



Research Paper

Immunization Practices Of Mothers Of Under-Five Children Attending Infant Welfare Clinic In Selected Primary Health Care Centers In Sagamu Lga, Ogun State

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ABSTRACT

Compliance with immunization regimen has been proven to be effective in preventing vaccine preventable diseases (VPD) in the community. The mothers of under-five children have significant roles to play in ensuring the safety of the under-five in this regard. This study assessed the knowledge and practice of mothers of under-five children towards immunization in Sagamu LGA, Ogun State.

Descriptive research design was adopted for this study and convenient sampling technique was used to select 150 respondents though 106 were returned successfully and analyzed. A self-structured questionnaire was used to collect data from mothers of under-five children. Data collected were analyzed using Statistical Package for the Social Sciences (SPSS - Version 25).

Findings from this study showed that 83% majority of the respondents have high knowledge about the concept of immunization. The findings also showed that 69.8% of the respondents have poor practice on the concept of immunization. Factors like mothers job, mother belief, attitude of health workers, lack of family support influences childhood immunization compliance among nursing mothers in Sagamu primary health centers. The result also shows that there is a significant difference between educational level of mothers and their practice of immunization ($f=15.942, p<.05$). Also the result found that there is a significant relationship between the knowledge and immunization practice ($r=-.206, p<0.05$).

Hence the researcher recommends that intensified outreach and regular home visits should be employed by community health nurses specifically for mothers who defaults as a result of different factors.

Keywords: Immunization, Knowledge, Practice, Under-five Children

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I. Background to the Study

Globally, immunization has reduced childhood mortality rate for years compared to other health intervention strategies. More than five decades, millions of deaths had been prevented per year in the whole world and immunization is widely recognized as the most effective, safest and efficient public health intervention program against diseases that affect childhood wellbeing. Immunization prevents an estimated two to three million deaths each year from diphtheria, tetanus, pertussis (whooping cough), and measles (WHO, 2017).

Immunization is inevitable for children of under-five to survive. World Health Organization (WHO) launched the expanded programme on immunization (EPI) in 1974 with the aim of immunizing children throughout the world. The programme uses proven strategies, like outreach services, to ensure delivery of vaccines even to the most hard-to reach and vulnerable populations. The worldwide implementation of this programme has resulted in more than 100 million infants being immunized each year, saving 2–3 million lives annually (UNICEF, 2019). Immunizing children against vaccine-preventable diseases played a vital role in saving lives, increasing productivity, and alleviating poverty (Mohammed, 2021).

One of the most essential services a nation can offer to its citizen is safe health system for good quality of life. Initially, vaccine is an unavoidable part of health system, a cost effective tools for controlling diseases and prevention of morbidity and mortality among people especially infant under five years. To sustain these greatest protection children should receive all their vaccinations within the stated intervals and age through proper immunization (Mphaka, 2018).

The level of knowledge, attitudes of parents towards vaccination and their level of awareness towards vitality of vaccination influences immunization uptake. More than 22 million children still go without basic immunization, leaving them susceptible to life threatening illness and permanent disability due to poor practices as a result of poor communication. Therefore, effective communication is particularly needed to achieve vaccination coverage in hard-to reach populations and to build trust in vaccines among those who question them (Almutairi, 2018).

According to Ismail (2014) who found that children from urban areas were more likely to complete their immunization schedule than those from rural areas. Supported by a finding conducted by Mahalingam (2014) who revealed a significant difference between urban mothers and rural mothers regarding their knowledge, attitudes, and practices regarding childhood vaccinations. Similarly, Illiteracy, poverty and other socio demographic factors affect their knowledge, attitude and practice with regard to their children's immunization. This implies that children of highly educated mothers were more likely to be correctly vaccinated than the children of illiterate mothers (Adam, 2015).

Initially, inadequate information-sharing by healthcare providers results in high dropout rates from vaccination and caregivers negative attitudes towards immunization services which form a great challenges to this intervention strategies in African. To promote a complete vaccination schedule a quality of interaction between healthcare workers and mothers is decisive to be ensure through the use of different types of media like television, social platforms and radio for immunization campaigns and collaboration with influential community leaders to enhance positively increase in immunization coverage in both rural and urban areas (Waisbord, 2020).

Mohammed, 2021 discovered from their study, that near half of the studied mothers had poor knowledge 87 (41.4%) related to children, vaccination and 110 (52.3%), more than half of mothers had good attitude and two third 188 (89.5%) reveal good practice towards vaccination. Based on this result, locality influenced the knowledge and practice of immunization. As most mothers had poor knowledge due to lack of information and rural area they lives (Mohammed, 2021).

This result might due to the misinterpretation regarding the safety of vaccinations that arise from media and the internet. Social media may have a considerable (negative or positive) impact on the knowledge of mothers. Moreso, superstitious belief or idea that disease are caused by witches and wizards are strongly rooted in their mind, some believe that diseases are caused by evil spirit and the only way out for them to avoid it is by offering sacrifices and some believe that it is the sin that the parents have committed towards the gods that make the child to be like that and there is no solution to the sickness of the child. Therefore, this implies that information misconception may also affect parents especially mothers knowledge, attitude and practices (Almutairi, 2021). Hence, this study assessed immunization practices of mothers of under - five children in Sagamu LGA, Ogun State.

Statement of the Problem

The health of children is a key factor in the promotion and preservation or maintenance of the health of the population. The common cause of increased morbidity and mortality of children under-five are communicable diseases. In the past, many children died before the age of 5 or before school age due to communicable diseases. Studies shows that many people have poor compliance with immunization regimen as mothers default with their children immunization due to various reasons.

Due to some factors such as age, level of education, marital status, location, occupation, economic status, non availability of mother to get the facility and religion, the practices and attitude exhibited for mothers appear to have received researchers' attention. Concerns for the alarming rate of infant and child death as a result of vaccine preventable diseases prompted the researcher to carry out the study to assess the practice of immunization among mothers.

Despite the abundance of research exploring the immunization knowledge, practice of mothers of under - five children attending infant welfare clinic, relatively little attention has been paid in exploring these in Sagamu LGA, Ogun state. It is against this background that the researcher will assess immunization practices and knowledge of mothers of under 5years children in selected Primary Health Centre in Sagamu LGA Ogun State.

Objective of the Study

The general objective of the study was to assess the immunization practice of mothers of under-five children attending infant welfare clinic in selected primary health care centres in Sagamu LGA Ogun State. The specific objectives are to:

- assess the level of knowledge of immunization among mothers of under - five children attending attending infant welfare clinic in selected primary health care centres in Sagamu LGA
- find out the immunization practice of mothers attending infant welfare clinic in selected primary health care centres in Sagamu LGA
- determinethe factors influencing immunization of under-five children among mothers attending infant welfare clinic in selected primary health care centres in Sagamu LGA.

Research Hypothesis

H₀1: There is no significant relationship between knowledge and immunization practice.

H₀2: There is no significant difference between educational level of mothers and their practice of immunization.

II. METHODOLOGY

The study employed a cross sectional descriptive design to collect data from mothers of under-five attending PHC at Makun, Sabo, and Ajaka at Sagamu LGA, Ogun State.

Table 1: Total population of mothers of under five years at the selected primary health clinic

Primary health centres	Estimated number of mothers present for immunization in a week
MakunOjumele health clinic	64
Sabo primary health clinic	47
Emuren primary health clinic (Ajaka)	39
TOTAL	150

Therefore, 150 participants were recruited for the study using convenience sampling technique to select participants from the three primary health centres. Only those available in the clinics were included in the study. A self-design questionnaire with close ended questions was used to gather data.

Face and content validity of the questionnaire were ensured. The reliability of the instrument was determined using Alpha Cronbach method. The questionnaires was tested in Ilishan primary health centre by giving 10 mothers of under-five children during their immunization day, this centre is outside the three selected public primary healthcentres in Sagamu LGA to answer the questionnaire. Cronbach's Alpha co-efficient value of 0.75 was considered reliable.

The researcher ensured that the respondents were adequately informed about the purpose of the study and assure them of their confidentiality and anonymity. This was explained to the respondents before the questionnaire was distributed.

Statistical analyses were done using Statistical Package for Social Sciences (SPSS) version 25.0 software. Descriptive and inferential analyses were done to answer the research questions and the hypotheses. Ethical approval was obtained from Babcock University Health Research Ethical Committee (BUHREC) with approval/reference number BUHREC 890/21. Written and verbal consent were obtained from each participants in the research. Confidentiality, autonomy and anonymity were ensured before, during and after the data collection procedure.

III. DATA ANALYSIS AND RESULTS

One hundred and fifty (150) copies of questionnaire were distributed but only one hundred and sixcopies were successfully retrieved and validated for analysis.

Table 2: Respondents' Socio-demographics Data

N =106			
DEMOGRAPHIC	CATEGORY	FREQUENCY(f)	PERCENTAGE (%)
AGE	16-25 years	12	11.3
	26-35 years	61	57.5
	36-45 years	18	17.0
	46 years & above	15	14.2
Marital status	Single	42	39.6
	Married	64	60.4
Educational Level	No formal education	13	12.3
	Secondary	30	28.3
	Tertiary	63	59.4

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Religion	Christianity	94	88.7
	Islam	12	11.3
Ethnicity	Yoruba	55	51.9
	Igbo	35	33.0
	Hausa	16	15.1
Number of children	2	55	51.9
	3	30	28.3
	4 & above	21	19.8
Age of infant	0-4months	17	16.0
	5-8months	37	34.9
	9-12months	16	15.1
	1-3years	18	17.0
	3-5 years	18	17.0

The result from table 2 reveals the demographic details of the respondents. It shows that about 57.5% are between the ages of 26-35 years, about 60.4% of them are married and about 59.4% had tertiary education. The table also shows that most (88.7%) of the respondents are Christians, about 51.9% of them are Yoruba, most (51.9%) of them had at least 2 children and about 34.9% of them stated that their infants were between the ages of 5-8 months old.

Table 3: Knowledge of mothers on the concept of immunization

Items	Category	N=106	
		Frequency	Percentage
Have you heard about immunization program	Yes	106	100.0
Do you think every child needs immunization	Yes	94	88.7
	No	12	11.3
Are you aware of the immunization schedule?	Yes	94	88.7
	No	12	11.3
Immunization prevent all childhood disease	Yes	94	88.7
	No	12	11.3
Immunized children are healthier than unimmunized children	Yes	94	88.7
	No	12	11.3
Do you think a child should complete the intake of immunization	Yes	88	83.0
	No	18	17.0
Do you know that fever is a side effect of vaccines	Yes	88	83.0
	No	18	17.0

Result from table 4.2.0 shows that all the respondents have heard about immunization program, about 88.7% think every child need immunization, are aware of the immunization schedule and know that immunization prevents all childhood diseases. The table also shows that 88.7% of the respondents believe that immunized children are healthier than unimmunized children, about 83.0% of them think that a child should complete the intake of immunization and fever is a side effect of vaccines.

Table 4: Knowledge Summary Scale

Value	Score	Frequency	Percent	Remark
Mean Score = 6.2±21.9	(≥6)	88	83.0	high
Min=1, Max=7	(<6)	18	17.0	low
Total		106	100.0	

The knowledge score was rated on a 7-point rating scale with majority (83.0%) scoring high. Hence, the respondents have high knowledge on the concept of immunization

Table 5: Practices of Mothers towards Immunization

VARIABLE	SA	A	D	SD	Mean	Standard deviation
	F(%)	F(%)	F(%)	F(%)		
I will not take my child for immunization because my child is not sick.	90(84.9)	9(8.5)	5(4.7)	2(1.9)	3.76	.626
I will always immunize my child and encourage other mothers to immunize their children.	90(84.9)	9(8.5)	5(4.7)	2(1.9)	3.76	.626
My child will receive immunization	90(84.9)	9(8.5)	5(4.7)	2(1.9)	3.76	.626

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according to routine immunization.			43(40.6)	63(59.4)	1.41	.493
My Job is more important than my child's immunization						
Immunization has an adverse effect on the health of my child	2(1.9)	12(11.3)	31(29.2)	61(57.5)	1.41	.493
Our major problem is malaria and not polio so immunization is not needed.		3(2.8)	40(37.7)	63(59.4)	1.41	.493
Grand mean					2.6	.56

Decision rule if mean is: 1-1.49= strongly disagree; 1.5-2.49= disagree; 2.5-3.49=agree 3.5-4.0= strongly agree

Result from table 5 shows the responses of the respondents on practices of mothers towards immunization. The table shows that 84.9% of the mothers strongly agreed that they will not take their child for immunization if they are sick, they will immunize the child and encourage other mothers to immunize their children as well and their children will be immunized according to the routine. Also about 59.4% of them strongly disagreed that their jobs were more important than the immunizations, that the immunization had an adverse effect on the health of the child and that their major problem was malaria and not polio hence no need for immunization. Generally it can be said that the respondents agree with the questions on the practices of mothers towards immunization with mean (=2.6) and SD (=0.56).

Table 6:Practice Summary Scale

Value	Score	Frequency	Percent	Remark
Mean Score = 18.5±2.2	(19-21)	32	30.2	Good
Min=12, Max=21	(12-18)	74	69.8	Bad
Total		106	100.0	

The knowledge score was rated on a 24-point rating scale with majority (69.8%) having bad score. Hence, the respondents have poor practice on the concept of immunization.

Table 7: Factors that influence mothers compliance to immunization program

VARIABLE	SA	A	D	SD	Mean	Standard deviation
	F(%)	F(%)	F(%)	F(%)		
I don't take my child for immunization because the health facility is too far	10(9.4)	12(11.3)	22(20.8)	62(58.5)	1.72	1.002
I get discouraged due to the attitude of health workers	10(9.4)	12(11.3)	22(20.8)	62(58.5)	1.72	1.002
I don't complete the immunization program for my child because of my work doesn't permit me	10(9.4)	12(11.3)	22(20.8)	62(58.5)	1.72	1.002
Immunization is against my religion belief	4(3.8)	11(10.4)	27(25.5)	64(60.4)	1.58	.827
Due to lack of family support, my child doesn't complete the uptake of immunization	4(3.8)	11(10.4)	27(25.5)	64(60.4)	1.58	.827
High cost of transportation hinders me from getting the complete immunization dose for my child	4(3.8)	11(10.4)	27(25.5)	64(60.4)	1.58	.827
My child's pain/crying has contributed to my reasons for not completing the immunization schedule	4(3.8)	11(10.4)	27(25.5)	64(60.4)	1.58	.827

Table 7 shows the result of the respondents, the result reveals that majority of the respondents (58.5%) strongly disagreed that they do not take their child for immunization due to the health centre is far, they do not take their child for immunization because they get discouraged by the attitude of health workers and they do not complete the immunization program of their child because their work does not permit them. About 60.4% also strongly disagree that their culture doesn't permit immunization, their child doesn't complete immunization uptake due to lack of family support, high cost of transportation hinders them from completing the immunization schedule and the child pain and cry contributes to the reasons the immunization is not completed.

TEST OF HYPOTHESES

HYPOTHESIS TESTING ONE: There is no significant relationship between the knowledge and immunization practice

Table 8: Pearson product moment correlations between relationship between the knowledge and immunization practice

		Knowledge	Practice	Mean	Std. Deviation
Knowledge	Pearson Correlation	1	.604**		
	Sig. (2-tailed)		.004	8.2727	1.03559
	N	106	106		
Practice	Pearson Correlation	.604**	1		
	Sig. (2-tailed)	.004		30.3990	4.17843
	N	106	106		

** . Correlation is significant at the 0.01 level (2-tailed).

Table 8 reveals that there is a significant relationship between the knowledge and immunization practice($r=-.206, p<0.05$). Hence, the null hypothesis (H0) is hereby rejected.

HYPOTHESIS TESTING TWO: There is no significant different between educational level of mothers and their practice of immunization.

Table: 9: One way ANOVA showing the difference between educational level of mothers and their practice of immunization.

Practice	N	Mean	Std. Deviation	Mean Square	F	Sig.	Remark
No formal education	7	4.00	.000				Sig.
secondary	67	2.99	1.080	12.066	15.942	.000	
Tertiary	32	3.97	.177	.757			

Table 9 shows that there is a significant difference between educational level of mothers and their practice of immunization ($f=15.942, p<.05$). The ANOVA table reveals that the mean difference existing among the three levels of education is statistically significant. Hence the null hypothesis is hereby accepted.

IV. DISCUSSION OF FINDINGS

What is the level of knowledge of immunization among mothers?

The findings of the study shows that about 69.8 respondents have high level of knowledge. This is similar with the study of Lharbi (2017) who found that majority of his respondents have high knowledge leve of immunization. also Lim et al. (2016) found similar result and concluded that the knowledge of the respondents can be further improved with constant awareness creation. On the contrary, Sohail, Mahmood, Asim, (2015) showed from their study which included 200 mothers, found that mothers lacked knowledge regarding the importance of vaccination: 26.5% did not know about routine vaccinations and the vaccination schedule, and only 37.0% knew the names of the infectious diseases and when to vaccinate their children.

What are the immunization practices of mother?

The study result shows that the respondents had poor practice on immunization. This was made obvious as majority of the respondents indicated that their Job is more important than their child's immunization while others noted that immunization has adverse effect on the health of their child This result is consistent with the findings of Prince (2021) who investigated factors associated with immunization incompleteness of children under 5 years in Ebonyi state, Southeastern part of Nigeria. The study reported that parenting mothers had poor practice and are not willing to comply with immunization programs. Similarly, Christopher (2019) evaluated the social determinants of routine immunization in Ekiti State of Nigeria. The findings identify factors that account for the relative poor immunization coverage. The salient issues include ignorance and social cost of access to the service.

What are the factors that influence immunization of children among mothers?

The study found that factors like mothers job, mother belief, attitude of health workers, lack of family support etc are factors influencing childhood immunization compliance among nursing mothers in sagamu primary health centers. This result is similar with the study of Umoke & Igwe. (2021) who found different factors like the job of mother, finance are factors influencing immunization compliance. Umeh (2018) also found a similar result showing that the income level of a mother affects her ability to comply with immunization. This finding is similar with the findings of Abubakar and Nor (2021), their study found that age and marital status were significant predictors of immunization compliance. Furthermore, Gill and Sekar (2012) found that factors like education, religion influenced immunization compliance.

Hypothesis one: There is no significant relationship between the knowledge and immunization practice.

The result of the study revealed that there is a significant relationship between mothers knowledge and immunization practice. The findings corroborate the findings of Almutairi, et al (2021) who found that knowledge is a significant factor to predict practice of immunization. Similarly, Sunny, Ramesh and Shankar, (2018) found that a significant relation exist between the knowledge and practice of mothers on immunization.

Hypothesis two: There is no significant difference between educational level of mothers and their practice of immunization.

The result shows that there is a significant difference between educational level of mothers and their practice of immunization ($F=15.942, p<.05$). This is in line with the study of Ramadan, Soliman, Abd El-kader, (2016) who indicated that a significant difference exist between the educational level of mothers and their immunization practice. Furthermore, Adefolalu, Kanma, Balogun, (2019) found a statistical difference mothers level of education and their level of immunization compliance.

V. Conclusion

From this study, it can be deduced that the respondents were knowledgeable of immunization; the result equally revealed that respondents had poor practice of immunization. It was also shown that different factors such as mother's job, mother belief, attitude of health workers, lack of family supports are factors influencing childhood immunization compliance among nursing mothers in Sagamu primary health centers.

VI. Recommendations

Based on the findings, the following recommendations are hereby made:

- Intensified outreach and regular home visits should be employed by community health nurses specifically for mothers who default as a result of different factors.
- The Government should improve on Supplemental immunization activities such as National Immunization Days (NIDs) and Catch-up campaigns that are already in place.
- There should be more campaign about immunization uptake and the benefits.

References

- [1]. Abubakar, N., and Nor, A. (2021). Factors influencing childhood immunization uptake in Africa: a systematic review. *BMC Public Health*, 6(12), 12-25.
- [2]. Adam, D., Mokiieldin, A., Bilal, A., Hussein, A., and Hirs, M. (2015) Socio-economic factors influence measles immunization coverage in Shendi and Almatama localities-Sudan. *Int J Chem Environ Biol Sci*. 3 (1), 411-4
- [3]. Adefolalu, O.A.; Kanma, O.J.O.; Balogun, M.R. (2019) Maternal knowledge, attitude and compliance regarding immunization of under five children in Primary Health Care centres in Ikorodu LGA Area, Lagos State. *J. Clin. Sci*. 16 (1), 8-14.
- [4]. Alamri, E.S.; Horaib, Y.F.; Raza, A.W. (2018) Knowledge and Attitudes of Parents on Childhood Immunization in Riyadh, Saudi Arabia. *Egypt. J. Hosp. Med*. 70, 251-256.
- [5]. Ali, A.H.M., Abdullah, M.A., Saad, F.M., and Mohamed, H.A. (2020) Immunization of children under five years: mothers' knowledge, attitude and practice in Alseir locality, Northern State, Sudan. *Sudan J Paediatr*. 20(2):152-162. <https://doi.org/10.24911/SJP.106-1586870453>
- [6]. Almutairi, W.M.; Alsharif, F.; Khamis, F.; Sallam, L.A.; Sharif, L.; Alsufyani, A.; Alshulah, F.N.; Alqasimi, R. (2021) Assessment of Mothers' Knowledge, Attitudes, and Practices Regarding Childhood Vaccination during the First Five Years of Life in Saudi Arabia. *Nurs. Rep*. 11, 506-516. <https://doi.org/10.3390/nursrep11030047>
- [7]. Ansong, D., Tawfik, D., Williams, E.A., Benson, S., Nyanor, I., Boakye, I. (2014) Suboptimal vaccination rates in rural Ghana despite positive caregiver attitudes towards vaccination. *J Vaccines Immun*. 2, 7-15. <https://doi.org/10.14312/2053-1273.2014-2>
- [8]. Ashley, H. S., Cynthia, S. M, Donna, M. S, Bernard, G. (2017). Parental satisfaction with early pediatric care and immunization of young children, the mediating role of age appropriate well-child care utilization. *Arch Pediatric Adolescent Med*. 161(1), 50-56
- [9]. Awosan, K., & Ibrahim, M. (2018). Knowledge, attitude and compliance with full immunization of children against vaccine-preventable diseases among pregnant mothers in Sokoto, Nigeria. *Int J Contemp Med Res*, 5(6), 10-17
- [10]. Bakhache P., Rodrigo C., Davie S., Ahuja A., Sudovar B., Crudup T. and Rose M. (2017),
- [11]. Health care providers' and parents' attitudes toward administration of new infant vaccines—a multinational survey, *European Journal of paediatrics*, 172 (4), 485-492, doi: 10.1007/s00431-012-1904-4
- [12]. Bedford, H. (2018). Vaccine hesitancy, refusal and access barriers: The need for clarity in terminology. *Vaccine*, 36(44), 6556-6558.
- [13]. Birhanu S., Anteneh A., Kibie Y. and Jejaw A., (2017), Knowledge, attitude and practice of mothers towards immunization of infants in health centres at Addis Ababa, Ethiopia, *American Journal of Health Research*, 4(1), 6-17.

- [14]. Fisha, A., &Tadesse, T. (2021). Knowledge, Attitude, and Practices of Parents About Immunization of Infants and Its Associated Factors in WadlaWoreda, North East Ethiopia, 2019. *Pediatric Health, Medicine and Therapeutics*, 2(9), 1-14.
- [15]. Fad, K.H.; Ibrahim, A.A.; Dldoom, M.M.B.; Ahmed, Z.O.H.(2017) Knowledge, attitude and practice of mothers with children less than five years toward vaccination in khartoum state-ummbada locality-allbugaa-2017. *Nurs. Palliat. Care* 4, 1-4.
- [16]. Gidado, S., Nguku, P., Biya, O., Waziri, N.E., Mohammed, A., Nsubuga, P., (2014). Determinants of routine immunization coverage in Bungudu, Zamfara state, northern Nigeria, 2010. *Pan Afr Med J.18(Suppl1):9*. <https://doi.org/10.11604/pamj.suppl.2014.18.1.4149>
- [17]. Habib, R.F.; Alsubhi, R.A.; Saadawi, D.W.; AL Hatim, R.F.L.; Saleh, A.; Alrashidi, A.; Awad, M.; Bukhari, A. (2018)Assessment of Knowledge, Attitude and Practice of Parents towards Immunization of Children in Saudi Arabia. *Egypt. J. Hosp. Med.* 71, 2585-2589
- [18]. Ismail, I.T.A., El-Tayeb, E.M., Omer, M.D.F., Eltahir, Y.M., El-Sayed, E.T.A., and Deribe, K.(2014) Assessment of routine immunization coverage in nyala locality, reasons behind incomplete immunization in South Darfur state, Sudan. *Asian J Med Sci.6:1-8*. <https://doi.org/10.19026/ajms.6.5348>
- [19]. Jones, C. L., Jensen, J. D., Scherr, C. L., Brown, N. R., Christy, K., & Weaver, J. (2015). The Health Belief Model as an explanatory framework in communication research: exploring parallel, serial, and moderated mediation. *Health communication*, 30(6), 566-576. <https://doi.org/10.1080/10410236.2013.873363>
- [20]. Mahalingam, S.; Soori, A.; Ram, P.; Achappa, B.; Chowta, M.; Madi, D.(2014) Knowledge, attitude and perceptions of mothers with children under five years of age about vaccination in Mangalore, India. *Asian J. Med. Sci.* 5, 52-57
- [21]. Mereena and Sujath, R. (2014) Study on Knowledge and Attitude Regarding Vaccines among Mothers of Under-Five Children Attending Pediatric OPD in a Selected Hospital at Mangalore. *Journal of Nursing and Health Science*, 3, 39-46. <https://doi.org/10.9790/1959-03533946>
- [22]. Mohammed, M.B. and Al-Zahrani, A. (2021) Knowledge, Attitude and Practice of Mothers toward Children's Vaccination at Alfatih One in Sudan. *Open Journal of Nursing*, 11, 557-565.
- [23]. Mphaka, M.R.; Moshime, M.; Reddy, C. A (2018) Cross-Sectional Study on Caregivers' Knowledge, Attitudes and Practices about the Routine Immunization Program in Tshwane Sub-District 2, Gauteng, South Africa. *J. Environ. Sci. Public Health.* 2, 221-231.
- [24]. Mugada, V.; Chandrabhotla, S.; Kaja, D.S.; Machara, S.G.K. (2017). Knowledge towards childhood immunization among mothers; reasons for incomplete immunization. *J. Appl. Pharm. Sci.* 7, 157-161.
- [25]. NDHS. (2018). Nigeria Demographic and Health Survey. Key indicators report. . Nigeria National Population Commission Abuja, 1-45.
- [26]. Odia, O.J.; Okafor, I.P.; Roberts, A.A. (2015) Knowledge, attitude and practice of childhood immunization among mothers of under-fives in Kosofe Local Council Development Area, Lagos State. *J. Community Med. Prim. Health Care.* 27, 55-63.
- [27]. Owais, A., Hanif, B., Siddiqui, A.R, Agha, A., Zaidi, A.K.(2011) Does improving maternal knowledge of vaccines impact infant immunization rates? A communitybased randomized-controlled trial in Karachi, Pakistan. *BMC Public Health.* 11(1), 239
- [28]. Ramadan, H.A.; Soliman, S.M.; Abd El-kader, R.G. (2016). Knowledge, Attitude and Practice of Mothers toward Children's Obligatory Vaccination. *IOSR J. Nurs. Health Sci.* 5, 22-28.
- [29]. Renu, G., George, A., Mamatha, S. P., Baby, S. N., Suneel, C. M., & Dinesh, M. (2015). Health Belief Model: A Theoretical Framework for the Development of Home Safety Supervisory Program in Childhood Injury Prevention. *International Journal of Current Research*, 7(11), 22691-22695.
- [30]. Rogalska J, Augustynowicz E, Gzyl A, and Stefanoff P (2010) [Parental attitudes towards Childhood immunizations in Poland].*PrzełEpidemiol* 64: 91-97.
- [31]. Selvaraj K., Sarkar S. and Daya P.A., (2014), Knowledge on routine pentavalent vaccines and Socioeconomic correlates among mothers of children aged younger than 5 years in Urban Puducherry, *International Journal of Medical Science and Public Health*, 4(2), <http://www.ijmsph.com>
- [32]. Sohail, M.M.; Mahmood, B.; Asim, M. (2015) Mother's Knowledge, Attitude and Practices about child immunization: A study in district Faisalabad, Pakistan. *Rawal Med. J.*, 40, 441-444.
- [33]. Sunny, A.; Ramesh, S.; Shankar, B.K. (2018) A Study to Assess and Correlate the Knowledge, Attitude and Practices of Vaccination among Mothers with Educational Status in a Teaching Hospital in South India. *Prim. Health Care.* 8, 1-6.
- [34]. Trushitkumar, P.B.; Pathak, R.; Singh, R.; Alves, V.; Mahesh, N.M.; Chaluvaraj, T.S.; Chandramouli, R.; Varghese, B. (2017) Assessment of Parents' Knowledge, Attitude and Practice about Child Vaccination in Rural areas. *J. Pharm. Res.* 16, 229-236.
- [35]. UNICEF. Immunization programme. (2019). Available from: <https://www.unicef.org/immunization>
- [36]. Verulava, T.; Mariam, J.; Lordkipanidze, A.; Jorbenadze, R. and Dangadze, B.(2020) Mothers' Knowledge and Attitudes towards Child Immunization in Georgia. *Open Public Health J.* 2020, 12, 232D-237D
- [37]. Wani, R.T.; Dar, H.; Raina, Z.A. (2017) Knowledge, Attitude and Practices of Mothers with Children under Five Years of Age about Vaccination. *J. Med. Sci. Clin. Res.* 5, 24449-24454
- [38]. WHO. (2017). UNICEF, Estimation of National Immunization Coverage World Health Organization. (2013). Immunization. <https://www.who.int/topics/immunization/en>
- [39]. World Health Organization (WHO) (2018), expanded programme on immunization. WHO
- [40]. African Region: Nigeria. Retrieved from <http://www.who.int/countries/nga7/abouten>
- [41]. World Health Organization (WHO). (2017), Department of Vaccines and Biological. WHO.
- [42]. Vaccines for Preventable Diseases: Monitoring System. Geneva.
- [43]. Yousif M.A., AlbarraqA.A.,Abdallah M.A. and ElburA.I. (2013), Parents' Knowledge and Attitudes on Childhood Immunization, Taif, Saudi Arabia, *Vaccines & Vaccination*,5:1, <http://dx.doi.org/10.4172/2157-7560.1000215>
- [44]. Zagminas K, Surkiene G, Urbanovic N, and Stukas R. (2007) [Parental attitudes towards Children's vaccination].*Medicina (Kaunas)* 43: 161-169.