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Routine childhood immunization knowledge: Do fathers who accompany their children for immunization differ from those who accompany their children for circumcision?

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Abstract: *Background:* Paternal involvement in child care activities especially immunization is being advocated as their involvement portend better outcomes. Compliance with circumcision another child care activity is much higher than for childhood immunization.

Method: Fathers who accompanied their children for immunization were recruited at the immunization centre while fathers who accompanied their male infants for circumcision were recruited at Accident and Emergency theatre where circumcisions are performed. Demographic information was obtained as well as information on the knowledge of fathers about immunization.

Results: There were 103 fathers accompanying children for immunization and circumcision respectively. Mean age of those who accompanied for immunization 34.47 ± 5.68 years was significantly younger than 36.91 ± 4.54 years for fathers who accompanied for cir-

cumcision $p < 0.0008$. Fathers who accompanied for circumcision were significantly more educated $p < 0.0001$ and were significantly more likely to know the names of the vaccines administered and potential side effects/ complications of vaccines. Fathers who accompanied for immunization were significantly more likely to know the age at commencement and completion of immunization although a significant proportion of both groups were not knowledgeable about these dates.

Conclusion: Majority of fathers were not knowledgeable about immunization. All opportunities for contact with fathers especially when they accompany their children for health care activities should be used to educate them about immunization and its importance.

Keywords: fathers, childhood immunization knowledge, circumcision

Introduction

Childhood immunization is one of the major preventive activities for children and this requires that children be taken to a health facility on several visits during the first year of life and subsequently. It thus, requires that the primary caregiver of the child is knowledgeable about immunization, its benefits and schedule to ensure the optimal uptake of immunization. Mothers have traditionally been the ones to take children for their immunization and many studies thus focus on the knowledge, attitudes and practices of mothers with regard to immunization.¹⁻³

More recently the potential roles of fathers in child care activities have been highlighted and studies have shown that positive father involvement in child care is linked to

positive child development outcomes.^{4,5} Increasingly, men are being urged to participate more in child care activities other than just making decisions and providing funds. This has become more critical with the increasing role of women in the formal work force and the shift from extended family to nuclear family structure^{6,7} With regard to immunization some studies have found that paternal level of education as well as maternal are significant determinants of uptake.⁸ It is presumed that an increased role of men in immunization activities may increase immunization uptake for their children.

Uptake of immunization in many countries and Nigeria in particular is low.^{9,10} Low immunization coverage was worsened by the Covid pandemic.¹¹ An estimated 23 million children globally were un- or under vaccinated (did not receive the first or third dose of DPT containing

vaccine) and more than 60% of these children live in ten countries including Nigeria.^{11,12} In Nigeria, only 31% of children were completely immunized while 19% had not received any immunization (Zero dose).¹⁰ It becomes imperative that additional strategies are designed to improve uptake of vaccines.

While male involvement in immunization¹³ in Nigeria is low an undocumented observation indicates that their involvement in another child care activity – circumcision seems to be more. Male circumcision is regarded as a beneficial medical procedure even though its major appeal is as a cultural or religious norm.¹⁴ In this study we aimed to determine if fathers who accompany their children for immunization and circumcision (male) differ in terms of their knowledge about immunization and other characteristics.

Methodology

This was a questionnaire-based cross-sectional study carried out between 19th July 2018 and 15th November 2019 at the General Practice clinic (immunization section) of the Hospital and at the Casualty theatre of the Accident and Emergency unit of the same hospital where circumcision is carried out every Thursday. The Immunization Clinic attends to about 10,000 clients every year while the Paediatric surgery department performs about 10 circumcisions every week at the Casualty theatre.

Sample size was calculated using the following formula which is utilized for comparing two proportions¹⁵

$$n = \frac{\{u [1 - p_1(1 - p_1)] + v [1 - p_2(1 - p_2)] + v [2 - (1 - p_1)]\}^2}{(p_2 - p_1)^2}$$

Where *n* is the sample size for one group

*p*₁ = proportion of fathers who attend immunization which is 10.9% obtained from a study in Nepal¹⁶ = 0.109

*p*₂ = proportion of fathers who attend circumcision. Since this is not known we assumed 30% so that a difference of about 20% can be detected = 0.3

$$= \frac{-1 + -0}{2} = \frac{0.109 + 0.3}{2} = \frac{0.409}{2} = 0.205$$

u = one sided percentage point of the normal distribution corresponding to 100% - the power which is 1.28. (The power of this study is 90%)

v = percentage point of the normal distribution corresponding to the two-sided significance level of 5% which is 1.96

$$n = \frac{\{1.28 [0.109(1 - 0.109)] + 0.3(1 - 0.3) + 1.96 [2 - 0.205(1 - 0.205)]\}^2}{(0.3 - 0.109)^2} = \frac{3.327}{0.037} = 89.9$$

The sample size for each group was thus 90 (fathers accompanying children for immunization and fathers accompanying children for circumcision) making a total of 180

Consecutive fathers accompanying children attending immunization clinic for their first immunization and fathers of those attending hospital for circumcision were recruited until the sample size for each group was met. The father of each child was interviewed after written informed consent was obtained. Fathers who did not

consent and their infants received standard care as provided by both the immunization clinic and the theatre. Ethical clearance for this study was obtained from the Hospital Ethics and Research Committee.

Data collection

Information on date of birth, age in days, mode of delivery, place of delivery, birth order, attendance at ANC was obtained. A pre-tested validated questionnaire was used to obtain information during the waiting period for circumcision and before the health talk during immunization sessions. Information on father's knowledge about immunization was obtained. The questionnaires were administered by research assistants who were trained by the research team on how to administer the questionnaires.

Each questionnaire was checked for completeness and accuracy of the data at the end of each day. Data from the questionnaires was entered into an SPSS spread sheet (IBM SPSS Statistics 23). The data was cleaned manually. Parametric variables such as age were summarized as means (\pm Standard Deviation). The number of fathers with particular characteristics were presented as simple proportions. Comparison between variables was done using Chi square test and Fishers Exact Test as appropriate. Significance level was set at *p*<0.05 at 95% confidence interval.

Results

A total of 206 fathers were interviewed- 103 accompanied their children for immunization (FAI) while 103 accompanied their children for circumcision (FAC). Table 1 shows the socio demographic characteristics of the fathers studied. The mean age of FAI was 34.47 \pm 5.68 years and this was significantly lower than the 36.91 \pm 4.54 years for FAC *p*=0.0008. There were more fathers in the 20-29 age group in the immunization group compared to those in the circumcision group whereas more of the fathers in the circumcision group were in the age groups 30-39 and 40-49 compared to those in the immunization group. The difference was significant *p*<0.0001

Majority of the fathers, 58(56.3%) of FAI and 85 (82.5%) of FAC had tertiary education but FAI were more likely to have secondary education compared to the circumcision group. (Table 1) This difference was significant *p*<0.0001.

The characteristics of the children is shown in Table 2. The children seen in the immunization clinic had an age range of 1-8days with a mean of 4.35 \pm 2.32 days (median 4.5days) which was significantly lower than the mean age of 23.18 \pm 40.08 days of the children who presented for circumcision (range 5 -304days, median 13 days) Majority 93(45.1%) of the children were the first-born. There was no significant difference in the birth order of the children in the immunization group compared to the circumcision group. *P*= 0.694. Majority

135(65.5%) of the fathers were present at the delivery of the index child. Most of the babies were born in health facilities but majority 89(86.4%) of the circumcision group were born in UBTH. This difference was statistically significant $p < 0.001$. Also, the mode of delivery was significantly different between the two groups with babies in the circumcision group 44(42.7%) being more likely to be born by Caesarean section compared to 12 (11.6%) in the immunization group $p < 0.0001$. Of the 12 male infants brought for immunization who had been circumcised, their fathers were present at the circumcision of 11 (91.7%) of them. Of the 95(95.2%) children brought for circumcision who had been immunized, 58 (56.3%) of their fathers were present at the immunization. Reasons proffered by fathers for not being present at the immunization of their children include work 11 (31.4%), hospital service-related issues 6(17.1%), health and birth related issues for the mother 3(8.6%) and others.

Table 3 shows the knowledge and attitude of fathers with regard to immunization. Almost all fathers 202 (98.1%) opined that every baby should be immunized. Majority 116 (56.3%) of the fathers knew that the first immunization should be given at birth. FAI were significantly more likely not to know the age at which immunization should be commenced. $P < 0.024$. More FAI 32(31.1%) could not name a single vaccine that should be given to children compared to FAC 20(19.4%). FAC 28(28.2%) were more likely to name 3 or 4 vaccines compared to FAI 16(15.5). These differences were statistically significant $p < 0.0001$.

Majority of the fathers 148 (72.3%) in both groups did not know the age at which immunization should be completed but this was significantly more among the cir-

cumcision group 84(81.6%) $p < 0.0031$. Of the FAC, 8 (47.1%) with secondary level of education did not know the age at commencement of immunization compared to 12(11.7%) of those with tertiary education. This difference was statistically significant $p = 0.0058$. Level of education was not significantly associated with knowing age at commencement of immunization among FAI $p = 0.4501$. Also, there was no significant association between knowing the age at completion of immunization and level of education among both groups of fathers.

More of the FAC 43(41.7%) could name two complications of immunization compared to FAI 27(26.2%). The difference was statistically significant $p < 0.0001$.

Figure 1 shows the responses of fathers to questions on the importance of immunization and circumcision. Just over half 107(51.9%) of all the fathers agreed that immunization was more important than circumcision. FAI 63(61.2%) were significantly more likely to agree that immunization was more important than circumcision $p < 0.0022$. Majority of the fathers disagreed that circumcision was more important than immunization but this was significantly more among FAC 89(86.4%) compared to FAI 71(68.9%) $p < 0.0001$. Almost all FAC 100(97.1%) agreed that immunization and circumcision were equally important whereas almost a quarter 24(23.3%) of FAI disagreed. This difference was statistically significant $p < 0.0001$.

Table 1: Sociodemographic characteristics of the fathers studied

Characteristics n (%)	Fathers accompanying children For immunization n (%)	Fathers accompanying children for circumcision n (%)	Total	pvalue
<i>Age group</i>				
20-29	21 (20.4)	2(2.0)	23(11.2)	0.0001
30-39	55 (53.4)	74(71.8)	129(62.6)	
40-49	20 (19.4)	27 (26.2)	47(22.8)	
50+	0(0.0)	1 (0.4)		
Not indicated	6 (5.8)	0 (0.0)	6 (3.0)	
<i>Level of education</i>				
1°	1(1 0 (0)	1(0.4)		0.0001
2°	44 (42.7)	17(16.5)	61(29.8)	
3°	58 (56.3)	85 (82.5)	143(69.8)	

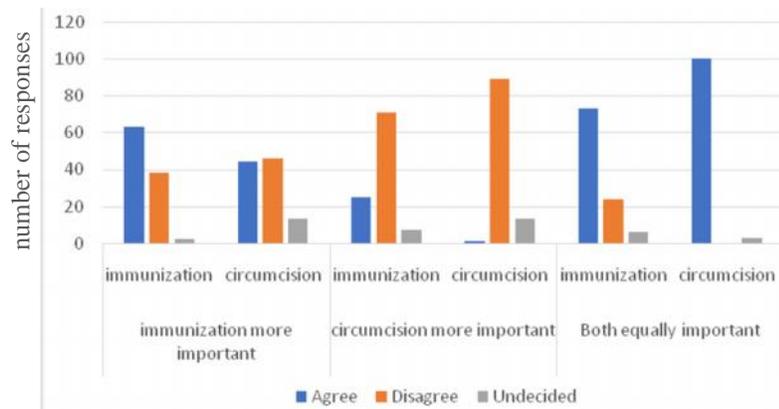
Table 2: Characteristics of the index babies of the fathers studied

Characteristic	Fathers accompanying children For immunization n(%)	Fathers accompanying children for circumcision n (%)	Total n (%)	pvalue
<i>Birth order</i>				
1	48 (46.6)	45(43.7)	93(45.1)	0.78
2	23 (22.3)	27(26.2)	50(24.3)	
3	23 (22.3)	18(17.5)	41(19.9)	
4	7 (6.8)	8(7.7)	15(7.3)	
5	2 (2.0)	4(3.9)	6(2.9)	
Not indicated	0(0.0)	1(1.0)	1(0.5)	
<i>Place of delivery</i>				
UBTH	58 (56.3)	89 (86.4)	147(71.4)	0.0001
Private facility	44 (42.7)	9 (8.7)	53(25.7)	
Govt facility	1 (1.0)	3(2.9)	4 (1.9)	
Not specified	0(0.0)	2 (2.0)	3 (1.5)	
<i>Mode of delivery</i>				
SVD	86(83.5)	57(55.3)	143(69.4)	0.0001
Caeserean section	12(11.6)	44 (42.7)	56(27.2)	
Not specified	5(4.9)	2 (2.0)	7 (3.4)	
<i>Father's presence At ANC</i>				
Yes	72 (69.2)	63(61.2)	135(65.5)	0.2192
No	31 (29.8)	39(37.8)	70(34.0)	
Not specified	0 (0.0)	1 (1.0)	1(0.5)	
<i>Father's presence At delivery</i>				
Yes	92 (89.3)	94 (91.3)	186((90.3)	0.4838
No	11 (10.7)	8(7.8)	19(9.2)	
Not specified	0(0.0)	1(1.0)	1(0.5)	

Table 3: Knowledge and attitude of fathers about immunization

Variable	Fathers accompanying children For immunization n(%)	Fathers accompanying children for circumcision n (%)	Total n (%)	pvalue
<i>Immunization for every child</i>				
Yes	101(98.1)	101(98.1)	202(98.1)	
No	0 (0.0)	0	0(0.0)	
Not specified	2 (1.9)	2	2(1.9)	
<i>Age at commencement</i>				
<i>Birth</i>				
First week	14 (13.6)	30(29.1)	44(21.4)	0.024
Others/don't know	26(25.2)	20(19.4)	46(22.3)	
<i>Age at completion</i>				
Correct	38 (36.9)	19(18.4)	57(27.7)	0.0031
Wrong	65(63.1)	84(81.6)	148(72.3)	
<i>List four vaccines</i>				
0	33 (31.1)	21(19.4)	54(26.2)	0.0001
1	49 (47.6)	24(23.3)	73(35.4)	
2	6 (5.8)	30(29.1)	36(17.5)	
3	11 (10.7)	18(17.5)	29(14.1)	
4	5 (4.8)	11(10.7)	16 (7.8)	
<i>List Complications</i>				
Correct	27 (26.2)	43(41.7)	70(34.0)	0.027
Wrong	77(73.8)	60(58.3)	136(66.0)	

Fig 1: Responses of fathers to questions on importance of immunization and circumcision



Discussion

This study showed that many of the fathers studied did not have adequate knowledge about immunization of children. Up to a quarter of all the fathers did not know the age at which immunization should commence. This proportion is lower than the 80.4% found by Raji et al¹⁷ in northern Nigeria. The difference may be due to the fact that the respondents in this study were more educated and were urban dwellers compared to those in Raji et al¹⁷ study which was among rural dwellers who mostly did not have formal education. More fathers (56.3%) in this study knew that immunization should be commenced at birth than in an Indian study in which only a third of the fathers knew this fact.¹⁸ But this is lower than the 89.3% of fathers in Zamfara state of Nigeria who knew that immunization should be commenced at birth.¹⁹ Not knowing the age at which immunization should commence may result in delay in initiating immunization. Delay in initiating immunization has been reported to be associated with non-completion of the immunization schedule.²⁰ Many fathers (72.3%) also did not know the age at which immunization should be completed. This finding is similar to that by Raji et al¹⁷ in which only 2.5% and 1.4% respectively knew the age at which yellow fever and measles vaccines are given.

These two vaccines are the last vaccines given according to the schedule operational at the time of the study. Knowing the age at commencement and at completion of the immunization schedule is necessary for fathers to monitor that their children commence and complete immunization in a timely fashion. Timeliness of uptake of immunization is an important aspect of immunization.²¹ We also noted that many of the fathers 54(26.2%) could not name a single childhood vaccine. This was very surprising especially among fathers at the immunization clinic as there were visual cues that could have given them clues to correct answers.

Majority (66%) of the fathers could not name two complications of immunization. The poor knowledge of these fathers about immunization means that they can

easily be swayed by any misinformation or disinformation involving potential complications of immunization. Fathers who accompanied their children for immunization were more knowledgeable about commencement and completion dates for immunization than those who accompanied their children for circumcision. This may be because the fathers who accompanied for immunization were at the immunization clinic for their babies first immunization and simply mentioned the age of their babies. This is unlike fathers who accompanied for circumcision whose babies were significantly older and many were not present at the first immunization of their babies. Also due to time lapse since the first immunization others could not remember. The fact that those who accompanied their children for immunization were less informed about other immunization-related information such as names of vaccines and complications despite being in immunization hall where information about immunization were clearly displayed is unusual.

An important difference between the two groups is the fact that majority of the babies for circumcision were born in UBTH. It is possible that immunization education during the antenatal care and immediate post-delivery may be more effective considering that UBTH is a tertiary facility. The involvement of the fathers in the care of the index babies for circumcision may have also been more considering that majority of them were born by caesarean section.

The fathers who accompanied their children for circumcision were significantly older. In a study by Baguma et al²², older age was associated with greater involvement in routine immunization. Similarly, in a study from Nepal older age of men was associated with greater involvement in reproductive health activities (antenatal care and birth preparedness) as well as the child care activities of exclusive breast feeding and immunization.¹⁶ Perhaps older men being more mature and experienced are able to prioritise health care-related activities above other competing needs.

The fathers who accompanied their children for circumcision were also significantly more educated than those who accompanied their children for immunization.

Majority of them had tertiary education. Tertiary level of

education was significantly associated with knowing age at commencement but not age at completion among fathers who accompanied their children for circumcision in this study. Variable association of paternal level of education with involvement in childhood immunization has previously been reported. Sodeinde et al¹³ reported tertiary education to be significantly associated with good paternal involvement with childhood immunization among urban fathers but not among rural fathers. Also in Nepal, uneducated men rather than educated were more likely to be involved in reproductive health activities, exclusive breastfeeding and immunization.¹⁶ Circumcision is an important religious/cultural activity and is performed for more than 85% of boys in Nigeria.¹⁴ This indicates high compliance unlike immunization. In this study, only about half of the men studied considered immunization to be more important than circumcision which may indicate how much premium is placed on immunization. Although, majority 160 (77.7%) of the fathers did not agree that circumcision was more important than immunization but that both were equally important. This latter perception that both procedures are equally important may be leveraged to encourage men to ensure compliance for immunization even as for circumcision.

With the poor knowledge about immunization demonstrated in this study, efforts should be targeted at improving the knowledge, attitude and participation of fathers in child care activities especially immunization. We note that a significant proportion (43.7%) of the fathers in the circumcision group missed out on the first immunization of their babies and the reasons given included work-related issues. This speaks to the need for paternity leave. It also speaks to reproductive health care services being organized to allow maximal participation of fathers as fathers also said they were not allowed into maternity wards because it wasn't visiting time. At the time of the study, the immunization hall could barely accommodate the mothers and babies. This meant that fathers and important others could not optimally participate in the immunization encounter. This may explain the unexpected low knowledge of the fathers that accompanied their children for immunization.

We did not identify any studies on fathers accompanying children for circumcision and as such no comparisons could be made. This study was carried out among fathers who were at least involved in some child care activity. It is possible that they are already more moti-

vated than other fathers. Further study of fathers who participate in child care activities may be needed to identify positive determinants of their involvement in child care that could be harnessed for motivating fathers in general.

This study is limited by the fact that only fathers attending these two child care activities were studied. They may be different from fathers who do not participate in these or other child care activities.

Conclusion

We conclude that fathers who accompany their children for immunization and circumcision have poor knowledge of routine childhood immunization even though majority are convinced of its importance. Such poor knowledge means they will not be able to adequately contribute to ensuring that their babies are adequately immunized and in a timely fashion. We recommend that all opportunities for contact with fathers should be utilized to educate them on Immunization while health services are organized to enable optimum participation of fathers in child care activities.

Authors contribution

AES conceptualized the study, was involved in data collection and analysis, interpreted the data, wrote the initial draft and approved the final draft.

DO contributed to the concept, was involved in data analysis and interpretation and approved the final draft.

EKO contributed to the concept, was involved in data collection and approved the final draft.

SOF contributed to the concept, was involved in data collection and approved the final draft.

VCE contributed to the concept, was involved in data collection and approved the final draft.

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References

1. Tagbo BN, Uleanya ND, Nwokoye IC, Eze JC, Omotowo IB. Mother's knowledge and perception of childhood immunization in Enugu. *Niger J Paed* 2012;39:
2. Giannakou K, Kyprianidou M, Hadjikou A, Fakonti G, Photiou G, Tzira E et al. Knowledge of mothers regarding children's vaccinations in Greece: an online cross-sectional study. *BMC Public Health* 21,2119 (2021). <https://doi.org/10.1186/s12889-021-12179-5>
3. Adedire EB, Ajumobi O, Bolu O, Nguku P, Ajayi O. Maternal knowledge, attitude and perception about childhood routine immunization program in Atakumosa-west local government area, Osun state, southwestern Nigeria. *Pan Afr Med J* 2021;40:8, doi: 10.11604/pamj.supp. 2021.40.1.30876j

4. Sarkadi A, Kristiansson R, Oberklaid F, Bremberg S. Fathers' involvement and children's developmental outcome: systematic review of longitudinal studies. *Acta Paediatrica* 2008;97:153-158
5. McMunn A, Martin P, Kelly Y, Sacker A. Fathers' involvement: Correlates and consequences for child socioemotional behavior in the United Kingdom. *J Fam Issues* 2015 DOI:10.1177/0192513X15622415
6. International Labour Office. Women at work: Trends 2016. International labour office Geneva. ILO 2016
7. Yusuff OS, Ajiboye EO. Social change and traditional gender roles in Lagos State, Nigeria. *African J for the Psychological studies of social issues* 2014;17:58-68
8. Brugha RF, Kevany JP, Swan AV. An investigation of the role of fathers in immunization uptake. *Int J Epidemiol* 1996;25:840-845
9. Bobo FT, Asante A, Woldie M, Dawson A, Hayen A. Child vaccination sub-Saharan Africa; increasing coverage addresses inequalities. *Vaccine* 2022;40:141-50
10. National Population Commission and the DHS program, ICF, Rockville, Maryland, USA. Nigeria Demographic and Health Survey 2018
11. Muhoza P, Danovaro-Holliday C, Diallo MS, Murphy P, Sodha S, Requejo JH, Wallace AS. Routine vaccination coverage – worldwide 2020 *Morb Mort Week Rep* 2021;70:1495-1500
12. United Nations Children's Fund. Immunization July 2021 Available at <https://data.unicef.org/topic/child-health/immunization> Accessed 10th May 2022
13. Sodeinde K, Amoran O, Abiodun O, Adekoya A, Abolurin O, Imhonopi B. A rural/urban comparison of paternal involvement in childhood immunization in Ogun central senatorial district, Nigeria. *Niger Postgrad Med J* 2020;27:336-42
14. Akeem AK, Olapade-Olaopa EO. Circumcision and its effects in Africa. *Translational andrology and urology* 2017;6:149-57
15. Kirkwood BR, Sterne AC. Essential Medical Statistics 2003. Blackwell Science Ltd, publishers.
16. Bhatta DN. Involvement of males in antenatal care, birth preparedness, exclusive breastfeeding and immunization for children in Kathmandu, Nepal. *BMC Pregnancy and Child birth* 2013;13:14 Available at <http://www.biomedcentral.com/1471-2393/13/14>
17. Raji MO, Sani AA, Ibrahim LS, Muhammad H, Oladigbolu RA, Kaoje AM. Assessment of the knowledge of fathers, uptake of routine immunization, and its associated factors in a rural community of North west Nigeria. *Ann Afr Med* 2019;18:97-102
18. Jose SE, Joseph NC, Sheela S, Joshy VM. Knowledge, attitude and practice of fathers about childhood immunization: a tertiary care hospital-based cross sectional study. *Int J Community Medicine Public Health* 2020;7:1932-1935
19. Abubakar A. Association between fathers' knowledge, attitude and practice with routine immunization status of their under five year old children in Gusau, Zamfara state Nigeria. A dissertation submitted to Morgan State University. Available at <https://mdsoar.org/handle> Accessed 13th August 2023
20. Janusz CB, Frye M, Mutua MK, Wagner AL, Banerjee M, Boulton M. Vaccine delay and its association with under-vaccination in children in sub-Saharan Africa. *Am J Prev Med* 2021;60:S53-S64
21. Dejene H, Girma D, Geleta LA, Legesse E. Vaccination timeliness and associated factors among children aged 12-23 months in Debre Libanos district of North Shewa Zone, Oromia regional state, Ethiopia. *Front Pediatr* 2022;10:867846 doi:10.3389/fped.2022.867846
22. Baguma C, Babirye JN, Oryema P, Wasswa P, Atuyambe L. Reasons for the low male involvement in routine child immunization in Holma district, Uganda using the attitude, social influence and self efficacy model. *J Immunization* 2016;1 doi:10.14302/issn.2577-137X.ji-16-1026