while others 8.4% were into professional services.

In terms of mothers' wealth quintile, almost half (45.0%) of them are within the upper wealth quintile (rich), about one-fifth (6.2%) are within the lower quintile (poor) with more than one-third (38.8%) within the middle wealth quintile (average). Parity (number of children alive) ranged from 1 to 13. However, due to smaller numbers and the spread of the variable, the range of parity collapsed and more than one-thirds of mothers 37.1 and 38.8% are in parity 2 (1 to 2 children) and parity 4 (3 to 4 children), respectively, while others, 24.1% are in parity 5 (5 or more children) at the time of the survey. With the use of preceding birth interval to the index child, a significant number of respondents (83.7%) had long birth interval.

Health seeking behaviour of respondents

In compliance with the WHO recommendation, almost half of the mothers (48.8%) went for 1st antenatal care within the first trimester (1st to 4th months) of their recent pregnancy, while a little above half (52.2%) went for their 1st antenatal care outside the first trimester (5th month or more) (Table 2). Findings from the in-depth interview also corroborate this pattern as majority of mothers who are in parity 3 and above did not initiate antenatal care until they are at least within the fifth month of their pregnancy in the absence of any complaint or complications. This attitude according to some of them emanated from the fact that they do not attach much importance to seeking antenatal care at the early stage of their pregnancy since they are not new to pregnancy related issues. These are some of the excerpts from their discussions:

"Since I didn't have any complaint concerning my pregnancy,… I started attending antenatal care when I was 5 months pregnant" (40 years old mother of 6 from Ibadan).

"I was so confident since the pregnancy was not my first time, but my husband was a bit scared… He forced me to go for antenatal care when I was five months pregnant" (28 years old mother of 4 from Sekona).

However, a significant number (89.5%) of mothers had at least four antenatal care visits while about one-tenth (10.5%) had less than four visits during their recent pregnancy. More than one-third (36.2%) of the mothers

Table 1. Percentage distribution of respondents by socio-demographic characteristics.

Variable	Frequency	Percentage
Age		
15-19	100	2.2
20-24	638	14.2
25-29	1,402	31.0
30-34	1,172	25.9
35-39	769	17.0
40-44	341	7.6
45-49	97	2.1
Current marital status		
Never married	86	1.9
Married	4,285	94.8
Living together	64	1.4
Widowed	38	0.8
Divorced	16	0.4
Not living together	30	0.7
Place of residence		
Urban	2,495	55.2
Rural	2,024	44.8
Religion		
Christian	2,736	60.7
Islam	1,727	38.4
Others	41	0.9
Level of education		
No education	673	14.9
Primary	1,307	28.9
Secondary	1,987	44.0
Higher	552	12.2
Type of occupation		
Full house wife	632	14.1
Professionals	378	8.4
Sales/Services	2,461	55.0
Agriculture/unskilled manual	1,006	22.5
Wealth quintile		
Lower	730	16.2
Middle	1,754	38.8
Upper	2,034	45.0
Birth interval		
Short birth interval	557	16.4
Long birth interval	2,849	83.7
Parity		
1-2 children	1,675	37.1
3-4 children	1,753	38.8
5 children+	1,091	24.1
Total	4,519	100.0

Data computed from 2008 NDHS.

Table 2. Percentage distribution of respondents' health seeking behaviour.

Health seeking indicators	Frequency	Percentage
1st time of ANC visit		
between 1-4 months	1,405	48.8
5 months plus	1,473	51.2
Number of ANC visits		
Less than 4 visits	290	10.5
4 visits plus	2,482	89.5
Place of ANC care		
No ANC	1,637	36.2
Home	312	6.9
Public health facilities	1,389	30.7
Private health facilities	1,181	26.2
Place of delivery		
Home	1,357	30.0
Public health facilities	1,581	35.0
Private health facilities	1,581	35.0
Postnatal check within 2 months		
No	691	63.2
Yes	403	36.8
Place of postnatal care		
Home	224	55.5
Public health facilities	112	27.9
Private health facilities	67	16.6
Total	4, 519	100.0

Data computed from 2008 NDHS.

did not receive any antenatal care, 6.9% received antenatal care at home, while others, 30.7% and 26.2% received their antenatal care within the public and private health facilities respectively. In terms of delivery, about one-third (30.0%) of mothers delivered their last birth at home and 70.0% of them delivered within the health care facilities (35.0% in public health facilities and 35.0% in private health facilities, respectively). This pattern was not substantially different from what was observed during the in-depth interview as majority of the mothers reported that they delivered at home. These are some of the excerpts from their discussion:

"I registered in the hospital but I did not deliver there, instead I went to deliver at our mission house" (28 years old mother of 4 from Sekona).

"I did not use any other place and I never missed any of my appointment date, but I later delivered at a nearby home…, the labour started in the night" (26 years old mother of 2 in Ibadan).

Table 3. Percentage distribution of children age 12-23 months who had received the (*Nine*) basic vaccines at 12 months of age, by source of information (vaccination card or mother's report), and percentage not vaccinated.

Source of information	Percentage of children age 12 to 23 months who had received specific vaccines at 12 months of age, by source of information (vaccination card or mother's report) and percentage not vaccinated, in South-western Nigeria												
	BCG	DPT			Polio				Measles	All basic vaccinations		No vaccination at all	Number of children
Child vaccinated before survey	-	1	2	3	0	1	2	3		Full	Partial	-	-
Vaccination on card	36.8	37.4	36.0	33.2	34.1	36.6	34.5	31.8	30.4				
Reported by mothers	45.5	44.1	42.3	36.3	31.5	47.2	43.7	23.4	39.8	36.5	51.0	12.5	1, 590
Either source	82.3	81.5	78.3	69.5	65.5	82.8	78.2	55.2	70.2				
No Vaccination	17.7	18.5	21.7	30.5	34.4	16.2	21.8	44.8	29.8				
Vaccinated by 12 months of age	80.5	80.7	78.2	67.5	63.4	82.3	77.0	54.4	65.6	35.4	51.8	12.8	814

[1]Polio 0 is the polio vaccination given at birth. [2] BCG, measles, and three doses each of DPT and polio vaccines (are the basic vaccines a child must complete by 12 months). Data computed from 2008 NDHS.

"I received antenatal care both at the mission house and the hospital…. Though, I later delivered at the mission house…" (18 years old mother of 1 from Ibadan).

In addition, the study found that more than two-thirds (63.2%) did not receive postnatal care at all, and of those that received postnatal care, more than half (55.5%) received postnatal care at home while others received their postnatal care within public (27.9%) and private (16.6%) health care facilities, respectively. This pattern was also revealed during the in-depth interview as majority of the mothers did not see postnatal care as important aspects of obstetric care in the absence of any complaint or complications. Many of them affirmed that there is no reason for postnatal care unless the child is sick or develop some symptoms. According to some of them:
"I did not go for any postnatal check-up since there was no problem with me and my child, I only took him back to hospital for vaccination" (36 years old mother of 4 from Sekona).

"Since I have given birth and up till now, neither I nor my child has fallen sick…. So, we only go to hospital for vaccination" (40 years old mother of 6 from Ibadan).

Vaccination status of children of age 12 to 23 months

Table 3 shows vaccination coverage by source of information for children of age 12 to 23 months, the age at which they should have received all vaccinations based on the information on vaccination card and mothers' verbal report. Overall, 36.5% of children aged 12 to 23 months are fully vaccinated, 51.0% of the children received partial vaccination (between 1 and 8 vaccines). On each of the vaccines, 82.3% received vaccinations for BCG and 70.2% received for measles. Fewer children received DPT 3 (69.5%) and polio 3 (55.2%), compared with those who received DPT 1 and 2 (81.5 and 78.3%) and polio 1 and 2 (82.8 and 78.2%), respectively. In

all, more than one-tenth (12.5%) of children aged 12 to 23 months in South-Western Nigeria have not received any of the recommended vaccines at the time of the survey. Meanwhile, the percentage of children aged 12 months that have received full immunization slightly increased from 35.4 to 36.5% when compared with the percentage of children aged 12 to 23 months that have received full immunization by 12 months of age. Likewise, the percentage of children that were partially immunized or not immunized at age 12 months slightly dropped from 51.8 to 51.0% and 12.8 to 12.5%, res-pectively when compared with children aged 12 to 23 months that were immunized by 12 months of age.

Respondents' reasons why child was not delivered within health care facilities or not vaccinated

The 2008 NDHS, collected information on whether each of the following factors constitute a big problem

Table 4. Percentage distribution of respondents by reasons why child was not delivered within the health care facilities or not vaccinated.

Variable	Frequency	Percentage
Reasons for not delivered within health care facilities		
Cost too much	72	8.5
Facility not open	23	2.7
Too far and no transport	198	23.2
Don't trust facility/poor service	57	6.7
No female provider	4	0.5
Husband/family didn't allow	37	4.4
Not necessary/customary	292	34.3
Others	168	19.7
Total	851	100.0
Reasons why child was not vaccinated		
lack of info	91	19.0
Fear of side effect	154	32.0
Vaccine do not work	8	2.0
Religious reason	13	4.0
Post too far	77	16.0
Child was absent	28	6.0
Others	110	23.0
Total	480	100.0

Data computed from 2008 NDHS.

in delivering within the health care facilities: cost too much, facilities not open, post too far and no transport cost, no female provider or any health provider, husband or family did not allow, and not necessary/customary to deliver within health care facilities and others. Of all the mothers that responded to these questions, a significant number 34.3% reported that they do not find it necessary or customary to deliver within health care facilities, followed by 23.4% of those who reported that the health care post is too far and there was no transport money (Table 4). Also, 9.0% mentioned cost of treatment as a serious problem in accessing health care for delivery, while 7.0% reported that they do not trust the facility as they were concerned that there would be no drugs available within the facility. Meanwhile, only 1.0% of these mothers were concerned that there would be no female provider to attend to them. Whereas, problems getting permission from husband or family to go for treatment was mentioned by 4.4% of them as another major reason for not delivering their last pregnancy within the health care facilities.

Furthermore, this study, "through the in-depth interview", discovered that a significant number of mothers that received antenatal care within the health care facilities often withdraw to deliver at home or mission houses. In all, about half (5 out of 12) of the mothers interviewed did not deliver within the health care facilities. However, various reasons were advanced for this behaviour; ranging from late night labour, prolonged labour and un-caring attitude of the nurses as the major reason. These are some of the excerpts from their discussion:

"I decided not to deliver there because of the stress and the un-caring attitudes of the nurses that are unbearable to me" (28 years old mother of 4 from Egbeda).

"I was one month pregnant when I went for immunization at the hospital, but I later deliver at mission house because they do exercise patience for those of us that normally have a prolonged labour" (34 years old mother of 4 from Egbeda).

Also, various reasons on why children aged 12 to 23 months were not fully vaccinated or did not receive any of the vaccines at any time before the survey were also assessed. In all, fear of side effects (32.0%) was the commonly reported reasons for children not being immunised, followed by lack of information (19.0%), and the post being located too far away (16.0%). Meanwhile, 23.0% of mothers mentioned other reasons why their children were not immunized which range from lack of money, vaccines not available to waste of time in the hospitals.

Findings from the in-depth discussion also complements this result by revealing that about two-thirds of the mothers interviewed partially vaccinate their

Table 5. Percentage distribution of mothers' socio-economic factors and childhood vaccination.

Socio-economic factor	Childhood vaccination status		Total N	Chi square	p-value
	Non full (%, N)	Full (%, N)			
Level of education					
No education	81.2 (195)	18.8 (45)	240		
Primary	72.6 (328)	27.4 (124)	452	89.6131	0.0000*
Secondary	59.4 (394)	40.6 (269)	663		
Tertiary	36.2 (85)	63.8 (150)	235		
Type of occupation					
Full house wife	57.8 (130)	41.2 (91)	221		
Professionals	40.8 (64)	59.2 (93)	157	35.0213	0.0000*
Sales and services	65.3 (557)	34.7 (296)	853		
Agriculture/unskilled	70.0 (251)	30.0 (108)	359		
Wealth quintile					
Lower	85.0 (223)	15.0 (57)	280		
Middle	70.8 (423)	29.2 (175)	598	89.2295	0.0000*
Higher	50.0 (356)	50.0 (356)	712		
Place of residence					
urban	52.4 (462)	47.6 (420)	882		
rural	77.3 (540)	22.7 (168)	708	76.6372	0.0000*
Total	63.0 (1,002)	37.0 (588)	1,590		

*P < 0.05. Data computed from 2008 NDHS.

children, while about one-third of them did not receive any vaccine for their children. Some of them reported that they deliberately decided not to vaccinate their children; while others mentioned various reasons why they could not vaccinate or fully vaccinate their children. Below are some of the excerpts from them:

"I did not vaccinate my child, it was deliberate, the one I took for his brother led to complication to the extent that it was operated. Since then, I can`t even advice people around me on child vaccination" (36 years old mother of 4 from Ibadan).

"*My child was unable to get the nine month vaccine, we were always asked to come back. The last time I went there, I waited for hours before I left to attend to customer and some other important issues" (34 years old mother of 4 from Egbeda).*

Relationship between mothers' socio-economic factors and childhood vaccination

This study revealed that significant relationships exist between mothers' socio-economic differentials (level of education, type of occupation, place of residence and wealth index) and childhood immunization (p < 0.01). The result revealed that the chances of a child being fully immunised varies consistently with mothers' level of education: 18.8% for no education, 27.4% for primary, 40.6% for secondary, and 63.8% for tertiary education, respectively (Table 5). The significant relationship between education and full childhood vaccination was also justified during the in-depth interview as one of the important determinants of full childhood vaccination as some the mothers expressed their views:

"I think lack of education as well as ignorance is a major factor. You see, when you advise some mothers in this environment, they will be asking you what benefit have you derived from vaccination, one of my friend even told me that it was that vaccine that killed her first child" (36 years old mother of 4 from Sekona).

"I know that the vaccines do protect children from diseases, but I think ignorance is the major factor why some mothers don't care about child vaccination" (34 years old mother of 4 from Egbeda).

Majority of mothers (59.2%) whose work falls within the formal sectors (professionals) fully immunized their children when compared with their counterpart that are into sales and services (34.7%) as well as those in agricultural/unskilled manual jobs (30.0%). Meanwhile,

Table 6. Percentage distribution of mothers' health seeking behaviour and childhood vaccination.

Health seeking indicators	Childhood vaccination status		Total N	Chi square	p-value
	Non full (%, N)	Full (%, N)			
1st time of ANC visits					
Between 1-4 months	55.7 (328)	44.3 (260)	588	15.8660	0.0018*
5 months plus	68.5 (448)	31.5 (206)	654		
Number of ANC visits					
Less than 4 visits	87.5 (513)	12.5 (73)	586	27.0446	0.0024*
4 visits plus	49.2 (499)	50.8 (515)	1,014		
Place of ANC care					
No antenatal care	68.8 (215)	31.2 (96)	311		
Home	69.1 (103)	30.9 (46)	149	22.9763	0.0006*
Public health facilities	65.5 (421)	34.5 (222)	643		
Private health facilities	54.1 (263)	45.9 (224)	487		
Place of delivery					
Home	80.8 (388)	19.2 (92)	480		
Public health facility	58.3 (341)	41.7 (244)	585	55.3752	0.0000*
Private health facility	52.0 (273)	48.0 (252)	525		
Place of postnatal care					
Home	76.7 (84)	23.3 (26)	110		
Public health facilities	76.1 (32)	23.9 (10)	42	4.9475	0.0998
Private health facilities	55.4 (24)	44.6 (19)	43		
Total	63.0 (1,002)	37.0 (588)	1,590		

*P < 0.05. Data computed from 2008 NDHS.

more than half (57.8%) of the mothers who were full house wife at the time of the survey partially immunize their children. Also, as revealed by the in-depth interview, mothers occupation competes with full childhood vaccination as some of the mothers pointed out that majority of their counterparts cannot wait for a longer time or revisit the hospital to ensure that their child received full vaccination:

"There are some mothers that don`t have time for their children, some will tell you that they are going to farm…, and that waiting at hospital for vaccination will take much of their time"
(32 years old mother of 5 from Egbeda).

"…, some cannot sacrifice their time for their children" (35 years old mother 4 from Osogbo)

The last time I went there, I waited for hours before I left to attend to customer and some other important issues"
(36 years old mother of 4 from Sekona).

Analysis on the relationship between mothers' wealth quintile is strongly and significantly associated with the

chance of full childhood immunisation; majority of the children, whose mothers are within the higher wealth quintile, were fully vaccinated (50.0%), when compared with those children whose mothers are within the middle wealth quintile (29.2%) and lower wealth quintile (15.0%), respectively.

For all antigens, the percentage of children that received full immunisation varies by place of residence: it was higher in urban areas (47.6%) than in rural areas (22.7%). This pattern also prevailed in two of the rural areas (Egbeda and Sekona) involved in the in-depth discussion as many of the mothers interviewed in those areas partially immunized their children while some did not vaccinate their children at all.

Relationship between mothers' health seeking behaviour and childhood vaccination

Analysis on the mothers 1st time of antenatal care visit revealed a significant relationship between 1st time of visit and full childhood vaccination (p < 0.01). For instance, 44.3% of the mothers that had their first antenatal care visit within the first trimester (1 to 4th

Table 7. General binary logistic regression Model I and II for the likelihood of full childhood vaccination among children age 12 to 23 years.

Variable	Model I			Model II		
	Odds-ratio (standard error)	p-value	95% CI	Odds-ratio (standard error)	p-value	95% CI
Socio-economic factor						
Level of education						
None	RC	-	-	-	-	-
Primary	1.13 (0.34)	0.676	0.63 – 2.04	-	-	-
Secondary	1.68 (0.51)	0.091	0.92 – 3.07	-	-	-
Tertiary	3.27 (1.26)	0.003**	1.52 – 7.01	-	-	-
Type of occupation						
Professionals	RC	-	-	-	-	-
Full house wife	0.87 (0.28)	0.653	0.46 – 1.62	-	-	-
Sales/Services	0.84 (0.23)	0.508	0.49 – 1.43	-	-	-
Agriculture/unskilled	0.89 (0.33)	0.86	0.57 – 1.96	-	-	-
Place of residence						
Rural	RC	-	-	-	-	-
Urban	1.80 (0.37)	0.005*	1.20 – 2.72	-	-	-
Wealth quintile						
Higher	RC			-	-	-
middle	0.65 (0.12)	0.022*	0.21 – 0.76	-	-	-
Lower	0.40 (0.13)	0.005*	0.45 – 0.94	-	-	-
Health seeking indicators						
1st time ANC visit						
1 – 4th months	-	-	-	RC		
5 months plus	-	-	-	1.09 (0.59)	0.875	0.37 – 3.18
No. of ANC visits						
More than 4 visits	-	-	-	RC		
Less than 4 visits	-	-	-	0.33 (0.34)	0.283	0.04 – 2.55
Place of ANC care						
Private H. facilities	-	-	-	RC		
No ANC/home	-	-	-	0.82 (0.36)	0.761	0.23 – 2.93
Public H. facilities	-	-	-	1.56 (1.25)	0.413	0.14 – 2.27
Place of delivery						
Home	-	-	-	RC		
Public H. facilities	-	-	-	2.90 (1.17)	0.000**	1.29 – 1.80
Private H. facilities	-	-	-	1.10 (0.19)	0.000**	0.01 – 0.89
Place of postnatal						
Home	-	-	-	RC		
Public H. facilities	-	-	-	2.53 (1.76)	0.188	0.63 – 10.12
Private H. facilities	-	-	-	2.42 (1.81)	0.958	0.54 – 10.73

*P < 0.05; **P < 0.01; Model I = model built with mothers socio- economic factors; RC = reference category; Model II = model built with mothers' health seeking indicators. Standard errors are in parenthesis.

months) of their last pregnancy fully immunized their children while only 33.1% of those that had their 1st visit outside the 1st trimester (5th months and above) of their recent pregnancy fully immunized their children (Table 6). Furthermore, the in-depth interview revealed that about two-thirds of those that initiated antenatal care outside the first trimester did not fully vaccinate their children for one reason or the other. These are excerpts from their statements:

"Since I didn`t have any complaint concerning my pregnancy,…. I started attending antenatal care when I was six months pregnant…'noted'- vaccines not completed" (22 years old mother 4 from Ibadan).

",… So, he forced me to go for antenatal care when I was five months pregnant,…. I have decided not to immunize any of my children again" (28 years old mother of 4 from Sekona).

"I was 4 months pregnant when I started antenatal care,……, you see, when someone is pregnant, it depends on your body situation, and that will make you to run for check-up,…. My child completed her vaccination" (30 years old mother of 3 from Osogbo).

Also, number of antenatal care visits was found to be significantly related to full childhood vaccination (p < 0.01). Less than one-fifth (12.5%) of mothers with less than four antenatal care visits during their last pregnancy fully immunized their children, while more than half (50.8%) of mothers with more than four antenatal care visits during their last pregnancy fully immunized their children.

Place of antenatal care was also found to be strongly and significantly associated with full childhood vaccination. The proportion of children that received full vaccination varies with mothers' place of ANC care: 25.8% of mothers that received antenatal care at home; 34.0% of mothers that received antenatal care at public health facilities; and 45.9% of those that received antenatal care at private health facilities fully immunized their children whereas, only 31.2% of mothers who did not receive any antenatal care fully immunized their children.

Analysis on the relationship between mothers' place of delivery and full childhood vaccination also showed a significant relationship (p < 0.01). Mothers who delivered within the health care facilities are more likely to fully immunize their children than those that delivered at home. Less than one-third (19.2%) of mothers with home delivery fully immunized their children, while about half of mothers that deliver within the health care facilities (41.7% for public health facilities and 48.0% for private health facilities) fully vaccinate their children. this finding was also discovered in the in-depth interview as some mothers tend to substitute going to mission houses during pregnancy for hospitals, while a significant number of those that received antenatal care within the health care facilities often withdraw to deliver at home or mission house. These are some of the excerpts from them:

"….I did not use any other place and I never missed any of my appointment dates, but I later delivered at a nearby home where a friend nurse took the delivery because the labour started in the night…, but she had already missed some of the vaccines by the time I took her to the hospital"
(26 years, mother of 2 from Ibadan).

"This is my 4th child and I have never delivered at hospital before…., since I do have a prolonged labour of about 4 to 5 days , I normally go to my mothers` place to deliver my baby… I have decided not to immunize any of my children again"   (28 years old mother of 4 from Sekona).

"I was going to the hospital and I was equally using some home based clinic. I later delivered at a nearby home based clinic because the labour started in the night. I took him to hospital for vaccination. But the nine month vaccine was not available"   (35 years old mother 5 from Osogbo).

Though there is no significant relationship between mothers' place of postnatal care and full childhood vaccination (p > 0.05). However, full childhood vaccination varies proportionately with place of postnatal care (23.3% for home, 23.9% for public health facilities, and 44.6% for private health facilities). Discussion on the issue relating to mothers' postnatal care during the in-depth interview revealed that majority of the mothers did not seek postnatal care as some of them affirmed that there is no reason for postnatal care unless the child is sick or develops some symptoms. Therefore, we cannot reasonably relate mothers' postnatal care with full childhood vaccination as some of them only took their children back to the hospital for the sole purpose of vaccination alone.

Binary logistic regression of mothers' socio-economic factors and health seeking behaviour on childhood vaccination

Here, presents the odds ratio from the general binary logistic regression Model I and II for the likelihood of full childhood vaccination among children aged 12 to 23 years. Obviously, the significant relationships that exist between mothers' socio-economic factors, her health seeking behaviour and full childhood vaccination at the bivariate level can be due to isolated effects of other unmeasured factors   and   non-interaction among

variables. We therefore at this stage used multilevel modelling to determine the predictors of full childhood vaccination having allowed for interrelationships among the various measured independent and intervening factors.

The result from model I revealed the most significant predictors of full childhood vaccination to be: level of education, place of residence, and wealth quintile. The odds ratio of reporting full childhood vaccination increase steadily with level of education such that mothers with tertiary education are significantly three times more likely to fully immunize their children (OR = 3.27; $p < 0.01$; 95% CI = 1.52 – 7.01) than their counterparts with no formal education. Also, mothers with primary (OR = 1.13; $p > 0.05$; 95% CI = 0.63 – 2.04) and secondary (OR = 1.68; $p > 0.05$; 95% CI = 0.92 – 3.07) education are almost twice more likely to have their children fully immunized than their counterpart with no formal education. At this level, significant relationship was found between mothers' type of occupation and childhood vaccination ($p > 0.05$). But our findings further revealed that mothers within the formal sectors are more likely to fully immunize their children than those who are full house wife or within agricultural/unskilled manual activities (OR = 1.60; $p > 0.05$; 95% CI = 0.57 – 1.96), and those that engaged in sales and services as well. Meanwhile, the odds ratio of full childhood immunization decreases monotonically with mothers' wealth quintile as the analysis revealed that majority of the mothers within the middle (OR = 0.65; $p < 0.05$; 95% CI = 0.21 – 0.76) and lower (OR = 0.40; $p < 0.05$; 95% CI = 0.45 – 0.94) wealth quintile are less likely than those in the upper wealth quintile to fully immunize their children. Also, mothers in the urban areas were found to be twice more likely to have their children fully vaccinated (OR = 1.80; $p < 0.05$; 95% CI = 1.20 – 2.72) than their counterpart in the rural areas.

Result from model II revealed that mothers who delivered within public health facilities are thrice more likely to fully immunize their children (OR = 2.90; $p < 0.01$; 95% CI = 1.29 – 1.80) than mothers with home delivery. Likewise, the odds of full childhood vaccination is significantly higher for mothers that delivered within private health care facilities (OR = 1.10; $p < 0.01$; 95% CI = 0.01 – 0.89) than those that delivered at home. Mothers with less than four ANC visits are less likely to fully immunize their children (OR = 0.33; $p > 0.05$; 95% CI = 0.04 – 2.55) compared with those that had more than four ANC visits, whereas mothers who received antenatal care within public health care facilities are more likely to fully immunize their children (OR = 1.56; $p > 0.05$; 95% CI = 0.14 – 2.27) than those who received antenatal care at private health facilities. Conversely, mothers who did not receive any antenatal care and those that received antenatal care at home are both less likely to fully immunize their children (OR = 0.82; $p > 0.05$; 95% CI = 0.23 – 2.93) (Table 7) when compared with those that received ANC care at either public or private health care

facilities. With regards to place of postnatal care, mothers that received postnatal care within either public (OR= 2.53; $p > 0.05$; 95% CI = 0.63 – 10.12) or private health care facilities (OR = 2.42; $p > 0.05$; 95% CI = 0.54 – 10.73) are twice more likely to fully vaccinate their children than mothers who received postnatal care at home.

DISCUSSION

This discussion focused on the quantitative findings of this study as well as findings "excerpts" from the qualitative (in-depth interview).

As part of the health intervention programme and strategic policy, pregnant mothers are expected to initiate their 1st ANC visit within the first trimester (1 to 4th month) and also required to have a minimum of 4 visits before delivery in the absence of any complain or complications (WHO, 2010). However, more than one-third of mothers in this study did not receive any ANC care, while significant number (52.2%) of those that received did not initiate their 1st ANC visit within the first trimester. More than one-tenth (10.5%) received less than four antenatal care, while about one-third (30.0%) had their last delivery at home. These patterns of maternal health seeking behaviour among mothers also reflect their behaviour towards the health of their children. For instance, a significant number of children whose mothers displayed these negative maternal health seeking behaviour were not fully vaccinated: 68.8% for no ANC, 68.5% for those that initiated 1st ANC outside the first trimester, 86.8% for those that received less than four ANC, and 78.7% for those that delivered at home. Also, the study further discovered that many mothers tend to substitute going to mission houses during pregnancies for hospitals, while some of those that even received antenatal care within the health care facilities often withdraw to deliver at home or mission due partly to the inpatient attitude of health workers and partly to the distance to the health care centers.

Analysis on the mothers first time of antenatal care visit revealed a significant relationship between first time of visit and full childhood vaccination and this is in agreement with the study conducted by Catherine et al. (1996). Our results further showed that majority of the children whose mothers went for 1st ANC visit outside the first trimester of their pregnancy are at increased risk of incomplete vaccination unlike those children whose mother initiated 1st ANC visit within the first trimester. The strong and significant relationships found by Meredith et al. (2011) between number of ANC visits and EPI attendance in all the three countries: Chad, Mali and Niger were also substantiated by this study. Our findings revealed that mothers with more than 4 ANC visits are more likely to fully immunize their children than mothers with less than 4 ANC visits. This finding is consistent with

some of the earlier studies by Phathammavong et al. (2010), where they concluded that ANC visits enhanced hospital deliveries and child immunizations. Also, findings from the in-depth interview further corroborate this result as mothers who reported not to have missed any of their appointment fully immunized their children. According to one of them:

"*I started attending ANC clinic when I was two months pregnant, since then I've never missed any of my appointment, and if you check this card, you will see that my child completed her vaccination*" *(22 years old mother of 1 from Ibadan).*

Evidence that mothers' place of delivery is significantly related with full childhood vaccination was also provided by the findings of this study. Mothers who delivered within health care facilities (both public and private health care facilities) are almost thrice more likely to fully immunize their children than those that delivered at home. This result is in conformity with some of the earlier findings by Cutts et al. (1991) and Oditt and Amuge. (2003), their study concluded that delivery in a hospital affected whether the child began immunization or not. This could be due to the fact that majority of mothers were aware of the importance of immunization as they gave birth in the hospital settings.

Similarly, this study revealed that the odds of reporting full childhood vaccination increases steadily with mothers' level of education such that mothers with primary, secondary and tertiary education are increasingly more likely to fully immunize their children than mothers with no formal education. This finding is consistent with some earlier findings by Hobcraft (1993), where he argued that the more educated women are more likely to have initiated immunization and even more likely to have their children fully vaccinated. This finding is in support of a report from Turkey study (Altinkaynak et al., 2004) that education of mothers increases the full vaccination chance of a child and reduces missed opportunity.

The significant relationship found in-terms of mothers' wealth quintile also justified the WHO-sponsored study by Heggenhougen and Clements (1987), which summarized their research findings that low socio-economic status, and especially low educational level of mothers, is usually associated with low acceptance of immunization. The logistic regression further reiterated that the odds of full childhood immunization decreases monotonically with mothers' wealth quintile: mothers within the middle and lower wealth quintile are less likely to fully immunize their children compared with those in the higher wealth quintile. This result also conforms to earlier findings by Klevens and Luman (2001): a study that associated family income with immunization coverage levels, and low family income as a risk factor for low immunization (Klevens and Luman, 2001). Parents with lower household incomes are more likely to experience

barriers, such as transportation or access to health care services that make staying up-to-date on immunizations difficult (Klevens and Luman, 2001).

Also, the logistic regression further provides a substantial and significant evidence as it shows that mothers in the urban areas are twice more likely to have their children fully vaccinated than mothers in the rural areas. This could be due to the fact that mothers in the rural areas are at increased risk of inadequate knowledge of vaccination schedule as well as lack of primary health care facilities and qualified personnel.

Contrary to some of the earlier findings, majority of mothers were knowledgeable about importance and schedule visit for immunization. However, fear of side effect, child's health and sickness were the most common reported cause of incomplete vaccination, followed by non-availability of the vaccines as some of the mothers recount their experiences:

"I did not vaccinate my child, it was deliberate, the one I took for his brother led to complication to the extent that it was operated,…… So, I can't even advice people around me on child vaccination" *(36 years old mother 0f 4 from Ibadan).*

Another mother from Sekona in Osun State also added:

"When I had my first child I took him for immunization, but it led to complication that almost paralysed his leg if not for the intervention of some doctors and the fact that I was not also careless. Since then, I have decided not to take any of my children for immunization again" *(28 years old mother of 4 from Sekona).*

Therefore, findings from the reasons for not or incomplete vaccination suggest that different strategies are needed to address the varying reasons for incomplete immunization especially for mothers who are concerned with immunization safety. Earlier findings suggested that addressing parents' concerns about vaccine safety (National Health and Medical Research Council, 2003; Hall et al., 2001) will help parents make informed decisions. Health workers should address parents' concerns regarding the few appropriate side effects and medical contraindications to immunisation to help reduce unnecessary missed opportunity and often lengthy postponement due to illnesses (Burgess et al., 1998; Prislin et al., 2002). Also, the concerns and experiences of previously compliant parents after a child experiences minor anticipated vaccine side effects, or a more serious adverse event, should be addressed and managed appropriately (Prislin et al., 2002) including referral to a specialist immunization clinic for intensive treatment if necessary (Wood, 2003; Gold et al., 2003).

Finally, this study having being disaggregated at both bivariate and multivariate level, pointed to mothers' socio-economic factors (level of education, wealth quintile and

place of residence); mothers' health seeking behaviour (1st time of ANC visit, number of ANC visits, place of ANC care and place of delivery); fear of side effect; as well as systemic factors (non-availability of vaccines) as the major factors affecting the full uptake of childhood vaccination in South-Western Nigeria. These findings are consistent with Nichter (1995) and Raharjo (1990) research conclusion that vaccination demand and acceptance depend on factors that are far more numerous and complex. This was also corroborated by Streatfield et al. (1999) and WHO (2010) as their study revealed that supply-related factors are clearly important, particularly the relationship between health-care workers and mothers (including attitudes of vaccinators towards mothers, as well as their perceived motives and technical competence).

CONCLUSION AND POLICY RECOMMENDATION

Having employed both secondary (quantitative) and primary (qualitative) data, respectively; the study examined the influence of mothers' health seeking behaviour and their socio-economic background details on full childhood vaccination. Findings from this cross-sectional study revealed that mothers' health seeking behaviour is not just a one off isolated event, but the result of an evolving mix of socio-economic, personal and experiential factors. The process of responding to 'illness' or seeking preventive care involves multiple steps (Uzma et al., 1999), and cannot be explained by a single model of health seeking behaviour only, but must also be related to some socio-economic factors.

As shown by this study, mothers' level of education, her wealth quintile and her place of residence significantly influence full childhood vaccination. This can be adduced to the fact that mothers with formal education, within higher wealth quintile and living within urban center are better informed about child susceptibility to diseases and severity of some diseases and therefore will want to take some preventive care unlike their counterparts who are less educated, within lower wealth quintile and living in rural areas. This result reinforces and strengthens the conclusion that education programs are vital to improving antenatal care, immunization coverage, and ultimately child health. Also, women within higher wealth quintile are more empowered to take some decisive decision as regards their personal health and that of their children. Furthermore, mothers in the urban centres are found to be more likely to fully immunize their children than those in the rural area. This could partly be as a result of the affordability and availability of the health care facilities in urban areas. Thus improving and increasing the availability of health care facilities in the rural areas could be a way forward to improve childhood preventive care in the rural areas as well.

Of all the mothers' health seeking indicators used,

mothers' place of delivery was revealed as a strong significant predictor of full childhood vaccination both at the bivariate and multivariate level of analysis. Meanwhile, at bivariate level, mothers' 1st time of ANC visit, number of ANC visits, place of ANC care and mothers' places of postnatal care significantly related to full childhood vaccination. Majority of the children whose mothers went for 1st ANC visits outside the first trimester are at increased risk of incomplete childhood vaccination unlike those children whose mother initiated 1st ANC visit within the first trimester.

Also, mothers with more than four ANC visits are more likely to vaccinate their children than mothers with less than four ANC visits. Likewise, mothers who received antenatal care within the health care facilities (both public and private) are more likely to fully vaccinate their children than mothers who received antenatal care at home. Also, mothers who received postnatal care within health care facilities were found to be twice more likely to fully vaccinate their children than those who received postnatal care at home. This result is consistent with the conclusion of the WHO/UNICEF (2010) findings that mothers' utilization of health care services during conception and delivery is a precondition that mothers will seek subsequent health care services for both themselves and their children.

The complexity of these findings traced in detail, and also disaggregated, in all sense of actual reality shows that mothers' health seeking behaviour needed to be focused and improved because it is a process that extends over time, space and cannot be picked out as something intrinsic to the individual alone but also influenced by their socio-economic circumstances as well.

Therefore, if the childhood survival programmes and strategies must succeed and the needless loss of children lives prevented, the following recommended strategies and programmes must be embarked upon by all the three tiers of government, non-governmental organization as well as international agencies to achieve 85 to 90% full national immunization coverage: expanding educational opportunities for women as well as focusing on literacy training for mothers as many countries have done; develop strategies and programmes that will be targeted at improving the health seeking behaviour of mothers through (sensitization programmes targeted at pregnant women to inform them on the value of modern medicine; programmes that lay emphasis on the importance of ANC care, place of delivery as well as postnatal care; programmes and strategies that will help women in developing familiarity with health care systems which will further increase the likelihood that they will rely on health care services again to the benefit of their children); above all, the national health care system must be restructured, the number of available facilities must be increased, well-equipped primary health care centres must be located in the rural areas as well as some

remote places and all the basic vaccines must always be made available within the health care facilities.

LIMITATION OF THE STUDY

This study makes use of a secondary data obtained from the 2008 National Demographic and Health Survey (NDHS), which is a nationally representative data. Thus, there are some limitations as predetermined by the data in term of the questionnaire design and variable measured. For instance mothers' perception of child susceptibilities to the six vaccine preventable diseases (VPD) as well as perceived benefit of immunization were not specifically measured and therefore cannot be measured by this study. Also, cases of missing values and non-response rate are common in the dataset and this was responsible for some variation in the row totals in the analysis.

AREAS FOR FURTHER RESEARCH

The study focused on the influence of mothers' health seeking behaviour and their socio-economic differentials on full childhood immunization. Mothers' perceptions of child susceptibilities to the vaccine preventable diseases (VPD) as well as mothers' perceived benefit of immunization were not specifically measured in the NDHS 2008 dataset used for this study. This create the need for further study since mothers' perceptions of child susceptibility to illness and anticipated severity as well as her perceived benefit of preventive care interact to influence mothers' health seeking behaviour towards their personal health and that of their children. Therefore, subsequent research should focus on the influence of mothers' perception of child susceptibilities to diseases, its anticipated severity and perceived benefit of preventive care on childhood vaccination status.

Measurement of variables and definition of terms

Mothers' place of antenatal care/postnatal care

Mothers' place of antenatal care and postnatal care were measured as the percentage of mothers who received antenatal care and post natal care within health care facilities (public or private health care facilities) as well as those who did not receive any antenatal care or received antenatal care at home (their home, other homes/traditional birth attendants' homes or in the church's mission houses).

Number of antenatal care visits

The antenatal care policy in Nigeria follows the newest WHO approach to promote safe pregnancies, recommending at least four ANC visits for women without complications. Therefore, this study used the ideal number of ANC visits, measured as the proportion of mothers' that had at least four ANC visits before delivery and those with less than four visits (NDHS, 2008).

First time of antenatal visit

The new schedule of visits is as follows: the first visit should occur by the end of 16 weeks of pregnancy (1st trimester); the second visit should be between 24 and 28 weeks of pregnancy; the third visit is at 32 weeks; and the fourth visit takes place at 36 weeks. However, women with complications, special needs, or conditions beyond the scope of basic care may require additional visits. Therefore, the new schedule of visits was followed appropriately in this study.

Place of delivery

Place of delivery was captured as the percentage of mothers who delivered within health care facilities (public and private health facilities) and at home (their home, other homes/traditional birth bttendants' homes or in the church's mission houses).

Parity

This was measured by making reference to the number of living children and was categorised into three: parity 2 (1 to 2 children), parity 4 (3 to 4 children), and parity 5 (5 children and above).

Birth interval

A birth interval is defined as the period of time between two successive live births. Using the preceding birth interval to the index child, the birth interval was captured in two ways: short birth interval (<24 months) and longer birth intervals (more than two years).

Full vaccination

The vaccination is measured as full if a child has received one dose of Bacille Calmette Guerin (BCG), four doses of oral polio vaccine, three doses of diphtheria, pertussis and tetanus vaccine, three doses of hepatitis B at birth, at six weeks of age and at 14 weeks of age and measles vaccine at nine months of age (Federal Ministry of Health, 1995; WHO, 2010).

Conflict of Interests

The author(s) have not declared any conflict of interests.

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