Disease Education on Knowledge, Attitude and Prevention of Measles among Mothers of Under-Five in Ibadan Metropolis, Nigeria

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Abstract
This study examined the effects of disease education on the knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis. It adopted the pretest-posttest control group quasi-experimental research design. The population consisted of all mothers of under-five children in Ibadan metropolis out of which eighty (80) mothers were chosen as sample for the study using the multi-stage sampling procedures. Self-developed and validated questionnaire was used for data collection, three hypotheses were tested. The inferential statistics of multivariate analysis of covariance was used to analyzed the hypotheses at 0.05 alpha level. Findings from the study revealed high level of knowledge (AWM= 1.61) and attitude (AWM = 1.65) towards the prevention of measles among mothers of under-five children in Ibadan metropolis. The study also found significant main effect of treatment ($F_{(3,73)} = 56.276$; $p<0.05$; ˆ 2=.698), significant main effect of age ($F_{(3, 73)} = 4.8466$; $p<0.05$; ˆ 2=.166), significant main effect of parity ($F_{(3, 73)} = 9.756$; $p<0.05$; ˆ 2=.356), significant interaction effect of treatment and age ($F_{(3, 71)} = 49.044$; $p<0.05$; ˆ 2=.675), significant interaction effect of treatment and parity ($F_{(3, 71)} =57.071$; $p<0.05$; ˆ 2=.675) on knowledge, attitude and prevention of measles. Based on the findings of this study, it was recommended among others that there is the need for a continuous disease education intervention to improve the knowledge of mothers about vaccines preventable disease.

Keywords: Measles, Knowledge, Attitude, Disease education, Under-five children

Introduction

Measles is a highly contagious and serious childhood vaccine preventable disease. It is caused by a virus that belongs to the group of *Morbilliviruses* of the family *Paramyxovirdae.* It is acquired via droplets or direct contact with nasal or throat secretions of infected persons and occasionally by airborne spread. Measles has a high infectivity rate of more than 90% which peaks 2-4 days prior and 2-5 days following outset of rash. Its incubation period ranges from 6-19 days (Kuti, Bankole and Oyelami, 2014).

Measles manifests with symptoms of fever, cough, conjunctivitis and coryza, the rash appears. Most deaths following measles often result from viral or super-imposed bacterial pneumonia, scoup, diarrhoea and are frequently seen in undernourished children. In addition, measles may be associated with long term complications including blindness, deafness, chronic lung disease, poor growth, recurrent infectious and progressive pan encephalitis (Babalola, Ibrahim, Kusfa, Gidado, Ngudu, Olayinka and Abubakar, 2019).

Being unvaccinated against measles is a risk factor for contracting the disease. Other factors responsible for measles outbreak and transmission in developing countries are lack of parental awareness of vaccination importance and compliance with routine immunization schedule, household overcrowding with easy contact with someone with measles acquired or inherited immunodeficiency states and malnutrition. During outbreaks, measles case fatality rate in developing countries are normally estimated to be 3-5% but may reach 10-30% compared with 0.1% reported from industrialized countries (Kuti, Bankole and Oyelami, 2014).

In spite of the increase in measles immunization coverage aimed at building population immunity against the disease, measles outbreak still occurs especially in developing countries like Nigeria. This ranks measles top among the burden of vaccine-preventable disease across the globe with worst picture seen in the developing countries that are not unconnected to malnutrition and overcrowding. The sporadic measles outbreak seen is often fatal with high morbidity and mortality in those under the age of five years (Saleh, 2016).

Polland, (2019) reported that in high income regions of the world such as Western Europe, measles causes death in about 1 in 5000 cases, but as many as 1 in 100 will die in the poorest regions of the world. Worldwide, measles is still a major cause of death, especially among children in resource-poor countries. In 2016 about 90,000 people died of measles. This was the first year on record when global measles deaths fell below 100,000 a year. However, in 2017, global measles deaths rose by over 20% to 110,000 deaths (over 300 deaths a day). This increase was due to gaps in vaccination coverage (Polland, 2019).

It is disheartening to note that Nigeria is among the 45 countries that account for 94% of the global deaths due to measles. While there is paucity in literature in Nigeria on the population-based prevalence of measles, several studies from tertiary hospitals show the prevalence of measles from pediatric admissions to be around 1.3–5.1%. Furthermore, the reported data for this disease in Nigeria showed some variations ranging from 1.9% to 12.4%. In a study conducted in a secondary health center, in a Southern Nigerian city, it was observed that measles accounted for 3.1% of all pediatric admissions in the hospital; this figure is higher than the 2.3% reported in 1998 at a tertiary health center in the same city. It also noted a rise in the prevalence of measles in a tertiary health center, in a neighboring state (Saleh, 2016).

Measles runs a more devastating course in children in developing countries, a phenomenon related to under-nutrition, overcrowding, and lack of access to care, with mortality as high as 1 to 15%.

Measles infection during pregnancy is associated with an increased risk of complications, including miscarriage, preterm birth, neonatal low birth weight, and maternal death (Peter and Walter, 2019).

National Academy of Sciences, (2019) stated that disease prevention involves actions to reduce or eliminate exposure to risks that might increase the chances that an individual or group will incur disease, disability, or premature death. Some risk factors for disease and disability are mutable or amenable to change (such as personal habits), while others (such as genetic endowment and family history) are not. A major goal of the health promotion and disease prevention approach (both for individuals and for an entire population) is to identify the health problems for which preventive efforts can result in more appropriate utilization of health services and improvements in health status. This approach to health emphasizes the importance of lifestyle and personal behavior in improving personal health status and in maintaining health and functioning, both physical and mental. It also recognizes that the extent to which health care interventions and behavior change or channeling can be effective in promoting health and preventing disease depends in part on current health status and the stage in the life cycle in which particular interventions are introduced. Both concepts underscore the need for individuals and family units to accept personal responsibility for their own health and to take the initiative in managing their health care (National Academy of Sciences, 2019).

Knowledge is the fact or condition of knowing something with familiarity gained through experience or association. It can as well be referred to as the ideas or understandings which an individual possess that are used to take effective action to achieve such individual's goal. Knowledge is thereby specific to the individual that created it and is believed to be true and reliable (Denning, 2019).

Attitude is a psychological construct, a mental and emotional entity that inheres in, or characterizes a person. They are complex and are an acquired state through experiences. It is an individual's predisposed state of mind regarding a value and it is precipitated through a responsive expression towards a person, place, thing or event which in turn influences the individual's thought and action (Perloff, 2016).

Prevention refers to a wide range of activities known as “interventions” aimed at reducing risks or threats to health. Researchers categorize prevention into primary, secondary and tertiary. Primary prevention aims to prevent disease or injury before it ever occurs. This is done by preventing exposures to hazards that cause disease or injury, altering unhealthy or unsafe behaviours that can lead to disease or injury and increasing resistance to disease or injury should exposure occur. Example includes immunization against infectious diseases, education about healthy and safe habits, and so on (Institute for Work and Health, 2015).

Age is a moderating variable that indicates the level of maturity of an individual to perform a specific action at a particular period of time and manner. Age assists an individual to take informed decision and for individual to be able to face the consequences of the decision taken. Age also helps in the acquisition of knowledge and attitude formation. It assists comprehensiveness of an experience at a particular period of time (Yaya, Ekholuenetale, Tudeme, and Kadio, *2017*).

Educational intervention is effective in increasing parental knowledge regarding immunization in our setting. The implementation of this educational animated movie can provide good exposure to parents with many pre-school children and lower education background. Further researches are warranted to determine other predictors of knowledge as well as its relation with attitudes and practices regarding immunization among parents. The multivariable analysis also showed that parents with higher exposure to information scores tended to have better knowledge regarding immunization. Supporting this assertion, Azreena, Nor Afiah and Rosliza (2018) noted that parents who attended educational talk had higher percentage of adequate knowledge. The same authors held that majority of mothers who took part in a planned program of educational talk had adequate knowledge of disease prevention.

Vezzosi, Santagati and Angelillo (2017) also suggested that repeated exposure to information from healthcare providers might as well help to improve the vaccination rates. Kidane and Tekie (2003) held that the awareness of immunisation was universal. This implies that interventions intended to increase parental awareness may have a modest impact. Previous evidences showed that educational intervention could successfully improve parental knowledge (Hu, Chen, Wang, Song and Li, 2017). Similarly, Awadh, Hassali, Al-Lela, Bux, Elkalmi and Hadi, 2014) perceived that more subjects answered the questions correctly after attending the educational seminar. Others had reported that implementing educational intervention could increase immunization rate as well as promote vaccination completeness and timeliness (Gowda and Dempsey, 2017). Providing an educational video during waiting time in the hospital may improve the convenience of healthcare whilst provide necessary information needed by patients and caregivers (Mclean, Aziz, Kathrin, Ulugbek, Mome, Akiko, and Claudia, 2013).

Azmi, Ling, Mageswaran, Wan Azlan and Abu Bakar (2018) examined the effect of educational intervention on parental knowledge regarding immunization. Findings from the study indicated that the number of parents who answered correctly were increased for all 10 items following educational intervention which 9 of them were significant ($p<0.05$). There was a significant improvement of mean (SD) knowledge scores when compared between pre- and post-test [5.84(2.26) vs 8.48(1.50), 95% CI (-3.22, -

2.06), p<0.001]. Also, Four (4) variables were significant as predictors of baseline knowledge scores; gender, number of pre-school children, education level and exposure to information scores (p<0.05). The study concluded that educational intervention was effective in increasing parental knowledge.

Misconceptions about childhood immunization were recorded as major hindrance to effective utilization of immunization services in this review (Bednarek and Zarzycka, 2015). Some parents believed that the immunity induced by vaccines is less effective than that of the natural disease, and they prefer to endure the diseases than immunization. Some caregivers were reported to believe in the efficacy of traditional medicines as an alternative to immunization and concomitant treatment by traditional healers (Gowda and Dempsey, 2017). Lack of trust towards vaccines was a major reported barrier. Some community members were reported to refuse immunization services due to the belief that vaccines were 'harmful', 'expired' and could cause 'physical disability' and/or 'death' among their children (Kiptoo, Kobia, Moses and Ngure, 2015).

It should be noted that parental knowledge on infectious diseases, vaccination and the applied preparations has a considerable impact on the acceptance of vaccination, which is undoubtedly related to parental education (Bednarek and Zarzycka, 2015). It was observed that individuals with higher education showed better knowledge regarding vaccination (Kata, 2012). However, it may be suspected that these are the individuals who search for information more extensively and who are critical in their assessments on vaccination. Faleńczyk, Piekarska and Pluta (2016) in their study showed that parents with a higher level of education encountered significantly more frequently negative opinions on vaccination as compared to other individuals.

Anna, Gabriela and Halina (2020) reported that the relationship between the level of knowledge about measles and age did not seem to be clear. Low results were found in the test of knowledge in the survey of women under twenty-five and over-forty years of age. For women over forty years of age, the low score could be affected by more difficult access to knowledge about measles in the past or a lack of interest in the topic of childhood diseases due to having older children it is concluded that education among the youngest parents awaiting the birth of their first child and the need to further disseminate knowledge about measles and its prevention also among older, more experienced mothers is extremely important (Mapatano, Kayembe, Piripiri and Nyandwe, 2008).

Statement of the Problem

In order to educate mothers on how to prevent and reduce the occurrence of measles among children of under-five and consequently prevent complications that can result from measles infection, this study therefore examined the effects of disease education on the knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis.

Hypotheses

The following hypotheses were tested in the study:

1. There will be no significant main effect of treatment on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis.
2. There will be no significant main effect of age on: knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis.
3. There will be no significant interaction effects of treatment and age on: knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis.

Methodology

The research design that was adopted for this study was pre-test post-test control group quasi experimental research design using 2X1X2 factorial matrix. The design was adopted in order to allow the researcher to match the participants in both the experimental and control groups on similar variables as well as make it possible to see the difference in the outcome measured in the study, which can be attributed to only the effect of the intervention given. Pre-test observation was made for both control and experimental groups. The experimental group was exposed to treatment of disease education on measles while the control group was exposed to safety education as placebo treatment. Posttest observation was made on both groups using the same instrument used earlier. The factorial matrix chosen in this design was based on the fact that it involved the use of independent variable at two levels since disease education intervention involves the treatment group and the placebo treatment of safety education for control group.

The only moderating variables of age was measured at two levels (Young mothers: <30 years and older mothers: 30 years and above)

The population for this study comprises all the mothers of under-five children in Ibadan metropolis. The sample size for this study consists of eighty (80) mothers of under-five children in Ibadan metropolis. Multistage sampling procedure was used to select the samples for the study:

Stage one: Simple random sampling technique of fish bowl without replacement was used to select two (2) out of the five (5) Local Government Areas in Ibadan Metropolis.

Stage two: Simple random technique of toss of coin was used to assign the two (2) selected Local Government Areas into experimental and control group respectively.

Stage three: Purposive sampling technique was used to select one government owned primary health centre having the highest number of measles cases each from the two selected Local Government Areas while

Stage four: Fourty volunteers which fulfill the inclusion criteria were selected from each of the two health centres for the experimental and control group.

The instrument used for this study are: **S**elf-developed training manual on disease education and self-developed questionnaire which was divided into the following four sub scales:

Section A: demographic information of the participants

Section B: the Knowledge of Measles Scale (KMS)
Section C: Attitude towards Measles Prevention Scale (AMPS) while
Section D: was on Uptake of Measles Prevention Scale (UMPS) with a reliability coefficient of 0.68 obtained

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Results

Hypothesis One: There will be no significant main effect of treatment on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis.

Table 2(a): MANCOVA of the main effect of treatment on knowledge, attitude and prevention of measles among mothers of under-five children

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Wilks' lambda	.302	56.276	3.000	73.000	.000	.698

Table 2a: Adjusted Marginal Mean showing the direction of difference of the effect of treatment on knowledge, attitude and prevention of measles among mothers of under-five children

Dependent Variable	Treatments	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Knowledge	Experimental	14.945[a]	.418	14.113	15.778
	Control	9.480[a]	.418	8.647	10.312
Attitude	Experimental	35.755[a]	.694	34.372	37.138
	Control	23.920[a]	.694	22.537	25.303
Prevention	Experimental	20.402[a]	.527	19.352	21.452
	Control	15.848[a]	.527	14.798	16.898
a. Covariates appearing in the model are evaluated at the following values: covariate1 = 10.1875, covariate2 = 25.2750, covariate3 = 16.5125.					

Table 2a showed that after co-varying with their pre-intervention scores, participants in the experimental group had the highest post-intervention mean score of knowledge (x = 14.945 > 9.480), attitude (x = 35.755 > 23.920) and prevention (x = 20.402 > 15.848) when compared to the control group. This therefore indicated that the intervention had more effect on the knowledge, attitude and prevention of measles among mothers of under-five children in the experimental group.

Table 2(b): Univariate Test Results of the main effect of treatment on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis

Source	Dependent Variables	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	Knowledge	68.211	1	68.211	47.684	.000	.389
	Attitude	319.837	1	319.837	80.946	.000	.519
	Prevention	47.361	1	47.361	20.798	.000	.217
Error	Knowledge	107.285	75	1.430			
	Attitude	296.345	75	3.951			
	Prevention	170.792	75	2.277			

From the MANCOVA summary table 2(a) above, there was a statistically significant main effect of treatment on the combined dependent variables after controlling for their pre-test scores ($F(3, 73) = 56.276$; $p<0.05$; $\eta^2=.698$) with the treatment accounting for 69.8% of the observed variance on combined dependent variables.

Table 2(b) also indicated that there was a significant main effect of treatments on knowledge ($F(1, 75) = 47.684$; $p<0.05$; $\eta^2=.389$ (effect size, 38.9%), attitude ($F(1, 75) = 80.946$; $p<0.05$; $\eta^2=.519$ (effect size, 51.9%) and prevention ($F(1, 75) = 20.798$; $p<0.05$; $\eta^2=.217$ (effect size, 21.7%) of measles among

mothers of under-five children in Ibadan metropolis. Therefore the null hypothesis which stated that there will be no significant main effect of treatment on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis is rejected.

Table 2(c): Adjusted Marginal Mean showing the direction of difference of the effect of treatment on knowledge, attitude and prevention of measles among mothers of under-five children

Dependent Variable	Treatments	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Knowledge	Experimental	14.945[a]	.418	14.113	15.778
	Control	9.480[a]	.418	8.647	10.312
Attitude	Experimental	35.755[a]	.694	34.372	37.138
	Control	23.920[a]	.694	22.537	25.303
Prevention	Experimental	20.402[a]	.527	19.352	21.452
	Control	15.848[a]	.527	14.798	16.898
a. Covariates appearing in the model are evaluated at the following values: covariate1 = 10.1875, covariate2 = 25.2750, covariate3 = 16.5125.					

Table 2(c). showed that after co-varying with their pre-intervention scores, participants in the experimental group had the highest post-intervention mean score of knowledge (x = 14.945 > 9.480), attitude (x = 35.755 > 23.920) and prevention (x = 20.402 > 15.848) when compared to the control group. This therefore indicated that the intervention had more effect on the knowledge, attitude and prevention of measles among mothers of under-five children in in the experimental group.

Hypothesis Two: There will be no significant main effect of age on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis.

Table 3 (a): Multivariate Test Results of the main effect of age on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Wilks' lambda	.834	4.846	3.000	73.000	.004	.166

Table 3(b): Univariate Test Results of the main effect of age on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis

Dependent Variable		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Knowledge	Contrast	27.373	1	27.373	13.860	.000	.156
	Error	148.122	75	1.975			
Attitude	Contrast	15.175	1	15.175	6.894	.047	.025
	Error	601.007	75	8.013			
Prevention	Contrast	8.120	1	8.120	5.900	.043	.037
	Error	210.033	75	2.800			
The F tests the effect of Age. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.							

From the MANCOVA summary table 3(a) above, there was a statistically significant main effect of age on the combined dependent variables after controlling for their pre-test scores ($F(3, 73) = 4.8466$; $p<0.05$; $\hat{}\ 2=.166$) with the age accounting for 16.6% of the observed variance on combined dependent variables. Also, table 3(b) indicated that there was a significant main effect of age on knowledge ($F(1, 75) = 13.860$; $p<0.05$; $\hat{}\ 2=.156$ (effect size, 15.6%), attitude ($F(1, 75) = 6.894$; $p<0.05$; $\hat{}\ 2=.047$ (effect size, 4.7%). and prevention ($F(1, 75) = 5.900$; $p<0.05$; $\hat{}\ 2=.037$ (effect size, 3.7%) of measles among mothers of under-five children in Ibadan metropolis. Therefore the null hypothesis which stated that there will be no significant main effect of age on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis is rejected.

Table 3c: Adjusted Marginal Mean showing the direction of difference of the effect of age on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis

Dependent Variable	Age	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Knowledge	Below 30	11.487[a]	.250	10.988	11.986
	30 and above	12.903[a]	.243	12.419	13.387
Attitude	Below 30	29.297[a]	.504	28.293	30.302
	30 and above	30.351[a]	.490	29.376	31.327
Prevention	Below 30	17.730[a]	.298	17.136	18.324
	30 and above	18.501[a]	.289	17.924	19.077
a. Covariates appearing in the model are evaluated at the following values: covariate1 = 10.1875, covariate2 = 25.2750, covariate3 = 16.5125.					

Table 3(c). showed that after co-varying with their pre-intervention knowledge of measles scores, participants of ages 30 years and above had a high mean score of (x = 12.903), while those below 30 years obtained a low mean score of (x = 11.487). Also, with regard to attitude towards measles, participants of ages 30 years and above had a high mean score of (x = 30.351), while those below 30 years obtained a low mean score of (x = 29.297). While on prevention of measles, participants of ages 30 years and above had a high mean score of (x = 18.501), while those below 30 years obtained a low mean score of (x = 17.730). This indicated that the age of the mothers of under-five children in Ibadan metropolis could determine their knowledge, attitude and prevention of measles.

Table 4(a): Multivariate Test Results of the interaction effect of treatment and age on knowledge, attitude and prevention of measles among mothers of under-five parity

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Wilks' lambda	.325	49.044	3.000	71.000	.000	.675

Table 4(b): Univariate Test Results of the interaction effect of treatment and age on knowledge, attitude and prevention of measles among mothers of under-five children

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	Knowledge	66.309	1	66.309	48.251	.000	.398
	Attitude	268.418	1	268.418	74.186	.000	.504
	Prevention	41.421	1	41.421	18.742	.000	.204
Error	Knowledge	100.320	73	1.374			
	Attitude	264.128	73	3.618			
	Prevention	161.334	73	2.210			

From the MANCOVA summary table 4(a). above, there was a statistically significant interaction effect of treatment and age on the combined dependent variables after controlling for their pre-test scores ($F(3, 71) = 49.044$; $p<0.05$; $\eta^2=.675$) with the interaction accounting for 67.5% of the observed variance on combined dependent variables.

Also, table 4(b) indicated that there was a significant interaction effect of treatment and age on knowledge ($F(1, 73) = 48.251$; $p<0.05$; $\eta^2=.398$ (effect size, 39.8%), attitude ($F(1, 73) = 74.186$; $p<0.05$; $\eta^2=.504$ (effect size, 50.4%). and prevention ($F(1, 73) = 18.742$; $p<0.05$; $\eta^2=.204$ (effect size, 20.4%) of measles among mothers of under-five children in Ibadan metropolis. Therefore, the null hypothesis which stated that there will be no significant interaction effects of treatment and age on knowledge, attitude and prevention of measles among mothers of under-five children in Ibadan metropolis is rejected.

Discussion of Findings

Findings from this study on hypothesis one revealed that there was a statistically significant main effect of treatment on the combined dependent variables after controlling for their pre-test score, There is change in the knowledge and attitude and prevention of measles among mothers of under-five children in Ibadan metropolis after being exposed to the treatment as against their pre-experience exposure behaviour. Findings further revealed that on the individual dependent variables, disease education had a significant main effect on knowledge These findings are also in tandem with previous evidence by Hu, Chen, Wang, Song and Li (2017) which showed that educational intervention could successfully improve parental knowledge about measles. These also corroborated the findings of Awadh, Hassali, Al-Lela, Bux, Elkalmi and Hadi (2014) that more women were able to answer measles related questions correctly after

attending a health educational seminar. On prevention, Gowda and Dempsey (2017) also reported that implementing educational intervention could increase immunization rate as well as promote vaccination completeness and timeliness. Supporting this, Mclean, Aziz, Kathrin, Ulugbek, Mome, Akiko, and Claudia (2013) also submitted that providing an educational video during waiting time in the hospital may improve the convenience of healthcare whilst provide necessary information needed by patients and caregivers.

Findings on hypothesis two revealed a significant main effect of age on the combined dependent variables after controlling for their pre-test scores. This implies that the age of the women affected their knowledge, attitude and prevention of measles. These findings are in-line with the findings of Abebe, Mengistu and Mekuria (2018) that age of mother, awareness about measles immunization, ante natal care service utilization and health facility availability were the factors that significantly associated with measles immunization.

It was also revealed that after co-varying with their pre-intervention, regarding knowledge of measles scores, participants of ages 30 years and above had a high mean score of (x = 12.903), while those below 30 years obtained a low mean score of (x = 11.487). Also, with regard to attitude towards measles, participants of ages 30 years and above had a high mean score of (x = 30.351), while those below 30 years obtained a low mean score of (x = 29.297). While on prevention of measles, participants of ages 30 years and above had a high mean score of (x = 18.501), while those below 30 years obtained a low mean score of (x = 17.730). This showed that the older the age of the mothers of under five children, the more their level of knowledge, attitudes and prevention of measles.

These findings are in line with the findings of Abdoulaye, Mitra, Bruno, Jean-Sebastien and Philippe (2014) that in adult patients, low education level and lack of knowledge of sequelae were associated with a more positive opinion. This is also in consonance with the findings of Anna, Gabriela and Halina (2020) who observed that that education, place of residence and age of the respondent statistically significantly affect the level of knowledge about measles. Also, there was no correlation between the fact of vaccination and the level of knowledge about measles. This findings on the effect of age on prevention of measles is also in line with the findings of Mapatano, Kayembe, Piripiri and Nyandwe (2008) that women of 35 years and above constituted mainly of who did not vaccinate according to the compulsory vaccination calendar.

Findings from the study on hypothesis three revealed that there was a statistically significant interaction effect of treatment and age on the combined dependent variables after controlling for their pre-test scores Also, the combination of treatment and age had a significant interaction effect on knowledge (of measles among mothers of under-five children in Ibadan metropolis. Also, the overall comparison showed that participants of 30 years and above in the experimental group (i.e. disease education) had the highest mean score in relation to the three dependent variables (knowledge This therefore indicated that the intervention had better effect on the participants of ages 30 years and above.

Recommendations

The following recommendations are made based on the findings of this study:

1. There is need for an wholesome and continuous health education intervention by governmental and non- governmental agencies to improve the knowledge of mothers about vaccines preventable disease
2. There should be fight against measles among children of under-five by government and leaders through the provision of immunization facilities both in the urban and rural areas

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