

NEWPORT INTERNATIONAL JOURNAL OF RESEARCH IN MEDICAL SCIENCES (NIJRMS) Volume 3 Issue 3 2023

Factors Associated with Timely Immunization of HIV-Exposed Infants Attending HIV/AIDS Clinic at Ishaka Adventist Hospital

Adan Ibrahim Abdirahman

Faculty of Clinical Medicine and Dentistry Kampala International University Western Campus Uganda.

ABSTRACT

The study assessed the factors associated with the timely immunization of HIV-exposed infants attending the HIV/AIDS clinic at Ishaka Adventist Hospital. The specific objectives were to establish the pattern of timely immunization and determine the association between socio-economic and demographic factors and the timely immunization of HIV-exposed infants. A cross-sectional study design was used to determine quantitative measures with questionnaires in which the researcher used the interview method during data collection to facilitate the administration of questionnaires. The study found that the prevalence of timely immunized HIV-exposed infants was 59.8%, also infants below 11 months were more likely to be timely immunized (p-value, 0.038) than those more than 12 months of age. The study also found out that being employed 55/101 at a p-value of 0.028, and nearness to the health facility, <5km and at a p-value of 0.042, (88/101) were significant in children being timely immunized, while maternal education level, (p-value, 0.355) and religion (p-value, 0.185) were insignificant in determining whether an HIV infant gets timely immunized or not. In conclusion, the timely immunization prevalence is still below the 85% recommendation by WHO. Therefore, the following are recommendations: government should do more sensitization regarding the immunization of HIV-exposed infants, more so health workers should do community outreaches to provide services closer to those unable to attain services from the health facility. More so, HIV mothers attending ANC should be health educated about the importance of timely immunization for their unborn babies.

Keywords: Immunization, HIV/AIDS, Infants, Health workers, Mothers.

INTRODUCTION

HIV is increasingly affecting the health and welfare of children and undermining hard-won gains in child survival in some of the highly affected countries. Recent estimates from UNAIDS suggest that, globally, about 2 million children younger than 15 years of age have HIV, 90% of whom live in sub-Saharan Africa [1, 2]. Sub-Saharan Africa (SSA) has the highest prevalence of HIV-infected children globally [3-5]. A study by Kharsany and Karim [6] confirmed this as more than 70% of HIV-infected children lie in Sub-Saharan Africa. The study further attributed some of the reasons for this too high number of new HIV infections due to mother-to-child transmission during birth, low knowledge of the care of HIV-exposed children, and limited access to EMTCT services [6]. Immunization is an effective public health intervention to reduce morbidity and mortality among HIV-infected infants [7-9]. It is an important means of controlling diseases and has been considered the most cost-effective health intervention [10]. Immunization has brought sound health to many HIV-infected children in the world, reduced the agony experienced by parents during child-rearing, and reduced the mortality rate among children [11, 12]. The Expanded Program

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

on Immunizations (EPI) of the World Health Organization (WHO), in collaboration with UNICEF, recommends a narrow and accelerated immunization schedule for HIV-infected children [13]. Childhood vaccination prevents 2 million deaths per year worldwide and is widely considered to be 'overwhelmingly good' by the scientific community [14]. However, 2.5 million deaths a year continue to be caused by vaccine-preventable diseases, mainly in Africa and Asia among children less than 5 years old, more so for HIV-exposed children. Vaccination coverage has now reached a plateau in many developing countries, and even where good coverage has been attained; reaching children not yet vaccinated has proved difficult. Thus, there is an urgent need to find ways to increase vaccination coverage and particularly to encourage parents to have their children vaccinated on time [15]. A study conducted in Rakai District, Uganda found that Immunization coverage in the overall sample was 26.1%. For all vaccines, children born to HIV-infected mothers had lower Immunization coverage than children born to HIV-negative mothers (21.3 vs. 27.7%). There was a statistically significant interaction between maternal HIV infection and maternal knowledge of HIV infection ($p = 0.034$). The children of mothers who were HIV-infected and knew their serostatus had more than two-fold odds of immunization compared to children of mothers who were unaware [16]. A report released by the advisory committee on vaccines and immunization of the Uganda National Academy of Science showed that with 52 percent national immunization coverage, Uganda has the lowest number of fully immunized children in East Africa against the 90 percent target of the global immunization vision and strategy. This makes Uganda the country with the highest infant mortality rate in the region [17].

The current immunization coverage for HIV-exposed children in Africa is 67%, the acceptable minimum coverage of 80% is yet to be reached. According to WHO [18], some of the major contributing factors to poor immunization coverage for HIV-exposed children were parental HIV-associated stigma and poor sensitization of parents prior to delivery. Immunization is an easy way to reduce vaccine-preventable childhood diseases. HIV-exposed children are at increased need for immunization against vaccine-preventable diseases (VPD) for they are more likely to acquire preventable disease due to their compromised immunity. To ensure an effective immune response to vaccines by HIV-exposed children and vaccine safety, early immunization of these children is mandatory. In Uganda, despite the efforts made by the Ministry of Health to end the surge of HIV transmission to children there still exists a gap in vertical transmission from mother to child [19-21]. Live attenuated vaccines like BCG and Yellow Fever Vaccines should not be given to symptomatic HIV-infected children [22]. This calls for timely immunization of these children to prevent immunization failure and complications resulting from the activation of live attenuated vaccines. Many children born to HIV-positive mothers are not fully immunized by the age of 12 months, [23]. Ideally, childhood immunization coverage should be more than 80% of the target population in order to bring the desired objectives. Uganda stands at 52% national immunization coverage [17]. This means a high mortality rate for children, especially for HIV-exposed children. This research is intended to establish the factors associated with the timely immunization of HIV-exposed infants attending the HIV/AIDS clinic at Ishaka Adventist Hospital and eventually find out why it is difficult to meet the recommended timely immunization schedules for these children.

METHODOLOGY

Area of Study

The study was carried out in Ishaka Adventist Hospital. The hospital was built in Igara County (West) in 1948 and opened in 1950. It is a missionary hospital (Seventh Day Adventist). Currently, it is a teaching hospital for both nurses (enrolled comprehensive nurses) and laboratory assistants. It serves as a catchment area for counties surrounding it in Bushenyi District that is Igara, Sheema, Ruhinda, Buhweju, and Bunyaruguru counties. The hospital has three wards with approximately 120 beds plus floor cases. There is a maternity ward, a female ward divided into medical/general and surgical wards. There is one major theatre. The hospital provides several other services among them are an outpatient department (OPD), laboratory services, counseling and guidance services for HIV, family planning, antenatal and postnatal clinic, immunization, and an AIDS clinic in collaboration with JCRC (Joint Clinic Research Center). The area has a wet and dry climate (seasons) there are two wet seasons running from February to June and from July to November, the population here is composed of different tribes but the most common is Banyankole by tribe. The most economic activities done here are small-scale retail shops, small-scale mini supermarkets small-scale marketing, and small-scale farming.

Study Design

A cross-sectional study design was used to determine quantitative measures with questionnaires. The researcher used the interview method during data collection to facilitate the administration of questionnaires. This design was preferred because it allows rapid data collection which saved time.

Study Population

The target population consisted of all children born to HIV-positive mothers between 1 to 12 months of age attending the HIV/AIDS clinic at Ishaka Adventist Hospital. This age group was targeted because WHO

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

recommends a timely and accelerated immunization schedule for HIV-exposed children which means an HIV-exposed child was expected to have received all the recommended vaccines on time by 12 months of age.

Sample procedure

The sample size for this study was derived from the total population of HIV-exposed children between 1 to 12 months of age attending HIV/AIDS clinic at Ishaka Adventist Hospital which stands at 300. To determine the sample size, Small Sample Techniques by Krejcie were used. From Table 1 of the Small Sample Technique, the sample size for a population of 300 is 169. Therefore, the sample size for this study is 169. The respondents were enrolled in a consecutive pattern as they come to the clinic until the sample size is complete.

Inclusion criteria

All children born to HIV-positive mothers between 1 to 12 months of age who are attending the HIV/AIDS clinic at Ishaka Adventist Hospital were eligible for the study.

Exclusion criteria

The children who met the inclusion criteria but were not accompanied by their primary caregiver and those accompanied by a minor.

Dependent variable

The pattern of timely immunization of HIV-exposed children between 1 to 12 months of age.

Independent variable

Socio-economic and demographic factors are associated with the timely immunization of the HIV-exposed child.

Data collection

This study used questionnaires as the main tool for collecting data. The selection of this tool had been guided by the nature of the data to be collected, the time available as well as the objectives of the study. The researcher intended to use close-ended questionnaires for the respondents to avoid unnecessary information being collected. The researcher helped facilitate the administration of questionnaires. This helped in collecting data over a short period of time.

Data collection procedure

The researcher went with the questionnaires and two research assistants. The researcher liaised with the clinicians at the HIV/AIDS clinic to sort out the participants eligible for the study. The participant was given a clear explanation of the study and requested to consent. After consenting, the participant was taken to a private place for an interview. The interview was place after the patients have received their services at the clinic. The files of the respondents who have already participated in the study will be labeled "Done" to avoid re-enrolling them again. The participants were let go after the interview to avoid interviewing a participant more than once.

Data analysis and presentation

Data was entered and analyzed using SPSS version 16.0. The data from the questionnaires were coded for easy entry and analysis. A data entry form was created in the Variable View, while the data entry was done on the Data View of SPSS. The frequency and percentage of the variables will be produced. For instance, the pattern of timely immunization was timely immunized, not timely immunized, and non-immunized in their respective percentages. Cross tabs were used to test whether there is an association between the pattern of timely immunization and socio-economic and demographic factors. To test whether the association between the independent variables and the timeliness of immunization is statistically significant chi-square test was used. Significant tests such as chi-square $P \leq 0.05$ was also used. Explanatory notes were added to the data presented to simplify the presentation of the results.

Ethical considerations

With regard to ethical issues, informed consent to participate in research was obtained from caregivers of the selected children. The researcher ensured that the participants receive adequate and appropriate information to make an informed decision. The researcher provided the respondents with information on the purpose of the study, the expected duration of the interview, and any risks and benefits. The privacy and confidentiality of the study participants will be protected. The names of the participants were recorded for privacy reasons. The study participation was voluntarism and the participants could withdraw at any time and were not subjected to any punishment. The participants were interviewed after they have received their services from the clinic to avoid delaying them. An approval letter from Kampala International University Research and ethics committee (KIUREC) for permission to carry out the research project was obtained. The letter was presented to the medical superintendent of Ishaka Adventist Hospital to seek permission from him/her to carry out the research.

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

RESULT

Social demographic characteristics of attendants

Table 1: shows the social demographic characteristics of caregivers, N=169

Variable	Frequency	Percentage
Age (years)		
18 - 29	32	18.9
30 - 39	85	50.3
40 years and above	52	30.8
Sex		
Females	147	87.0
Males	22	13.0
Education		
No formal education	20	11.8
Primary education	97	57.4
Post-primary education	52	30.8
Religion		
Christian	121	71.6
Muslim	48	28.4
Marital status		
Married	144	85.2
Single	25	14.8

From the table above regarding the social demographic characteristics of the participants, 32(18.9%) were between 18 to 29 years of age, the majority 85(50.3%) were between 30 to 39 years, and at least 52(30.8%) were forty years and above. Regarding gender, the majority of participants 147(87.0%) were females while 22(13.0%) were males.

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

More so, regarding educational level, the majority 97(57.4%) had obtained at least a primary level of education, 20(11.8%) had obtained no formal schooling while 52(30.8%) had obtained at least a secondary level of education. As far as religion was concerned, the majority of the participants 121(71.6%) were Christians while 48(28.4) were Muslims, and concerning marital status, 144(85.2%) were married while 25(14.8%) were single.

Table 2: showing age and place of delivery for the children under study. N=169

Variable	Frequency	Percentage
Age (months)		
0-11	96	56.8
12-59	73	43.2
The place from where the baby was delivered		
Health facility	115	68.0
Home	47	27.8
Traditional birth attendant	07	4.2

From Table 2 above, the majority of the children involved in the study 96(56.8%) were between 0 to 11 months of age, while 73(43.2%) of the children were between 12 to 59 months of age. Regarding the place where the child was delivered from, the majority of children 115(68.0%) were born in hospitals, 47(27.8%) were born at home, while at least 7(4.2%) of the children were born with the assistance of traditional birth attendants.

Child's immunization status as per age.

Table 3; shows immunization status as per the age of the child

Variable	Frequency	Percentage
Fully immunized	101	59.8
Partially immunized	65	38.5
Not immunized	03	1.7

From Table 3, regarding the timely immunization of HIV exposure, the majority of the children 101(59.8) were timely immunized, 65(38.8%) of the children were partially immunized as per the WHO immunization schedule compared to age, while at least 3(1.7%) of the children were not yet immunized.

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

Association between child demographics and timely immunization status

Table 4, shows an association between child demographics and immunization status

Variable	Timely immunized; n=101		Untimely immunized; n=68		p-value
	Frequency	Percentage	Frequency	Percentage	
Age					
0-11 months	63	62.4	23	33.8	0.038
12-59 months	38	37.6	45	66.2	
Place of delivery					
Health facility	73	72.3	58	85.3	0.974
Not health facility	28	27.3	10	14.7	

From Table 4 above, regarding the association between immunization status of HIV-exposed infants with age, having an age below 12 months was significant to be timely immunized in HIV-exposed infants while having an age of above 11 months was a predisposing factor to being untimely immunized at p-value 0.038, this was correlative to majority 63(62.4%) of children who were immunized and were below 12 months and yet the majority of those who had had untimely immunization 45(66.2%) were above 11 months. From the same study, a place of delivery was not significant as to whether an HIV-exposed infant would be timely immunized or not at a p-value of 0.974 this was reflected in the majority of those timely immunized being born from hospitals, yet even in those with untimely immunization the majority were born from health facilities.

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

Association between social demographic factors and timely immunization.

Table 5, shows an association between social demographic characteristics and timely immunization.

Variable	Timely immunized, n=101		Untimely immunized		p-value
	Frequency	Percentage	Frequency	Percentage	
Education level					
Primary	70	69.3	47	69.1	0.355
Post-primary	31	30.7	21	30.9	
Occupation					
Unemployed	46	45.5	40	58.8	0.028
Employed	55	54.5	28	42.1	
Religion					
Christian	70	69.3	51	75.0	0.185
Muslim	31	30.7	17	25.0	
Distance from health facility					
Less than 5km	88	87.1	31	45.6	0.042
5km or more	13	12.9	37	54.4	

Regarding the association between social demographics and immunization schedule, maternal education was not significant (p-value=0.355) to whether the child is timely immunized or not, this was seen in the majority 70(69.3%) of the timely immunized infants being of mothers of primary education as well majority 47(69.1%) of those untimely immunized being of primary level of education. From the study also, children of mothers who were employed were more likely to be timely immunized at 55(54.5%); p-value 0.028 than those of unemployed mothers at 46(45.5%). This was also seen with the majority of the children of unemployed mothers being untimely immunized at 40(58.8%). More so, regarding religion, the majority of the children who were timely immunized were from Christian mothers at 70(69.3%) and so were those who were untimely immunized at 51(75.0%); the least of those who were timely immunized Muslims at 31(30.7%) and so were those who were untimely immunized at 17(25.0%), this shows that religion was not a significant factor at (p-value 0.185) as to whether a child is timely immunized or not From Table 4, it was found out that being nearer to a health facility with immunization services in less than 5 km distance was a significant factor in having a child timely immunized, this was observed with the majority of the children who

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

were timely immunized 88(87.1%) coming within a 5 km radius distance into the nearest health facility while those who were untimely immunized majority 37(54.4) coming from a distance above 5km, this shows nearness to a health facility (less than 5 km), was a protective factor (p-value=0.042) for the HIV infant to be timely immunized.

DISCUSSION

Social demographic characteristics of attendants.

From the study regarding the social demographic characteristics of the participants, 32(18.9%) were between 18 to 29 years of age, the majority 85(50.3%) were between 30 to 39 years, and at least 52(30.8%) were forty years and above, more so the majority of participants 147(87.0%) were females while 22(13.0%) were males, additionally 97(57.4%) had obtained at least a primary level of education, 20(11.8%) had obtained no formal schooling while 52(30.8%) had obtained at least a secondary level of education, education usually affects one's perception towards immunization and affects one's immunization seeking behavior, a review from other studies by Joseph et al, 2014 had also shown that parents of low level of education were less likely to be up-to-date with newer vaccines and hence their children were less likely to be vaccinated with these vaccines. As far as religion was concerned, the majority of the participants 121(71.6%) were Christians while 48(28.4) were Muslims, and concerning marital status, 144(85.2%) were married while 25(14.8%) were single, also the majority of the children involved in study 96(56.8%) were between 0 to 11 months of age, while 73(43.2%) of the children were between 12 to 59 months of age, children's age has a correlative impact on immunization because a schedule has to be followed for a particular age. In comparison with other studies, by Sensarma *et al.* [23] carried out in India found that more than one-fourth of children of HIV-infected mothers living in Kolkata city are not completely immunized by 12 months of age. Regarding the place where the child was delivered from, the majority of children 115(68.0%) were born in hospitals, 47(27.8%) were born from home, while at least 7(4.2%) of the children were born with the assistance of traditional birth attendants. The place of delivery enables the mother to be healthily educated about the immunization schedule requirements. A comparison with a study by Basel *et al.* [24] conducted in Nepal among HIV-exposed infants showed that children of lower socio-economic status were more likely to have late vaccination and higher dropout rates.

Child's immunization status as per age.

From the study, regarding the timely immunization of HIV exposure, the majority of the children 101(59.8) were timely immunized, 65(38.8%) of the children were partially immunized as per WHO immunization schedule compared to age, while at least 3(1.7%) of the children were not yet immunized. This study shows the majority of the children had been immunized although the percentage falls short of WHO [18] immunity coverage. When this study was compared with other studies, a report by UNAS in 2013 cited that childhood immunization coverage should be more than 80% of the target population in order to bring the desired objectives [17]. Uganda stands at 52% national immunization coverage, which means a high mortality rate for children, especially for HIV-exposed children.

Association between child demographics and timely immunization status

Regarding the association between immunization status of HIV-exposed infants with age, having an age below 12 months was significant to be timely immunized in HIV-exposed infants while having an age of above 11 months was a predisposing factor to being untimely immunized at a p-value 0.038. This was correlative to the majority 63(62.4%) of children who were immunized and were below 12 months and yet the majority of those who had had untimely immunization 45(66.2%) were above 11 months. This could be because by 11 months most of the mothers are accustomed to the various dates of immunization since they are close to each other than those after 11 months of age. A comparison with other studies shows a correlation between this study and a study by Sensarma *et al.* [23] who found out that more than one-fourth of children of HIV-infected mothers living in Kolkata city are not completely immunized by 12 months of age. From the same study, a place of delivery was not significant as to whether an HIV-exposed infant would be timely immunized or not at a p-value of 0.974. This was reflected in the majority, 73(72.3%) of those timely immunized being born from hospitals, yet even in those with untimely immunization the majority 58(85.3%) were born from health facilities. This study shows that the majority of the HIV-exposed children 73(72.3%) were timely immunized but it still didn't reach the WHO baseline requirement of 85%. According to a study by Sarsarma [23], deteriorating socioeconomic status, tightening of the time schedule of caregivers due to illness in the family, stigma, discrimination, and lack of awareness about immunization prove to be major barriers to immunization of HIV-exposed children.

Association between social demographic factors and timely immunization

Regarding the association between social demographics and immunization schedule, maternal education was not significant (p-value=0.355) to whether the child is timely immunized or not. This was seen in the majority 70(69.3%) of the timely immunized infants being of mothers of primary education as well majority 47(69.1%) of the untimely

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

immunized being of primary level education. Education provides people with vast information regarding immunization. Another study by Hu *et al.* [25] in 2013 in China showed that increasing the education level of the parents, especially mothers can improve untimely immunization coverage among HIV-exposed children. From the study also, children of mothers who were employed were more likely to be timely immunized at 55(54.5%); p-value 0.028 than those of unemployed mothers at 46(45.5%). This was also seen with the majority of the children of unemployed mothers being untimely immunized at 40(58.8%), this could be because employed mothers have the income to cater for any costs involved in immunization requirements. When this study was compared with other studies, the mother's occupation and that of her partner are important in the attainment of timely childhood immunization. A study by Bbaale [26] in 2013, showed that children whose parents held white-collar jobs were more advantaged to have timely immunization as compared to those in agriculture, blue-collar jobs, and services/sales. A study by Streefland [27] showed that untimely immunization was common among poor populations and in peripheral areas mainly due to the inability to afford transportation to bring the child to immunization clinics. More so, regarding religion, the majority of the children who were timely immunized were from Christian mothers at 70(69.3%) and so were those who were untimely immunized at 51(75.0%); the least of those who were timely immunized were Muslims at 31(30.7%) and so were those who were untimely immunized at 17(25.0%) This shows that religion was not a significant factor at (p-value 0.185) as to whether a child is timely immunized or not, the majority being Christians could be because the community is more dominated by Christians and not because of immunization significance. When this study is compared with other studies, this study result is different from a WHO report from a polio-endemic region in Kenya which stated that only a total of 16% of children were adequately vaccinated in that region; the main reason being that the community was predominantly of Muslim background who believed that polio drops were used as a tool for causing sterility in the children and had been shunned by community leaders leading to a substantial rise in polio cases in that area. From the study, it was found out that being nearer to a health facility with immunization services in less than 5 km distance was a significant factor in having a child timely immunized, this was observed with the majority of the children who were timely immunized 88(87.1%) coming within a 5 km radius distance into the nearest health facility while those who were untimely immunized majority 37(54.4) coming from a distance above 5km, this shows nearness to a health facility (less than 5 km), was a protective factor (p-value=0.042) for the HIV infant to be timely immunized, this could be being nearer the health facility involves fewer costs for one to take a child for immunization. When this study was compared with other studies, it shows a correlation with a study by Breiman *et al.* [28] in 2014 in which they showed that distance of vaccination from health centers also affects vaccination uptake, especially, in the context of developing countries. One study conducted in Bangladesh on HIV-exposed infants showed that the proximity of the health center to the residence was directly proportional to the timely vaccination coverage [28].

CONCLUSION

The study concludes that the prevalence of timely immunized HIV-exposed infants was 59.8% which is below the 85% recommendation by WHO. The study concludes that infants below 11 months were more likely to be timely immunized (p-value, 0.038) than those more than 12 months of age. The study also concludes that being employed 55/101 at a p-value of 0.028, and nearness to the health facility, <5km and at a p-value of 0.042, (88/101) were significant in children being timely immunized, while maternal education level, (p-value, 0.355) and religion (p-value, 0.185) were insignificant in determining whether an HIV infant gets timely immunized or not.

RECOMMENDATIONS

The government should do more sensitization regarding the immunization of HIV-exposed infants. The health workers should do community outreaches to provide services closer to those unable to attain services from the health facility. HIV-positive mothers attending ANC should be health educated about the importance of timely immunization for their unborn babies.

REFERENCES

1. UNAIDS. Global Report. Report on the Global Aids Epidemic, 2010.
2. Alum, E. U., Obeagu, E. I., Ugwu, O. P.C., Aja, P. M. and Okon, M. B. HIV Infection and Cardiovascular diseases: The obnoxious Duos. *Newport International Journal of Research in Medical Sciences (NIJRMS)*, 2023; 3(2): 95-99.
3. Tram, K. H., Mwangwa, F., Chamie, G., Atukunda, M., Owaraganise, A., Ayieko, J., ... & SEARCH collaboration. Predictors of isoniazid preventive therapy completion among HIV-infected patients receiving differentiated and non-differentiated HIV care in rural Uganda. *AIDS care*, 2020; 32(1): 119-127.
4. Obeagu, E.I., Alum, E.U. and Obeagu, G.U. Factors Associated with Prevalence of HIV Among Youths: A Review of Africa Perspective. *Madonna University Journal of Medicine and Health Sciences*. 2023; 3(1): 13-18.

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

5. Alum, E. U., Aja, Ugwu, O. P.C., Obeagu, E. I. and Okon, M. B. Curtailing HIV/AIDS Spread: Impact of Religious Leaders. *Newport International Journal of Research in Medical Sciences (NIJRMS)*. 2023; 3(2): 28-31.
6. Kharsany AB, Karim QA. HIV Infection and AIDS in Sub-Saharan Africa: Current Status, Challenges and Opportunities. *Open AIDS J*. 2016; 10:34-48.
7. Izuchukwu, I. F., Ozims, S. J., Agu, G. C., Obeagu, E. I., Onu, I., Amah, H., ... & Arunsi, M. O. Knowledge of preventive measures and management of HIV/AIDS victims among parents in Umuna Orlu community of Imo state Nigeria. *Int. J. Adv. Res. Biol. Sci*, 2016; 3(10): 55-65.
8. Koku, E. F., Rajab-Gyagenda, W. M., Korto, M. D., Morrison, S. D., Beyene, Y., Mbajah, J., & Ashton, C. HIV/AIDS among African immigrants in the US: the need for disaggregating HIV surveillance data by country of birth. *Journal of health care for the poor and underserved*, 2016; 27(3): 1316-1329.
9. Omo-Emmanuel, U. K., Ochei, K. C., Osuala, E. O., Obeagu, E. I., & Onwuasoanya, U. F. Impact of prevention of mother to child transmission (PMTCT) of HIV on positivity rate in Kafanchan, Nigeria. *Int. J. Curr. Res. Med. Sci*, 2017; 3(2): 28-34.
10. CDC. Basic and Common Questions: The Importance of Childhood Immunization. Atlanta: CDC, 2015.
11. Ibebuikwe, J. E., Nwokike, G. I., Kor, R., Nwagu, S. A., Agu, G. C., Ezenwuba, C. O., ... & Nwanjo, H. U. Factors that influence health care givers' 2016 effective implementation of infant immunization in Calabar Cross River state, Nigeria. *Int. J. Curr. Res. Biol. Med*, 2017; 2(7): 38-44.
12. Obeagu, E. I., Babar, Q., Vincent, C. C. N., & Anyanwu, C. O. INFANTS IMMUNIZATION: CHALLENGES OF OTHER VACCINES DUE TO COVID-19 PANDEMIC. *Journal of Bioinnovation*, 2021; 10(4): 1056-1066.
13. CDC. Health information for international travel, 2008
14. Akandinda, M., Obeagu, E. I., Madekwe, C. C., & Nakyeyune, S. A REVIEW ON FACTORS ASSOCIATED WITH HPV VACCINATION IN AFRICA. *Madonna University Journal of Medicine and Health Sciences*. 2022; 2(3): 1-5.
15. WHO & UNICEF. Scale up of HIV-related prevention, diagnosis, care and treatment for infants and children: A programming framework. WHO Press 2008.
16. Mast TC, Kigozi G, Wabwire-Mangen F, et al. Immunisation coverage among children born to HIV-infected women in Rakai district, Uganda: Effect of voluntary testing and counselling (VCT). *AIDS Care*. 2006;18(7):755-763.
17. UNAS. Uganda childhood immunization status in East Africa: A report by the advisory committee on vaccines and immunization of UNAS. Sunday Nation; issue January 2013.
18. WHO. Worldwide Immunization Report, 2012. Available at www.who.int/about/en.
19. Rubaihayo J, Akib S, Mughusu E, Abaasa A. High HIV prevalence and associated factors in a remote community in the Rwenzori region of Western Uganda. *Infect Dis Rep*. 2010;2(2): e13.
20. Ssemmondo, E., Mwangwa, F., Kironde, J. L., Kwarisii, D., Clark, T. D., Marquez, C., ... & Chamie, G. Implementation and Operational Research: Population-Based Active Tuberculosis Case Finding During Large-Scale Mobile HIV Testing Campaigns in Rural Uganda. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 2016; 73(3): e46-e50.
21. Ezeonwumelu, J. O. C., Ntale, M., Ogonnia, S. O., Agwu, E., Tanayen, J. K., Kasozi, K. I., ... & Byarugaba, F. In vitro Antibacterial Efficacy of Bidens pilosa, Ageratum conyzoides and Ocimum suave Extracts against HIV/AIDS Patients' Oral Bacteria in South-Western Uganda. *Pharmacology & Pharmacy*, 2017; 8(9): 306-323.
22. WHO. Revised BCG vaccination guidelines for infants at risk for HIV infection. *Wkly. Epidemiol. Rec*. 2013.
23. Sensarma P, Bhandari S, Kutty VR. Immunisation status and its predictors among children of HIV-infected people in Kolkata. *Health Soc Care Community*. 2012;20(6):645-52.
24. Basel, Singh, P. & Yadav, R. Immunization Status of Children in Bimaru States, Nepal. *Nepal Journal of Pediatrics*, 2017; 68:495-500.
25. Hu, Vaahtera, M., Kulmala, T., Maleta, K., Cullinan. T., Salin, M.L. & Ashorn, P. Childhood Immunization in Rural China: Time of Administration and Predictors of Non-compliance. *Annals of Tropical Paediatrics: International Child Health*. 2013; 20 (4): 305-312.
26. Bbaale E. Factors influencing childhood immunization in Uganda. *J Health Popul Nutr*. 2013;31(1):118-29.
27. Streefland Rafiqul, I., Mahfuzar, R. & Mosfequr, R. Immunization turns up Among Slum Children: A Case Study of Rajshahi City Corporation. *The Middle East Journal of Family Medicine*, 2013; 5 (6).
28. Breiman, Müller I, Smith T, Mellor S, Rare L, Genton B. The effect of distance from home on attendance at a small rural health centre in Bangladesh. *Int J Epidemiol.*, 2014, 27:878-84.

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

Adan Ibrahim Abdirahman (2023). Factors Associated with Timely Immunization of HIV-Exposed Infants Attending HIV/AIDS Clinic at Ishaka Adventist Hospital. NEWPORT INTERNATIONAL JOURNAL OF RESEARCH IN MEDICAL SCIENCES (NIJRMS) 3(3):7-17.

Adan

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited