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Immunization Coverage and Factors Contributing to Nursing Mothers and their Neonates' Adherence with Immunization Regimen in Infant-Welfare-Clinic, Olabisi Onabanjo Teaching Hospital, Sagamu, Ogun State, Nigeria

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Abstract: Vaccine preventable diseases are still the most common cause of childhood mortality, with an estimated 3 million deaths every year, mainly in Africa and Asia. An estimate of 29% deaths among children aged 1–59 months were due to vaccine preventable diseases. Despite the benefits of childhood immunization, routine vaccination coverage for all recommended Expanded Programme on Immunization vaccines has remained poor in some African countries, such as Nigeria (31%), Ethiopia (43%), Uganda (55%) and Ghana (57%). So therefore, this study aimed to investigate the immunization coverage and factors contributing to nursing mothers and their children's adherence with immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State.

A Cross- sectional design was conducted. The study was carried out at infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State and the target population was all children under 59 months of age. A total of 403 participants were selected by simple random sampling method and data collection was by researcher administered semi- structured questionnaire. Data was analyzed using SPSS Version 21. Descriptive statistics was used and data were presented in tables, bar graphs and frequencies and inferential statistics such as Chi square test was used to determine the level of statistical Significance between independents and dependents variables at $p<0.05$. Majority of the children (92.0%) were brought by their mothers. Among the study participants, (51.9%) were aged between 26-30 years with mean and standard deviation (34.04 ± 5.601). (72.7%) were married while 77.9% had attained secondary school. All the participants do you know that aim of immunization is to protect the children between 0-59 months from vaccine-preventable diseases. It was also found that level of education of the respondents is statistically significant with the level of perception towards the routine immunization regimen also, age of the

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mothers towards adherence to immunization regimen was also found to be significant with the level of knowledge towards routine immunization regimen by the mothers while other factors tested were not statistically not significant.

Socio demographic characteristic such as age, and level educational were only factors determined the adherence to immunization schedule while other socio-demographic characteristics proves insignificant. Health systems' factors such as rigid clinic hours, long distance to health facility and lack of strategies to follow-up caregivers or remind them on due date influence non adherence to immunization schedule. So therefore, it is recommended that the health institutions should put in place mechanisms of reminding the caregivers on the return date using text messages. This will solve the problem of forgetfulness by the caregiver. It is however also recommended that a lot of emphasis should be laid on educating head of homes, mothers and religious groups on the importance of routine immunization in the lives of children and mothers.

Keywords: Immunization coverage, Knowledge, Perception, Mothers, Iinfant's welfare clinic.

Background of the Study

Vaccine Preventable Diseases (VPDs) are still the most common cause of childhood mortality with an estimated 3 million deaths every year, mainly in Africa and Asia (Hu et al., 2016). A study conducted by the World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) in 2014, reported that an estimate of 29% deaths among children aged 1–59 months were due to vaccine preventable diseases (Hu et al., 2016) In 2014, there were 24.1 million reported cases of pertussis, with the African region accounting for the highest proportion of 7.8 million (33%) cases.

Immunization is considered to be one of the most successful and cost-effective public health sustainable interventions for human beings against diseases that affect our health (GebreEyesus et al., 2021). Routine immunization plays a key role to significantly reduce child mortality due to vaccine preventable diseases. WHO revealed that immunization has been estimated to prevent 3 million deaths globally every year (Ayinde et al., 2021). Between the years 2000 and 2016, a decrease of 84% in the measles mortality rate was recorded worldwide due to measles vaccination (GebreEyesus et al., 2021)Likewise, a reduction in pertussis mortality was also recorded globally from 390,000 deaths in 1999 among children younger than 5 years of age to 160,700 deaths in 2014 as a result of vaccine effectiveness against pertussis (Yenit et al., 2015)

Immunization is an effective public health intervention to reduce morbidity and mortality among infants. It is an important means of controlling diseases, and has been considered the most cost-effective health intervention (Hu et al., 2016). Globally, it is estimated that around 22.6 million infants were partially protected (GebreEyesus et al., 2021). In 2016, routine immunization services such as the DTP3 vaccine did not reach about 19.5 million children under 1 year of age worldwide (Casey et al., 2016). About 70% of these children are in 10 countries, and more than 50% of them are living in Africa including Ethiopia, Kenya, and South Africa (Yenit et al., 2015).

The public health achievements of vaccines are threatened by those parents who decline, delay or are unable to access vaccines for their children. Many studies have been conducted on the aspect of access to immunization facilities in relation to childhood vaccination uptake (Kaufman et al., 2021). This study will therefore, utilize a qualitative approach to identify all those parental factors that are responsible for the decline and delay by parents in presenting their wards for vaccinations.

Previous studies carried out worldwide showed that the death of children is more common in underdeveloped countries. Among 9 million deaths of children worldwide as a result of VPDs, a higher proportion happened in sub- Saharan Africa, which was 4.4 million, from this about 844,321 children passed away in 2020 before their fifth birthday largely from VPDs in Nigeria (UNICEF, 2021).

Various reports revealed that VPDs are still responsible for about one-fourth of deaths occurring annually among children less than 5 years of age. Thus, VPDs put a significant economic and social

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crisis among individuals, families, and communities as a whole. Children who are exposed to these preventable diseases usually suffer from numerous growth and developmental squeals (Sharma et al., 2016; Yenit et al., 2015).

The Expanded Programme on Immunization (EPI), introduced in 1978 with the aim of providing routine immunization to children less than the age of two years, recorded initial but intermittent successes. The optimum level was recorded by the early 1990s with the country achieving a universal childhood immunization coverage of 81.5%. But since that period of success, Nigeria has witnessed gradual but consistent reduction in immunization coverage. By 1996, the national data showed less than 30% coverage for all antigens, and this decreased to 12.9% 2003 (Ophori et al., 2014). This figure which is consistent with the 2003 national immunization coverage survey figures is among the lowest in the world and explains the poor health status of children in the country. It is the worst in the west African subregion, only better than Sierra Leone. For instance, the polio epidemic in Nigeria is the worst in the African region and constitutes threat to other nations (Ophori et al., 2014).

the Global Vaccine Action Plan 2011–2020 declared by the World Health Assembly in 2012, calls on all countries to reach >90% national coverage for all vaccines in the respective countries' routine immunization schedule by 2020. Parents' knowledge, attitude, and practices regarding immunization are the most important factors that could contribute to their immunization decisions (Alagsam & Alshehri, 2019). Thus, parents' decisions about immunization are very crucial for enhancing the immunization rate and compliance. Their compliance, in turn, leads to full immunizations of children, which prevents VPDs in children and for inhibiting any possible immunization errors (Mphaka et al., 2018; Yousif et al., 2013).

Many studies have been published globally regarding parents' knowledge, attitude, and practices about infant immunizations (Adhikari et al., 2006; Awadh et al., 2014). There is however, no study has looked in-depth into the parental factors that can influence their disposition towards infant vaccination are available in the study area. This study therefore, aims to investigate the determinants factors contributing to nursing mothers and their children's adherence with immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State

The study will help policymakers, program implementers, and service providers in identifying the factors that aid the utilization of immunization service and enhance infant immunization status to attain the goals of universal immunization.

As stated earlier, immunization is one of the most cost-effective health interventions mostly employed in order to prevent children from diseases that could easily be solved and it usually helps to reduce or eradicate diseases that would cost more money to treat later on.

However, immunization coverage remains far below the United Nations International Children's Emergency Fund (UNICEF) and World Health Organization (WHO) target of 80%. Some data from WHO shows that immunization prevents over 2.5 million children deaths every year. But in the year 2008, up to 1.7 million children died of vaccine-preventable diseases and about 19.2 million children were missing six basic vaccines in the year 2010. The countries where up to half of those vaccines were missing were in India, Nigeria, and Indonesia (Mukherjee, Madhivanan, Li, 2015).

Despite the effort of the government of Nigeria to combat childhood illnesses through immunization, it is still inadequate. A lot of children and Neonate still suffer from incomplete vaccination and non-uptake of immunization despite annually published immunization guidelines that define the criteria for the timing of Immunization.

The Northern part of Nigeria suffers the most from the problem of no immunization or incomplete immunization as evidence by prevalence of childhood mortality, morbidity due to vaccine-preventable diseases (Ophori et al, 2014). The reason being, in Nigeria, immunization is a postnatal service given to Nursing mothers and their children in order to boost their health, prevent vaccine preventable diseases, reduce infant mortality and morbidity (Adebiyi & Ajani, 2017). But most times in Northern parts of Nigeria, mothers do not present or make themselves available for this postnatal

service due to high level of resistance to child immunization which in turn leads to an increase in vaccine preventable diseases and child mortality and morbidity (McArthur-Lloyd, McKenzie and Adamu, 2016).

A study was carried out previously (Ayebo and Charles, 2009) provided some explanations for incomplete immunization and missed immunization and this includes late reporting for immunization, non-administration of simultaneous injections, longer interval between DPT3 (percentage of one-year old that have received three doses of the combine diphtheria, tetanus toxoid and pertussis vaccine in a given year). So therefore, this study aimed to investigate immunization coverage and factors contributing to nursing mothers and their children's adherence with immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State

Objective of the study

The main objective of this study is to investigate immunization coverage and factors contributing to nursing mothers and their neonates' adherence with immunization regimen in infant-welfare-clinic, Olabisi Onabanjo Teaching Hospital, Sagamu, Ogun state, Nigeria. The specific objectives of the study are to:

1. Determine the respondent's level of knowledge on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria
2. Determine respondents' level of perception on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria
3. Determine respondents' Coping strategies on regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria.
4. To determine the factors contributing to strict adherence of Nursing mothers and their children to Immunization schedule.

Research Questions

The following research questions are necessary to enable better understanding of the factors that affect the immunization rate of children and how improvement can be ensured

1. What is the respondents level of knowledge on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria
2. What is respondents' level of perception on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria
3. What are respondents' Coping strategies on regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria.
4. What are the factors contributing to strict adherence of Nursing mothers and their children to Immunization schedule.

Research Hypothesis

Ho: There is no significant association between age of the respondents and their knowledge on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria

Ho: There is no significant association between level of education of the respondents and their perception on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria

Hi: There is significant association between level of education of the respondents and their perception on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria

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Ho: There is no significant association between knowledge of the respondents and their perception on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria

Hi: There is significant association between knowledge of the respondents and their perception on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria

Material and Method

Study Area

The study was carried out among mothers attending the infant welfare clinic in Olabisi Onabanjo University Teaching Hospital (O.O.U.T.H), Sagamu, Ogun state, South West Nigeria. The University Teaching University was established in the year 1986 with the primary aim of teaching medical students from Olabisi Onabanjo University and provision of healthcare service to the indigene of Ogun State and Nigeria as a whole. It is a contemporary Teaching University that focuses on good relationship between heath workers and patients.

Study Design

A descriptive cross-sectional survey research was adopted for the study in order to investigate immunization coverage and factors contributing to nursing mothers and their neonates' adherence with immunization regimen in infant-welfare-clinic, Olabisi Onabanjo Teaching Hospital, Sagamu, Ogun state, Nigeria. The primary target population are Nursing mothers attending Infant welfare clinic, O.O.U.T.H.with sample size of 403 mothers

Sampling Techniques

A convenience sampling technique was used to collect data from the nursing mothers attending Infant welfare clinic, O.O.U.T.H, Sagamu, Ogun State. This sampling technique has been checked and rechecked to reduce bias.

Method of Data Analysis

Data collected were entered, cleans, coded and analyzed using social sciences (Statistical package SPSS version 23) software. Descriptive statistics were used such as frequency tables and percentages and inferential statistics such as chi-square was used to determine the level of association between selected independents and dependent variables with p-value less than 0.05 considered statistically significant.

Ethical Consideration

While conducting this study, the necessary forms and permission were acquired. A letter of permission to collect data was obtained from Babcock University School of Nursing, Ethical approval was also obtained from the Babcock University Health Research Ethical Committee (BUHREC). Also, approval was given from the Management of Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state, to conduct the study on Determinants contributing to Nursing mothers and their children's adherence to Immunization regimen schedule. Before conducting data collection from the respondents, verbal consent was obtained. In the instrument of data collection which was the Questionnaire, the name of the respondent was not allocated to be written for confidentiality purposes. The rights of the respondents were not infringed upon, and the respondents were duly notified of what they are doing. The respondents were informed that participation in the study was entirely voluntary and also that adherence to strict confidentiality and safeguards will be ensured.

Result

Socio-Demographic Characteristics of Respondents surveyed

Variable	Responses	Frequency (403)	Percentage (100)
Age	20-26	9	2.2
	27-33	209	51.9
	34- 40	116	28.8
	41-46	69	17.1
Mean ± S.D.	34.04 ± 5.601		
Sex	Female	403	100.0
Marital status	Married	293	72.7
	Separated	15	3.7
	Cohabiting	95	23.6
Religion	Christianity	300	74.4
	Islam	103	25.6
Level of education	Secondary	314	77.9
	Tertiary	89	22.1
Ethnic group	Yoruba	257	63.8
	Hausa	83	20.6
	Igbo	63	15.6
Number of living children	1	68	16.9
	2	73	18.1
	3	262	65.0
Number of the child that followed you to the clinic	1	55	13.6
	2	86	21.3
	3	262	65.0

Table 4.1 shows the socio demographic characteristics of the respondents under survey. It was revealed that 9(2.2%) of the respondents fell within age group of 20-26, (51.9%) respondents fell within age group 27-33, 116(28.8%) of the respondents were within age group 34-40years, and 69(17.1%) of the respondents were within the age group of 41-46years. The mean and standard deviation of the ages of the respondents were found to be 34.04years and 5.6years respectively.

More than half of the respondents, (63.8%), were Yoruba, (20.6%) were Hausa, and the remaining (15.6%) were Igbo. Majority of the respondents (72.7%) were married, (3.7%) are separated and the remaining (23.6%) are cohabitating. Majority of the participants (74.4%) are Christians, and the remaining (25.6%) practice Islam. The table shows that 314(77.9%) of the participants highest level of education is secondary level, and the remaining 89(22.1%) has tertiary highest level of education.

More than half of the respondents 262(65.0%) are blessed with three child, 73(18.1%) has two children and the remaining 68(16.9%) has one children and. Majority of the participants 262(65.0%) come to the clinic with their third child, 86(21.3%) of the respondents come with their second child while the remaining 55(13.6%) come with their first child.

Respondents' Level of Knowledge on immunization regimen

Variable	**Responses**	**Frequency (403)**	**Percentage (100)**
Do you know that aim of immunization is to protect the individual and te public from vaccine-preventable diseases?	Yes, I do	403	100.0
Do you know that modern vaccines are safe, especially those recognized by W.H.O. and produced by accredited manufacturers?	Yes, I do	403	100.0

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Do you know that some vaccine present with some adverse effect?	Yes, I do No, I don't	319 84	79.2 20.8
Do you know that Children having serious illness should be vaccinated as soon as their general condition improves?	Yes, I do No, I don't	324 79	80.4 19.6
Do you know that when a child had severe adverse effect from a vaccine, subsequent dose of same vaccine should not be given?	Yes, I do No, I don't I will inquire	310 48 45	76.9 11.9 11.2
Do you know that a malnourished child can be allowed to receive normal dose of next vaccine?	Yes, I do No, I don't	300 103	74.4 25.6
Do you know that a child with history of jaundice after birth can be allowed to receive vaccine?	Yes, I do No, I don't	339 64	84.1 15.9
Do you know that pain, swelling and redness are common vaccination reactions?	Yes, I do	403	100.0
Do you know that fever, weakness and irritability are normal immune response?	Yes, I do No, I don't	322 81	79.9 20.1
Do you know that support from significant others enhance appropriate utilization of immunization regimen?	Yes, I do No, I don't	327 76	81.1 18.9

The table above revealed that all the participants know that aim of immunization is to protect the individual and the public from vaccine-preventable diseases and they all agreed that modern vaccines are safe, especially those recognized by W.H.O. and produced by accredited manufacturers. The table also shows that majority of the respondents 319(79.2%) said yes that some vaccine presents with some adverse effect and the remaining 84(20.8%) said they don't know. Also, majority of the respondent 324(80.4%) knows that children having serious illness should be vaccinated as soon as their general condition improves, while the remaining 79(19.6%) don't know they should be vaccinated.

Majority of the participants 310(76.9%) knows that when a child had severe adverse effect from a vaccine, subsequent dose of same vaccine should not be given, 48(11.9%) don't know, while the remaining 45(11.2%) said they will make enquiry about it. It was also revealed that majority of the participants 300(74.4%) knows that a malnourished child can be allowed to receive normal dose of next vaccine, while the remaining 103(25.6%) don't know by saying no.

Majority of the participants 339(84.1%) knows that a child with history of jaundice after birth can be allowed to receive vaccine, while the remaining 64(15.9%) don't know about it. It was also revealed that all the participants know that pain, swelling and redness are common vaccination reactions. Also, majority of the participants knows that fever, weakness and irritability are normal immune response, while the remaining 81(20.1%) don't know by saying no. The table also shows that majority of the respondent knows that support from significant others enhance appropriate utilization of immunization regimen, while the remaining 76(18.9%) don't know.

Respondents' level of perception on immunization regimen

Variable	Responses	Frequency (403)	Percentage (100)
Do you perceive that ability of the government to understand level of immunization would them to design good interventions?	Yes, I do No, I don't	343 60	85.1 14.9
Do you perceive that ability of the mother to ensure their Children receive full immunization would prevent lots of Children's death and disease conditions?	Yes, I do No, I don't	326 77	80.9 19.1
Do you perceive that immunization is a social issue and it should therefore be voluntary?	Yes, I do	403	100.0
Do you perceive that religion and cultural influences are barrier to full immunization coverage?	Yes, I do	403	100.0
Do you perceive that immunization is central to child-health care practices in the all communities?	Yes, I do No, I don't	328 75	81.4 18.6
Do you perceive that immunization simply meant the practice of protecting every child and the entire family in any community against contracting itemized preventable diseases?	Yes, I do No, I don't	329 74	81.6 18.4
Do you perceive that immunization remains the only source of strength that covers children in their early period of development?	Yes, I do No, I don't	314 89	77.9 22.1
Do you perceive that regular Clinic attendance encourages.	Yes, I do No, I don't	308 95	76.4 23.6

From the table above, majority of the total participants 343(85.1%) perceived that ability of the government to understand level of immunization would help them to designed good interventions while the remaining 60(14.9%) don't perceived it by saying no. 326(80.9%) of the participants also perceived that ability of mothers to ensure their children received full immunization would prevent lots of children's death and diseases condition, while the remaining 77(19.1%) don't perceived it. The table shows that all the participants agreed that immunization is a social issue and it should therefore be voluntary and also believed that religion and cultural influences are major barrier to full immunization coverage. 328(81.4%) of the respondents perceived that immunization is central to child-health care practices in all communities, while the remaining 75(18.6%) don't perceived it.

Majority of the participants 329(81.6%) perceived that immunization is the practice of protecting every child and the entire family in any community against contracting itemized preventable diseases, while the remaining 74(18.4%) don't perceived it. 314(77.9%) of the total participants also believed that immunization remains the only source of strength that covers children in their early period of development, while the remaining 89(22.1%) don't believed it. Also, more than half of the total participants perceived that regular clinic attendance encourages, and the remaining 95(23.6%) don't perceived that regular clinic attendance encourages immunization adherences by choosing no.

Respondents' coping strategies on immunization regimen

Variable	Responses	Frequency (403)	Percentage (100)
Would you able to cope with the stress of attending the regular booking appointment of all immunization regimen for you and your child?	Yes, I would No, I would not	311 92	77.2 22.8
Would you be able to cope with the attitude of health care workers when issues that upset you arises?	Yes, I would No, I would not	290 113	72.0 28.0
Would you be able to cope with the health care worker delay attitude especially when they ask you to wait for other Clients before certain vials of vaccines are open, to minimize waste?	Yes, I would No, I would not	317 86	78.7 21.3
Would you be able to cope with situation when you are asked to pay some money before some procedures are carried out on you and your child?	Yes, I would No, I would not	321 82	79.7 20.3
Would you be able to cope with situation when the child was sick and you are at the same time expected to bring the Child for immunization?	Yes, I would No, I would not	312 91	77.4 22.6
Would you be able to cope during immunization Clinic days for it looks like a social event due to dancing and singing that stimulate Nursing mothers and their children?	Yes, I would No, I would not	309 94	76.7 23.3
Would you be able to cope with the bubbling and social networking displayed during immunization Clinic days at infant-welfare Center?	Yes, I would No, I would not	323 80	80.1 19.9
Would you be able to cope with artificially created friendship in the clinic resulting in common spending like payment of every established friend's transport fare on your way home?	Yes, I would No, I would not	312 91	77.4 22.6

The table above table shows that out of 403 participants, 311(77.2%) of the participants think that they would be able to cope with the stress of attending the regular booking appointment of all immunization regimen for them and their child, while the remaining 92(22.8%) said they would not be able to cope with it by saying no. More than half of the respondents 290(72.0%) said they would be able to cope with the attitude of health care workers when issues that upset them arises, while the remaining 113(18.0%) said they will take it up, by choosing no, they would not be able to cope with it. The table above also revealed that 317(78.7%) of the participant said yes that they would be able to cope with the health care worker delay attitude especially when they ask them to wait for other

Clients before certain vials of vaccines are open, to minimize waste, while the remaining 86(21.3%) said no.

Majority of the participant 321(79.7%) said they would be able to cope with situation when they are asked to pay some money before some procedures are carried out on them and their child, and the remaining 82(20.3%) said they would not be able to cope with it by choosing no. Also, 312(77.4%) of the participants said they would be able to cope with situation when their child is sick and they are also expected to bring the Child for immunization, while the remaining 91(22.6%) said no. Also, more than half of the total participants 309(76.7%) they would be able to cope during immunization Clinic days for it looks like a social event due to dancing and singing that stimulate Nursing mothers and their children, while 94(23.3%) disagree by choosing no.

Majority of the respondents 323(80.1%) said they would cope with the bubbling and social networking displayed during immunization Clinic days at infant-welfare Center, and the remaining 80(19.9%) said no, they won't be able to cope. More than half of the total participants 312(77.4%) said they would be able to cope with artificially created friendship in the clinic resulting in common spending like payment of every established friend's transport fare on your way home, while the remaining 91(22.6%) said they are not comfortable with it by choosing no.

Bivarate Analysis Testing

Hypothesis Testing

Ho: There is no significant association between age of the respondents and their knowledge on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria

Ho: There is no significant association between level of education of the respondents and their perception on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria

Ho: There is no significant association between knowledge of the respondents and their perception on immunization regimen in infant welfare clinic in Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria

Age of the respondents against knowledge score

Age	Knowledge categories					
	Fair knowledge (%)	Good knowledge (%)	Total (%)	df	Chi-square	P-value
20-26	3 (33.3%)	6 (66.7%)	9 (100.0)	3	4.787	0.188
27-33	46 (22.0%)	163 (78.0%)	209(100.0)			
34-40	17 (14.7%)	99 (85.3%0	116(100.0)			
41-46	10 (14.5%)	59 (85.5%)	69 (100.0)			
Total	76 (18.9%)	327 (81.1%)	403(100.0)			

The table above revealed that level of respondents age is found to be statistically significant with the level of knowledge of nursing mothers & their under-five infants on routine immunization regimen (chi -square =4.787, p-value >0.0188)

Level of education against perception score

Level of education	Perception categories					
	Fair	Good	Total (%)	df	Chi-square	P-value
Secondary	83 (26.4%)	231 (73.6%)	231(100.0)	1	12.550	0.000
Tertiary	41 (46.1%)	48 (53.9%)	89 (100.0)			

Table above revealed that level of respondents education is found to be statistically significant with the level of perception of nursing mothers & their under-five infants on routine immunization regimen (chi -square =12.550, p-value >0.000).

Knowledge score against perception score

Knowledge score	Perception categories					
	Fair	Good	Total (%)	df	Chi-square	P-value
Fair	0 (0.0%)	124 (100.0%)	124(100.0)	1	41.628	0.000
Good	76 (27.2%)	203 (72.8%)	279(100.0)			
Total	76 (18.9%)	327 (81.1%)	403(100.0)			

Table above revealed that level of respondents knowledge is found to be statistically significant with the level of perception of nursing mothers & their under-five infants on routine immunization regimen (chi -square =41.628, p-value >0.000) decision: since the calculated value is more than the tabulated value, we therefore reject the null hypothesis and conclude that respondent level of perception has a positive influence on their knowledge towards immunization regimen which reflect on their level of adherence and compliances toward intake of immunization vaccine.

Discussion of Findings, Conclusion and Recommendation

Discussion of Findings

Socio-Demographic Characteristics of Respondents surveyed

The study consists of respondent from age 22 to 45year old and the mean and standard deviation of the ages of the respondents were found to be 34.04years and 5.6years respectively. More of the respondents had secondary school certificate, follow by tertiary school, but minority had primary education. Majority of the respondents are married which implies that more married women participated in the study with more from Yoruba ethnic group. Majority of the respondents are having at least three children and majority of the respondent are Christians.

Respondents' Level of Knowledge on immunization regimen

All the participants know that aim of immunization is to protect the individual and the public from vaccine-preventable diseases. This is in line with study conducted by (Obasoha, Mustapha et al 2018) who stated that childhood Immunization is one of the greatest public health and Nursing interventions as it helps to reduce the amount of disease-related morbidity and mortality at little to no cost. Also partially in line according to a study by (Adefolalu, Kanma-Okafor, & Balogun, 2019), who stated that all respondents were aware of immunization, more than half of the mothers had good knowledge about the immunization of under five children. All agreed that modern vaccines are safe, especially those recognized by W.H.O. and produced by accredited manufacturers. Majority of the respondents know that some vaccine present with some adverse effect. Higher number of the respondent knows that children having serious illness should be vaccinated as soon as their general condition improves. This is in line with the study by (Nafila,2019), who state that majority of the mothers believed that vaccination could be done even if the child had fever. Majority of the participants knows that when a child had severe adverse effect from a vaccine, subsequent dose of same vaccine should not be given. It was also revealed that majority of the participants knows that a malnourished child can be allowed to receive normal dose of next vaccine. More than half of the participants know that a child with history of jaundice after birth can be allowed to receive vaccine. All the participants knows that pain, swelling and redness are common vaccination reactions. Also, majority of the participants knows that fever, weakness and irritability are normal immune response. This study also shows that majority of the respondent knows that support from significant others enhance appropriate utilization of immunization regimen.

Respondents' level of perception on immunization regimen

This study reveals that majority of the total participants perceived that ability of the government to understand level of immunization would help them to designed good interventions. Majority of the participants also perceived that ability of mothers to ensure their children received full immunization would prevent lots of children's death and diseases condition. This is in line with the study conducted by (Etana B, Deressa W, 2012) who stated that mothers who knew the benefits of childhood immunization, had supportive partners, and have a good source of income were six times

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more likely to have their children fully immunized to prevent children motility compared with their counterparts. All the participants agreed that immunization is a social issue and it should therefore be voluntary and also believed that religion and cultural influences are major barrier to full immunization coverage. Majority of the respondents perceived that immunization is central to child-health care practices in all communities. Majority of the participants perceived that immunization is the practice of protecting every child and the entire family in any community against contracting itemized preventable diseases. This is in line with the study conducted by (Verulava, Jaiani, Lordkipanidze, Jorbenadze, & Dangadze, 2019) who stated that majority of mother show positive attitude towards immunization and believe that vaccination plays an important role in disease prevention. Higher number of the participants believed that immunization remains the only source of strength that covers children in their early period of development. Also, more than half of the total participants perceived that regular clinic attendance encourages, minority don't perceive that regular clinic attendance encourages immunization adherences by choosing no. This is in line with the study conducted by (Pore, 2012) who stated that factors for incomplete vaccination as maternal education, socioeconomic status of the family, lack of knowledge about immunization, ignorance and fear of losing daily employment

Respondents' coping strategies on immunization regimen

This study reveals that majority of the participants think that they would be able to cope with the stress of attending the regular booking appointment of all immunization regimen for them and their child. More than half of the respondents said they would be able to cope with the attitude of health care workers when issues that upset them arises This is not in line with the study conducted in Gabon by (Nobert George, 2009) on the reason for non – Adherence to immunizations it was shown that important reason for non-attendance to mother – child clinics (MCC) included transport costs, negative experiences at MCC such as interactions with unfriendly staff. Majority of the participant said yes that they would be able to cope with the health care worker delay attitude especially when they ask them to wait for other Clients before certain vials of vaccines are open, to minimize waste. More than half of the participant said they would be able to cope with situation when they are asked to pay some money before some procedures are carried out on them and their child. This is not in line with the study conducted in Gabon by (Nobert George, 2009) on the reason for non – Adherence to immunizations it was shown that important reason for non-attendance to mother – child clinics (MCC) included transport costs, negative experiences at MCC such as interactions with unfriendly staff, Also, majority of the participants said they would be able to cope with situation when their child is sick and they are also expected to bring the Child for immunization. More than half of the total participants stated that they would be able to cope during immunization Clinic days for it looks like a social event due to dancing and singing that stimulate Nursing mothers and their children. Majority of the respondents said they would cope with the bubbling and social networking displayed during immunization Clinic days at infant-welfare Center. More than half of the total participants said they would be able to cope with artificially created friendship in the clinic resulting in common spending like payment of every established friend's transport fare on your way home

Age against knowledge score

The study revealed that level of respondents age is found to be statistically significant with the level of knowledge of nursing mothers and conclude that respondent age has a positive influence on their knowledge on immunization regimen which reflect how exposed they are.

Level of education against perception score

The study revealed that level of respondent's educational level is found to be statistically significant with the level of perception of nursing mothers and their children on routine immunization regimen and conclude that respondent level of education has a positive influence on their perception towards immunization regimen which reflect how exposed they are. This is on the contrary from the study conducted by (Pore, 2012) which stated in one of his studies that he also cited factors for incomplete vaccination as maternal education, socioeconomic status of the family.

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Knowledge score against perception score

The study revealed that level of respondent's knowledge is found to be statistically significant with the level of perception of nursing mothers and their children on routine immunization regimen and conclude that respondent level of perception has a positive influence on their knowledge towards immunization regimen which reflect on their level of compliances toward intake of immunization vaccine.

Conclusion

Moreover, on a common scale, a tall number of the respondents appeared a great discernment and information towards adherence to schedule immunization. Chi square examination advance uncovered that mother's level of instruction is measurably critical with the level of discernment of schedule immunization regimen too, age of the moms towards adherence to immunization regimen was moreover found to be critical with the level of information of schedule immunization regimen by the mothers

Recommendations

Based on the result of the study, the following recommendations were made:

1. Health care providers should create awareness of importance of keeping appointments by caregivers
2. Flexible clinic hours will allow a good number of children to get immunized. Health care providers working in the immunization clinics should get a way of ensuring that all children who come to the clinic are immunized without compromising the cold chain.
3. Text message reminders. The health institutions should put in place mechanisms of reminding the caregivers on the return date using text messages. This will solve the problem of forgetfulness by the care giver.
4. More emphasis should be laid on educating head of homes and religious groups on the importance of routine immunization in the lives of children and mothers

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