ORIGINAL ARTICLE

Influence of Family Structure and Functionality on Immunization Status of Infants Attending GOPC of BMC Saki

***Bolaji A.I[1], Ojebode T.O[2], Adekanye O.S[2], Bolaji A.O[3]**

ABSTRACT

Introduction: Vaccine-preventable diseases are endemic in Nigeria, and contribute greatly to childhood morbidities and mortalities. Good family structure has been reported to improve children's wellbeing, health and eating habit, but the contribution of family structure together with family functionality on immunization status has not been documented. Overall, the goal of the research was to determine the level of immunization status in the study population, assess their knowledge of immunization and determine what influence family structure and functionality have on children's immunization status.

Methods: A cross-sectional descriptive study was conducted in 2016 in the General outpatient clinic (GOPC) of Baptist Medical Centre (BMC), Saki, Oyo State. Family APGAR Scale and self-design questionnaire were used to collect data from 299 respondents using systematic sampling technique. A SPSS (version 21) was used for the analysis.

Results: Our results showed that 82.9% of the respondents were fully immunized and 98% had knowledge about Immunization. Majority of the respondents came from functional families, accounting for 85.6% of cases. The following factors were found to be statistically significantly associated with immunization status: family functionality (X2 = 101.694, P = 0.000), family type (p value =0.000), family size (p value = 0.000), ethnic group (p value = 0.000) and number of children (P value = 0.000)

Conclusion: Our findings showed that there is an adequate knowledge of immunization in the study population, and that a child's immunization status is significantly influenced by the family structure and functionality. However, given the fact that this is a single, hospital-based study, several multi-center studies would have to be employed not just to validate this conclusion but also to inform policy making.

Keywords: Immunization status, family structure, family functionality, vaccine, health facility, Nigeria

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ORIGINAL ARTICLE

Influence de la structure familiale et de la fonctionnalité sur le statut de vaccination des nourrissons assistant au GOPC de BMC, Saki

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Introduction

Les morts évitables par la vaccination restent endémiques et contribuent de manière significative à la morbidité infantile au Nigéria et il a été reconnu qu'une bonne structure familiale améliore le bien-être, la santé et les habitudes alimentaires des enfants, mais la contribution de la structure et de la fonctionnalité de la famille au statut vaccinal n'est pas encore établie. Le but de cette étude est de déterminer le niveau d'immunisation des répondants, d'évaluer leurs connaissances en matière d'immunisation et de déterminer l'influence de la structure et de la fonctionnalité de la famille sur l'état de vaccination.

Méthode de l'étude: Une étude descriptive transversale a été menée en 2016 dans la clinique externe générale (GOPC) du Baptist Medical Center (BMC), Saki, dans l'état d'Oyo. L'échelle familiale APGAR et le questionnaire d'auto-conception ont été employés pour recueillir des données auprès de 299 répondants à l'aide d'une technique d'échantillonnage systématique. Un SPSS (version 21) a été utilisé pour l'analyse.

Résultats de l'étude: Les résultats ont révélé que la majorité (82,9%) des répondants était entièrement immunisée et que 98% avaient des connaissances sur la vaccination. La majorité des répondants (85,6%) étaient issus de familles fonctionnelles. La fonctionnalité de la famille était statistiquement significative sur le statut vaccinal (X2 = 101,694, P = 0,000) ainsi que sur certaines composantes de la structure familiale: type de famille (P = 0,000), taille de la famille (P = 0,000), groupe ethnique (P = 0,000), et nombre d'enfants (P = 0,000)

Conclusion: Les répondants avaient une connaissance adéquate de la vaccination. De plus, la fonctionnalité familiale et la structure familiale influencent le statut vaccinal des nourrissons. Par conséquent, d'autres études devraient être menées sur l'influence de la fonctionnalité et de la structure de la famille sur le statut vaccinal en utilisant une approche multicentrique.

Mots-clés: Immunisation, fonctionnalité familiale, structure familiale, vaccine

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INTRODUCTION

Immunization remains an important cost-saving, preventive strategy in the fight against infectious diseases globally (1). To combat these infectious agents, vaccines can be administered to stimulate immune responses, leading to antibodies production (2). It is saddening however to note that a vast majority of children who are at risk of contracting and dying from these illnesses do not have access to these life-saving preparations.[3] Nigeria has one of the highest under-five mortality rates in the world, accounting for about 194 per thousand, out of which vaccine preventable diseases account for nothing less than 20%! It is worrisome to note that even some countries that are going through conflicts have better immunization coverage than Nigeria (5, 6).

With respect to family structure, research studies have shown that nuclear family set ups have worse childhood immunization history compared to other household structures (7, 8). Moreover, whereas a number of studies reported the determinants of immunization uptake for example among children aged 12-23 months, studies among infants (aged 0-11 months) will determine this earlier.

Broadly, the family connotes any group of persons who are related biologically, emotionally or legally (9). It is logical therefore to assert that the family is the most important source of health beliefs and health-related behaviors, stress and emotional support. Family structure however, denotes its composition and membership, and remains the fundamental building block of social structure around the world (10).

According to WHO, immunization is a process of protecting an individual against infectious diseases through an administration of vaccines (11). No doubt, immunization is one of the most useful and safest interventions in public health. It is estimated that 3 million lives can be saved by vaccination as it prevents diseases (10). Studies have shown that the number of parents in the household equally plays a very significant role in a child's physical growth and development (12).

Family functioning is a terminology that is used to describe the social as well as the structural attributes of a family as part of the global community. It relates to interactions that exist within a family setting, including but not limited to the ability to resolve conflicts, adapt, organize and effectively communicate. To determine the levels of family functioning, a 5-item questionnaire, popularly called family APGAR (Adaptation, Partnership, Growth, Affection and Resolve) scale, is often utilized (13). The scale can be used to categorize families based on their functionalities. The scale has 5 questions (with 3 possible answers - 0 for 'hardly ever', 1 for 'sometimes' and 2 for 'always', with the total score ranging from 0 - 10), and measures the level of an individual's satisfaction with family relationships. On a scale of 10, a score of 7 (or higher) is indicative of a highly functional family, 4 to 6, a moderately dysfunctional family and 3 and below, a severely dysfunctional family setting (14). A study on the influence of family structure and functionality on the immunization status of infants, in a primary care setting is therefore necessary, as it will put emphasis on the importance of immunization in child's health.

MATERIAL AND METHODS

The study was a cross-sectional study using hospital-based data collection to evaluate the association between family structure and functionality and immunization status of infants attending GOPC of Baptist Medical Centre, Saki (BMCS), specifically at the Infant welfare/postnatal clinic of the hospital. BMCS is one of the Nigerian Baptist Convention mission health facilities and is located in Saki, Saki West Local Government area of Oyo State. This 200-bedded health institution was founded in May 1902 with the sole of purpose of providing both primary and secondary healthcare to the residents of Oke-Ogun and their neighboring communities, with referrals from other parts of Nigeria. The research was carried out among infants, aged 0-11 months, and their caregivers who attended the outpatient department of the health facility between May and October, 2016, who met both the inclusion and exclusion criteria and who consented to participate in the research. Additionally, the Fisher's statistical formula for estimating minimum sample size for single proportion in population of greater than 10,0000 was used to determine the sample size for the study ($N= Z^2 \times P(1-p) / d^2$) (15), where N represents the minimum sample size for a statistically significant survey, Z, the normal deviant at 95% confidence interval (standard value being 1.96), P is the estimated immunization prevalence in the study area (approximately 23% in Nigeria) (16) and d, the error margin at a standard value of 0.05 (5%) minus precision.

The sample size was therefore calculated thus:

$$N = \frac{1.962 \times 0.23\ (1 - 0.23)}{0.05^2}$$

$$= 272$$

To accommodate contingencies like non-response or errors associated with recording, we increased the sample size by 10%, giving a sample size of 299. Research subjects were recruited using a systematic random sampling technique. The outpatient clinic is run 5 days a week, with an approximately 12 infants attending each day, translating into about 60 infants per week, 240 every month and 960 over the 4-month period the study lasted. The required sample size for the study was arrived at by systematically selecting every 3rd infant beginning with the 3rd infant that attended the clinic at the start of the study. The 1st to be recruited was selected using a simple random sampling namely balloting. This way, the 1st study participant to be included was the 3rd infant, the 2nd was the 6th infant, the 3rd was the 9th infant and so on, until the desired sample size was reached. In a situation in which the selected infant did not meet the inclusion criteria, we chose the next subject, while the sampling interval continued from that point. To avoid registering a child twice, we opened a register for all the infants that participated in the study, while we marked their cards. On the average, about 3 to 4 infants were recruited per day, and the exercise lasted for approximately 4 calendar months.

Our inclusion criteria were as follows: children aged 0-11 months, who were being seen at the general outpatient clinic of the hospital, and whose parents or caregivers were willing to participate in the study. Our exclusion criteria included infants with contraindication (e.g. on medical grounds) for immunization or whose parents or caregivers declined to participate. The lead researcher identified the children that met the aforementioned inclusion criteria, and also administered the questionnaires on their parents or caregivers. Each child's Road-to-Health Chart was critically examined by paying special attention to what immunization has or has not been received. Parents or caregivers who did not come with their children's charts were given an appointment to bring them the next visit for confirmation.

All the measurements were documented in the questionnaire which was pre-tested in the General Hospital Saki by the researcher. Family structure was classified into single parent, nuclear and non-nuclear families or multiple families (17). An infant was taken as any child aged 0 to 11 months (18). Data collection using structured questionnaires, validation of instruments and random auditing were done on a daily basis by the researcher.

Ethical approval was obtained before the commencement of the study from the Ethics Committee of the Hospital. Well written informed consent was obtained from each participant after adequate information had been given about what the study entailed to the parents and caregivers and after having assured them that their responses would be kept anonymous and treated with utmost confidentiality. All financial implications were borne by the authors, and there was no conflict of interest. Data were promptly entered into the questionnaires, transferred and stored into the lead author's personal computer using the Microsoft Excel Worksheet version 2007. Data were then exported and analyzed using the Statistical Package for Social Sciences (SPSS) version 21 for windows. Statistical significance was set at a confident interval of 95% and a P-value of <0.05. Fisher exact test was used to determine whether or not there was a significant association between the participants' family structure, family functionality and their immunization status. Any child in need of immunization during the study will have his/her caregiver adequately counseled before such services are given in the health facility.

RESULTS

Characteristics of the Study Population

Table 1 showed the socio-demographic features of the infants that were recruited for the study. The vast majority of the caregivers (representing 93.6%), were biological mothers of the infants. Gender distribution revealed that 166, accounting for 55.5%, were male while 133 (44.5%) were female. Infants aged 0-3 months accounted for more than half (55.5%) of the participants. Majority of the caregivers (61.5%) were Muslims, while about 74.2% of the caregivers resided in peri-urban settlements. Table 2 gives information about the socio-economic characteristics and anthropometric measurements of study participants. While about 222 (74.2%) of the caregivers indicated trading as their occupation, only 17 (5.7%) had post-tertiary education. Family income of more than ₦200,000 was reported only by 16 of the caregivers, representing just 5.4%!

Table 3 depicts the family structure of the

Table 1: Socio-demographic characteristics of the subjects (n=299)

Variable	frequency (f)	percentage (%)
Informant relationship to the child		
Father	19	6.4
Mother	280	93.6
Siblings	0	0
Sex of the child		
Male	166	55.5
Female	133	44.5
Age of the child (Months)		
0-3	169	56.5
4-6	35	11.7
7-9	46	15.4
10-11	49	16.4
Number of Under 5 siblings in the family		
None	108	36.1
One	109	36.5
2 or more	82	27.4
Religion of parent/caregiver		
Christianity	115	38.5
Islam	184	61.5
Traditional	0	0
Residence		
Urban	22	7.4
Peri-urban	222	74.2
Rural	55	18.4

participants. Approximately three quarters (78.9%) of the children came from a 2-parent family setting with the least of their family size being 2. Approximately 260 (88.3%) of the infants had caregivers who were currently married, 3% were Igbo, family expenses were mainly borne by the fathers, accounting for about 90.6% while approximately 94.3% of the household heads were male.Figure 1 shows the family functionality of the infants. Majority of the participants (85.6%) hailed from functional family setting.

Figure 2 gives a summary of the number of respondents who had been fully immunized. Two hundred and forty-eight of the participants, accounting for 82.9%, have received full immunization appropriate for their ages.

Table 4 summarizes the level of knowledge of immunization among the caregivers. While most (about 98%) have had some knowledge of immunization, just about 91% of these could be said to truly understand the purpose of immunization.

Table 5 is a summary of the association that existed between the family functionality and the participants' immunization standing. A very strong relationship was observed between the infants' immunization status and their family functionality (X^2=101.694, p value = <0.001; df=2). Infants with 'nil immunization status' accounted for 34.9%, and all of them came from dysfunctional families. Greater proportion (89.5%) of those with full immunization status came from functional family setting.

Table 6 shows the relationship between the family structure and the infant's immunization status. The participants' immunization status was significantly associated with their family type (Fisher = 29.988, p value =0.000, df =4). All the children (100%) from single-parent family set up had been fully immunized, about 86 (89.6%) of the participants with full immunization status had family size of 3 (X^2 = 37.309, p value = 0.000, df = 8). A vast majority (84.6%) of the respondents, who were of Yoruba extraction, had been fully immunized. It is also clear from the table that family type with 3 children constituted the majority of those who have been fully immunization (X^2 = 53.279, p value = 0.000, df=8)

Table 2: Socio-economic characteristics of the subjects' parent/caregiver (n =299)

Variable	frequency (f)	percentage (%)
Occupation of parent/caregiver		
Civil servant	44	14.7
Trading	222	74.2
Farming	6	2.0
Others	27	9.1
Highest level of education of the caregiver		
None	28	9.4
Primary	58	19.4
Secondary	107	35.7
Tertiary	89	29.8
Post- tertiary	17	5.7
The child caregiver relationship		
Parents	296	99
Parents-in-law	3	1
Others	0	0
Father's level of education		
None	10	3.3
Primary	21	7.0
Secondary	120	40.2
Tertiary	110	36.8
Post-tertiary	38	12.7
Family income in a month		
Less 25,000	45	15.0
25,000-50,000	159	53.2
51,000-100,000	64	21.4
101,000-200,000	15	5.0
More than 200,000	16	5.4
Birth order of child		
First	92	30.8
Second	63	21.1
Third	76	25.4
Fourth	56	18.7
Fourth and above	12	4.0

*Others included unemployed, housewives, tailoring and knitting

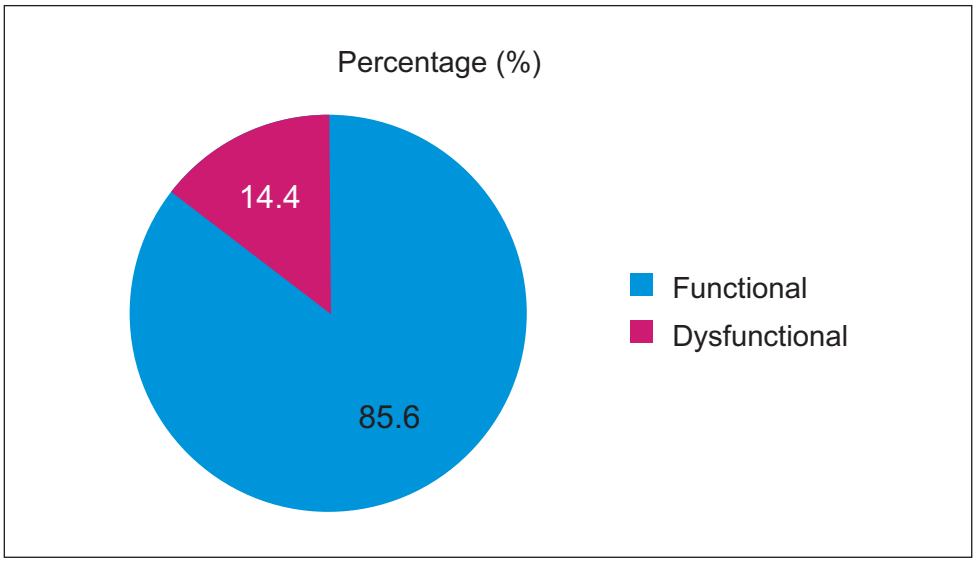

Figure 1: Functionality of the families of the subjects

Table 3: Household structure of the subjects

Variable	frequency (f)	percentage (%)
Family type		
Single parents	19	6.4
Two parents	236	78.9
Extended	44	14.7
Family size		
Two	3	1.0
Three	96	32.2
Four	68	22.7
Five	58	19.4
> Five	74	24.7
Marital status of the caregiver		
Single	27	9.0
Married	264	88.3
Divorced	8	2.7
Separated	0	0
Others	0	0
Ethnic group		
Yoruba	272	91.0
Hausa/Fulani	18	6.0
Igbo	9	3.0
Others	0	0
Family expenses bearer		
Father	271	90.6
Mother	3	1.0
Others	25	8.4
No of children		
1	109	36.5
2	53	17.7
3	66	22.0
4	40	13.4
> 5	31	10.4
Sex of household head		
Male	282	94.3
Female	17	5.7
Total	299	100

Table 4: Knowledge of immunization of the caregivers

Immunization	Heard		Not heard	
	F	%	F	%
	293	98.0	6	2.0
	Yes		No	
Immunization is the protection from some diseases	272	91.0	27	9.0
Immunization is a birth control method	24	8.0	275	92.0
Immunization of treatment for infection	51	17.1	248	82.9

Table 5: Family functionality and Immunization Status

Variable	Immunization Status				Fi	P-Value	df
	None (15) n (%)	Any (36) n (%)	Full (248) n (%)	Total (299) n (%)			
Dysfunctional	15(34.9)	9(20.9)	19(244)	43(100)	101.694	<0.001	2
Functional	0(0)	27(10.5)	229(89.5)	256(100)			

Table 6: Association between family structure and immunization status

Variable	Immunization status				Fi	P-value	Df
	None	Any	Full	Total			
	(15)	(36)	(248)	299			
	N (%)	N (%)	N (%)	N (%)			
Family type							
Single Parent	0(0)	0(0)	19(100)	19(100)			
Nuclear	6(2.5)	33(14)	197(83.5)	236(100)	29.988	**<0.001**	4
Nuclear Extended	9(20.5)	3(6.8)	32(72.7)	44(100)			
Family size							
Two	0(0)	0(0)	3(100)	3(100)			
Three	0(0)	10(10.4)	86(89.6)	96(100)			
Four	0(0)	9(13.2)	59(86.8)	68(100)	54.722	**<0.001**	8
Five	0(0)	4(6.9)	54(93.1)	58(100)			
>five	15(20.3)	13(17.6)	46(62.2)	74(100)			
Marital status							
Single	0(0)	0(0)	27(100)	27(100)			
Married	15(15.7)	36(13.6)	213(80.7)	264(100)	8.152	0.086	4
Divorced/separated	0(0)	0(0)	8(100)	8(100)			
Ethnic group							
Yoruba	9(3.3)	33(12.1)	230(84.6)	272(100)			
Hausa/Fulani	6(33.3)	0(0)	12(66.7)	18(100)	37.309	**<0.001**	4
Igbo	0(0)	3(33.3)	6(66.7)	9(100)			
Family expenses bearer							
Father	15(15.5)	36(13.3)	220(81.2)	271(100)	6.353	0.174	4
Mother	0(0)	0(0)	3(100)	3(100)			
Others	0(0)	0(0)	25(100)	25(100)			
No of children							
1	1(0.9)	13(11.9)	95(87.2)	109(100)	53.279	**<0.001**	8
2	0(0)	9(17)	44(83)	53(100)			
3	0(0)	4(6.1)	62(93.6)	66(100)			
4	6(15)	4(10)	30(75)	40(100)			
≥5							
Sex of household head							
Male	15(5.3)	36(12.8)	231(81.9)	282(100)	3.707	0.157	2
Female	0(0)	0(0)	17(100)	17(100)			

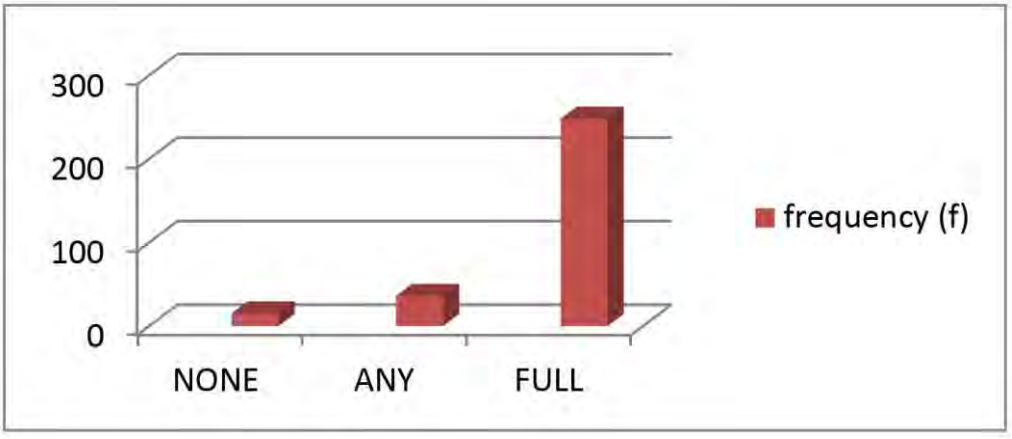

Figure 2: Immunization status/coverage of the subjects

DISCUSSION

Our research showed that a greater percentage (78.9%) of the study participants belonged to two-parent families. This finding is in agreement with previous studies conducted in Chatsworth, South Africa, Asia as well as in the Middle East where presence of both the father and the mother in a nuclear family setting was reported as the predominant household structure, as high as 63.8% (19). Several other studies conducted in some selected countries like Kenya, Nigeria, South Africa, India, Peru, Colombia and Nicaragua have however reported lower percentages, ranging from about 52% to 70% (20). This study also noted that most respondents reported the father as the head of the family, accounting for about 94.3% of cases. Similar finding had earlier been reported by Akinyemi among some selected communities in Africa (21). In this study, the proportion of children that were living in families headed by female ranged from about 5.2% in Burkina Faso to about 49.1% in Namibia. This is not surprising because while there are documented evidences of increasing numbers of mothers, grandparents, and children heading the family (22), in African culture generally, this role is performed mainly by the fathers. That children are now taking up the responsibility of heading the family in some settings in Africa may not be unconnected with the fact that HIV-AIDS is taking its tolls on the family by reducing the lifespan of most parents. The study equally noted that a high proportion of the participants (85.6%) had history suggestive of living in families that are functional. Again, this agrees with the study of Muyibi and others (23) in which about 84.5% of their respondents in Ibadan, Southwest Nigeria, were reported to come from functional families. Further, there are documented evidences of similar findings in Spain, namely 79.35% and 84% by Rodriguez et al and Bellon et al respectively (24, 25). It can be safely concluded therefore that socio-cultural differences and economic disparities that exist between the developed and less developed economies of the world have little or no influence on the family functionality, in fact, reports have it that dysfunctional families have no social, financial or intellectual boundaries (26). The level of family functionality in our study is, however, higher compared to what was reported in Anambra State, Southeast Nigeria (27, 28). The reason may be due to the difference in ethnicity between the people in the Southwest and those in the Southeast of Nigeria, however, further research would be needed to substantiate this. The percentage of infants that were immunized for age in this study was high (82%). This was higher than that of a peri-urban study in Kenya, Pakistan and India which reported coverage of 76.6%,44.8% and 44% respectively (18, 29, 30). It was also more when compared with the National average (23%), as well as 8.3%, 1.6%, 1.5% and 1% from Kastina, Zamfara, Yobe and Jigawa states respectively from Northern Nigeria (16, 31, 32). However, studies from Americas, Europe and Western Pacific reported immunization coverage above 90%. The widespread information and worldwide awareness about immunization including National immunization days, as well as Mop-up programmes might be responsible for the high coverage seen in this study. Moreover, immunization knowledge level among the caregivers was found to be high (98%). Interestingly, similar finding was reported in a study done in Igbo-ora, Oyo state, Southwestern Nigeria where the knowledge level was 99%. However, studies conducted in United Arab Emirates and Saudi Arabia reported lower level of knowledge (85% and 91.9%) respectively when compared to our finding.

This study found that a significant relationship exists between functionality of the children's families and their immunization status. 89.5% of fully immunized children were from functional families while dysfunctional families contributed all non-immunized children ($p<0.05$). Studies by Vandermeulin et al and Adeyinka et al supported this finding when they reported that cooperation between parents as well as Family/cultural support influence full childhood immunization status of chidren.[36,37] The strong relationship seen in this study is not unexpected because functional families usually demonstrates good attitude towards live since all the members strife and cooperate towards the welfare of all family members.[38,39] In fact, Children development, education, health and well-being is greatly influenced by family functioning and parenting practices (40).

This Study revealed that immunization status of the children was significantly influenced by some family structure components. For instance, all (100%) subjects from single parent family were fully immunized for age when compared to children from two-parent and extended families. Similar report was made in a study done in Dschang, Cameroun where children from single parent families were found to have higher coverage of immunization (41). This may

not be surprising because attention of a single parent is not likely to be taken away from his/her child when compared with both parent families.

A similar finding was reported by an Indian study which found that children of non-nuclear families were found to be at greater advantage in terms of immunization (42). However, a study done in a rural area of Oyo State, Southwestern Nigeria is in contrast to our study by reporting that children from monogamous families were two times more likely to complete their doses of immunization when compared to their polygamous counterpart (43).

Moreover, our study revealed strong relationship between family size and immunization status such that all the 3(100%) who had full immunization status came from family size not greater than two. This finding was supported by a study done in Owerri, Nigeria where higher odds of full childhood immunization status was found in mothers whose family size was less than three when compared with those with family size more than six (44). The finding in our study did not come by surprise since families consisting of the caregiver and only one child is likely to concentrate on the health of the child with little distractions.

CONCLUSION

The study was done to find out the association between family functionality and family structure, and immunization status of infants seen at the GOPC of a mission hospital. Our study was able to establish that the coverage of immunization among the respondents was high (82.9%). A high level of immunization knowledge was also found in this study with (98%) of the respondents having adequate knowledge about immunization. Majority (85.6%) were from functional families. Moreover, the association between family functionality and immunization status of the respondent was found to be significant statistically. Also, association between family size, family type and number of children in the family, and children immunization status was statistically significant.

In the light of these findings, Physicians are advised to always dig into the structure and functionality of families of all children within the ages of immunization as this information this will enhance the coverage of immunization.

LIMITATION

The sample population in this study is limited to infants who attended GOPC of Baptist Medical Centre, Saki. It did not reveal information about other children in the community who were not seen in the clinic.

CONFLICT OF INTEREST

The authors have not declared any conflict of interests.

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