ISSN: 2536-7153 SJMLS

Sokoto Journal of Medical Laboratory Science 2024; 9(1): 40 - 47

SJMLS - 9(1) - 004

Vaccine Hesitancy Among Sub-Sahara African Population: A Narrative Review and Empirical Case of South-South Nigeria

Onoriasakpobare Felix O.[1,2], Igere Bright E.[1,2*], Chukuka Vivian I.[1,2], Onianwah Ifeanyichukwu F.[1,2]
Microbiology Unit, Department of Biological Sciences, Dennis Osadebay University, Anwai, Asaba, Delta State, Nigeria [1], Biotechnology and Emerging Environmental Infections Pathogens Research Group (BEEIPREG), Microbiology Unit, Department of Biological Sciences, Dennis Osadebay University, Asaba, Delta State, Nigeria [2].
Author for Correspondence: ibe22002@yahoo.com/felixonoriasakpobare@gmail.com. DOI: 10.4314/sokjmls.v9i1.4

Abstract

Vaccine hesitancy, a state of general rejection by individuals or refusal to be immunize, despite availability and clinically affirmed safety of vaccines has been associated with vaccine-preventable outbreaks and have hampered disease control and eradication programs such as polio eradication program in Nigeria. Such refusal of bio-control agents is not new as it has existed since the application of diverse vaccines (smallpox vaccine) and have notably increased in recent years. This study determined the level of vaccine hesitancy among Sub-Saharan population with emphasis on South-South region of Nigeria. The cross-sectional study employed a non-probability sampling method using questionnaire as the instrument for assessment of volunteers/informed consent participants (students in tertiary institutions, civil servants: teachers, traders and local farmers) across the states. The questionnaire was designed to reveal demographic information and information relating to the usage of 18 vaccines administered from childbirth to adulthood, while different communication tools were applied to ascertain clarity of questions, ease of form completion and language understanding for non-educated participants. It was observed that amongst the 800 respondents document received, 378 were observed to be eligible for analysis amongst which 272 (72%) were females and 106 (28%) were males. Amongst these, 250 (66%) were married and 128 (44%) were single. Also, 30 (8%) were uneducated, 37 (10%) had secondary education and 311 (82%) had tertiary education. Also, 33 (8.7%) were living in rural areas while 345 (91.3%) were living in urban areas. A total of 107 (28.3%) eligible participants' responses demonstrated vaccine hesitancy despite high rate of vaccine availability (82.7%) and accessibility (90%) within the region. This is worrisome as it poses great risk for vaccine-preventable diseases outbreaks as well as viral infectious agents' outbreaks. It is noteworthy to state that the effectiveness of vaccines is plausible only when it is acceptable and applicable. This was the reason why the World Health Organization (WHO) has identified vaccine hesitancy as one amongst 10 global health threats. The need for continuous awareness scheme on vaccine usage and usefulness (relevance) remains a germane strategy for vaccination and global health wellness.

Keywords: Vaccine, Vaccine Hesitancy, Vaccination. Preventable disease

Introduction

Vaccination is considered to be one of the greatest achievements of public health and wellness. Its programmes have contributed to the decline in mortality and morbidity of various viral- based infectious diseases and are credited with the elimination of poliomyelitis in the Americas and the worldwide eradication of smallpox (CDC, 1999). To achieve success in the reduction of viral disease prevalence/incidence on vaccine preventable diseases (VPD), vaccination programs must rely on high uptake level. In addition to protection for vaccinated individuals, high vaccination coverage rates induce indirect protection for the overall community, or herd immunity, by slowing transmission of VPD, thereby decreasing the risk of infection among those who remain susceptible in the community (Fine *et al.*, 2011). However, in

recent times, there had been the occurrence of the vaccine hesitancy phenomenon in major health related systems.

The term vaccine hesitancy generally refers to the refusal of individuals to be immunize despite the availability and safety of vaccines (Current Opinion in Virology, 2020). It has been associated with diverse vaccine-preventable outbreaks and have hampered disease control and eradication programs such as polio eradication program (MacDonald, 2015; Onohuean *et al*., 2022). Globally, vaccine hesitancy and refusal have hampered polio eradication efforts. For example, in 2003, as the world was getting close to polio eradication, many clerics and other individuals boycotted the polio vaccine in Northern Nigeria due to multiple political, cultural, and socioeconomic factors. This boycott spread and led to an increase in vaccine hesitancy within the region of Nigeria and beyond. It is hard to say that the world may have eradicated polio by now if the Nigeria boycott had not happened. However, it is indeed documented that cases arising from the boycott were linked to exportation of the virus to other countries, undermining eradication efforts for several years (Ayodeje, 2007; Ekundayo *et al*., 2021). Information and dynamics of vaccine hesitancy and refusal are not new as they have existed since the origin of the smallpox vaccine; however, they have notably increased in recent years. Furthermore, the beliefs around vaccines and hesitancy have existed amongst families and healthcare workers (Paterson *et al.*, 2016) yet notable reports keep growing daily. It is to this end the study tends to determine vaccine hesitancy among Sub-Saharan African population: a narrative review and empirical case of South-South Nigeria.

Table 1: Vaccines and Diseases it Prevents.

Vaccine	Disease	Symptoms and effect
BCG	Tuberculosis	Tuberculosis (TB) is an infection that most often attacks the lungs, but in infants and young children, affects other organs like the brain. Severe case could cause serious complications or death. TB is very difficult to treat when contracted, and treatment is lengthy and not always successful.
MMR	Rubella	Rubella infection in children and adults is usually mild, but in pregnant women it can cause miscarriage, stillbirth, infant death or birth defects.
HPV	Human papillomavirus (HPV)	HPV usually has no symptoms, but some strains can cause cervical cancer. Almost all cases of cervical cancer (99 per cent) are caused by HPV. HPV can also cause genital warts in both men and women, as well as cancer on other parts of the body.
MMR	Mumps	Mumps can cause headache, malaise, fever, and swollen salivary glands. Complications can include meningitis, swollen testicles and deafness.
MMR	Measles	Measles is a highly contagious disease with symptoms that include fever, runny nose, white spots in the back of the mouth and a rash. Serious cases can cause blindness, brain swelling and death.
Polio	Poliovirus	Polio is a virus that paralyzes 1 in 200 people who get infected. Among those cases, 5 to 10 per cent die when their breathing muscles are paralyzed. There is no cure for polio once the paralysis sets in – only treatment to alleviate the symptoms.

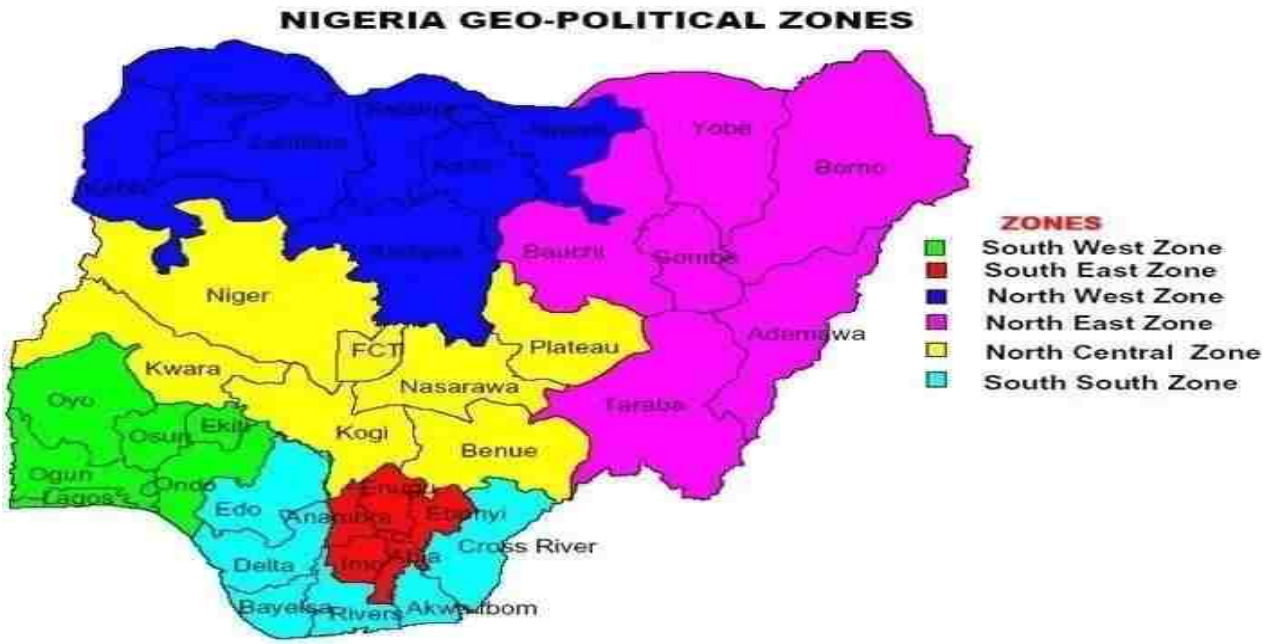
Hep B	Hepatitis B	Hepatitis B virus is a dangerous liver infection that, when caught as an infant, often shows no symptoms for decades. It can develop into cirrhosis and liver cancer later in life.
DTP	Tetanus	Tetanus causes very painful muscle contractions. It can cause children's neck and jaw muscles to lock (lockjaw), making it hard for them to open their mouth, swallow (breastfeed) or breathe. Even with treatment, tetanus is often fatal.
DTP	Diphtheria	Diphtheria infects the throat and tonsils, making it hard for children to breathe and swallow. Severe cases can cause heart, kidney and/or nerve damage.
DTP	Pertussis	Pertussis (whooping cough) causes coughing spells that can last for weeks. In some cases, it can lead to trouble breathing, pneumonia, and death.
Pneumococcal	Pneumococcal diseases	Pneumococcal diseases range from serious diseases such as meningitis and pneumonia to milder but more common infections like sinusitis and ear infections.
Hib	Haemophilus influenza type b (Hib)	Hib is a bacterium that causes pneumonia, meningitis and other severe infections almost exclusively in children under 5 years old.
Rotavirus	Rotavirus	Rotaviruses cause severe diarrhoea and vomiting, which can lead to dehydration, electrolyte imbalance and shock in young children.

Source: https://www.unicef.org/parenting/health/vaccines-and-diseases-they-prevent

The above Table 1 shows some of the selected vaccines employed for the study, which describe the vaccine, disease, symptoms and effects. It is noteworthy to state that vaccine hesitancy has existed since vaccines were first developed (Schwartz, 2012) and it represents an ongoing threat to global public health. It possesses potential of decreasing vaccination rates both directly through lessening vaccine uptake and indirectly through hostility to mandatory vaccination policies (Joslyn and Sylvester, 2017.) Decreases in vaccination rates have contributed to the increased prevalence of preventable deaths and the reappearance of previously eradicated diseases such as polio and measles. (Joslyn and Sylvester, 2017; WHO, 2021).

2.0 Materials and Methods

The study was conducted in the South-South region of Nigeria. The region has a population of about 26 million or about 12% of the country total population. Port Harcourt; Rivers State and Benin City; Edo State are the most populous cities in the South-South and the fourth and fifth most populous cities in Nigeria. The study was a cross-sectional study using a non-probability sampling method. Questionnaires were distributed by the researchers and volunteers to participants across the states. The sampling populations include students in the tertiary schools, civil servants, teachers, traders and artisans. Informed consent of participants was sought at the beginning of the study. Questionnaires were designed to capture demographic information and information relating to 18 vaccines administered from childbirth to adulthood. The questionnaires were administered to participants in the different states and local government areas using different communication tools to assess clarity of questions, ease of filling form and grammatical composition. Data for the study was collected between April 10th and June 30th , 2023. The data was entered into Microsoft excel and analyzed using IBM SPSS Version 20.



Source: https://www.skabash.com/geopolitical-zones-in-nigeria/
Figure 1 showing the sampled regions in the South-South Nigeria

Limitation of study

The study of vaccine hesitancy was focused specifically on the selected vaccines and study population which are within the study area. It does not emphasize on the effectiveness of the vaccines or viability as well as availability of the vaccine product. In addition, the study only used questionnaire to analyze the population level of vaccine rejection/acceptance and does not describe the country supply rate or clinical and human ethics associated concerns on the usage of vaccines.

Results

A total of 800 responses were received. However, after cleaning, those incompletely filled were discarded and the remaining 378 returns were analyzed. Among the participants 272 (72%) were females and 106 (28%) were males. 250 (66%) were married and 128 (44%) were single. Also, 30 (8%) has no education, 37 (10%) has secondary education and 311 (82%) has tertiary education. 33 (8.7%) were living in rural areas while 345 (91.3%) were living in urban areas.

Table 2: Profile of States involved in the study

Variables	Number of Respondent	Percentage %
Akwa Ibom	53	14.0
Bayelsa	35	9.3
Cross River	68	18.0
Delta	156	41.2
Edo	35	9.3
Rivers	31	8.2
Total	378	100

Table 3: Profile of Respondents from, April-June, 2023

Variables	Number of Respondent	Percentage %
Age group		
15 -24	66	17.5
25 -34	246	65.0
35 - 44	34	9.0
45 – 54	32	8.5
Total	378	100
Healthcare facility		
Present	289	76.4
Absent	60	15.9
Undecided	29	7.7
Total	378	100
Vaccine Availability		
Present	313	82.7
Absent	58	15.3
Undecided	7	2.0
Total	378	100
Vaccine Accessibility		
Present	340	90
Absent	2	0.5
Undecided	36	9.5
Total	378	100

About 60 (15.9%) of participants indicated that healthcare facilities were absent in their community, 289 (76.4%) indicated the present of healthcare facility and 29 (7.7%) were undecided of healthcare facility in their community. Among the 378 participants analyzed, 107 (28.3%) have not taken any type of vaccine while 89 (23.5%) have taken only BCG. 58 (15.3%) indicated the absence of vaccine in their community, 313 (82.7%) indicated present of vaccines and 7 (2.0%) were undecided of the availability of the vaccines in their community. Also, 2 (0.5%) shows that vaccines were not accessible, 340 (90%) shows the accessibility of vaccines and 36 (9.5%) were unsure of the accessibility of vaccine in their communities.

Discussion

Despite the array of safe and effective vaccines currently in use nation-wide and globally, with major impacts on health, the WHO Strategic Advisory Group of Experts (WHO-SAGE) on immunization has been repeatedly confronted with reports of hesitancy in accepting specific vaccines or vaccination programmes (WHO, 2015). Although it is quite difficult to quantify accurately the proportion of the population that could be categorized as vaccine-hesitant, there has been a growing consensus among experts worldwide that there is an increasing trend towards vaccine hesitancy (Dewesh Kumar *et al*., 2016). The study determined vaccine hesitancy among Sub-Saharan African population: a narrative review and empirical case of South-South Nigeria using eighteen selected vaccines that were currently in used with notable reported history of preventive benefit for the various diseases. It is worthy of note that despite vaccines beneficial effects, there are yet issues of vaccine hesitancy among the populations. It was observed from the study that amongst the population studied, Table 2 describes the demographics on the usage of vaccines, profile of participants within South-South, Nigeria between April-June 2023. It was observed that amongst the 800 respondents document received, 378 were observed to be eligible for analysis amongst which 272 (72%) were females and 106 (28%) were males. Amongst these, 250 (66%) were married and 128 (44%) were single. Also, 30 (8%) were uneducated, 37 (10%) had secondary education and 311 (82%) had tertiary education. 33 (8.7%) were living in rural areas while 345 (91.3%) were living in urban areas. The aforementioned report is an indication that there exist a structure of vaccine usage, administration by specific health workers, application of appropriate standard practice in storage as well as participation by the population affected as required by WHO (WHO, 2015).

Furthermore, it was also observed from the study that 60 (15.9%) of participants indicated that healthcare facility was absent in their community which is an indication that awareness on vaccine usage is poor within some area in the region and necessitates adroit awareness campaign scheme for such region. In addition, 289 (76.4%) indicated the present of healthcare facility and 29 (7.7%) were not certain of healthcare facility in their community. It was also observed that 107 (28.3%) have not taken any type of vaccine while 89 (23.5%) have taken only BCG. 58 (15.3%) indicated the absence of vaccine in their community, 313 (82.7%) indicated present of vaccines and 7 (2.0%) were not sure of the availability of the vaccines. Also, 2 (0.5%) of the participants show that vaccines were not accessible, 340 (90%) shows the accessibility of vaccines and 36 (9.5%) were unsure of the accessibility of vaccine. It is an indication that within the study region, there exist a high level of vaccine accessibility which is similar to the previous reported of some related investigators (Schwartz, 2012; Joslyn and Sylvester, 2017; WHO,2021).

Among the 378 participants analyzed, a total of 107 (28.3%) eligible participants' responses demonstrated vaccine hesitancy (Table 3) despite high rate of vaccine availability (82.7%) and accessibility (90%) of the various vaccines within the study region which implies that specific percentage of the population rejects the usage of vaccines. This is similar to the previous report of related investigators who reported vaccine hesitancy amongst specific populations (Current opinion in Virology, 2020; Paterson *et al*., 2016; CDC, 1999). This is worrisome as it poses great risk of infection to the various viral infectious agents associated with diseases. It is important to note that although an innovative vaccine may be effective, it is only useful when it is accepted and used when needed. Hence, the

World Health Organization (WHO) has opined that vaccine hesitancy is one of the 10 threats to global health (Koledade *et al*., 2022). If effective vaccines are refused, then the resources invested to develop and obtain such health control products (vaccines) would be regarded as resources wastage.

Conclusion

The study determines vaccine hesitancy among Sub-Saharan African population: a narrative review and empirical case of South-South Nigeria using eighteen selected vaccines which have shown potential beneficial relevance to the population within the study area. The study has revealed that there yet exist issues of vaccine hesitancy among the participants within study area despite notable records of vaccine effectiveness. In very few locations of the study area, it was also noted that there is poor awareness on the relevance of vaccine in viral disease control. It is therefore suggested that such rejection of vaccines should be jettisoned since the non-acceptance and refusal of effective vaccines has potential of creating wastage of national resources invested during development and purchase of such vaccines. Furthermore, an adroit awareness campaign scheme should be encouraged especially within the study region to remove any potential indices that may arouse vaccine hesitancy.

Acknowledgement

The authors wish to thank a crowd of interest-based researchers and voluntary participants who were useful during the collection of data from various States within the South-South region of the country. The study and authors did not receive any external funding.

Conflict of Interest

Authors have no conflict to declare.

References

Ayodeje Samuel Jegede 2007. What Led to the Nigerian Boycott of the Polio Vaccination Campaign. *PLoS Medicine*; **4(3)**: e73. doi: 10.1371/journal.pmed.0040073.

Centers for Disease Control and Prevention (CDC) 1999. Ten great public health achievements--United States, 1900-1999. *MMWR Morbidity and Mortality Weekly Report*; **48**:241-243.

Centers for Disease Control and Prevention 2021. Vaccination demographics trends 2021 [Available from: https://covid.cdc.gov/covid-data-tracker/#vaccination-demographics-trends.

Dewesh Kumar, Rahul Chandra, Medha Mathur, Saurabh Samdariya and Neelesh Kapoor 2016. Vaccine hesitancy: Understanding better to address better: *Israel Journal of Health Policy Research*; 5:2.

Ekundayo, T.C., Igere, B.E., Oluwafemi, Y.D., Iwu, C.D. and Olaniyi, O.O., 2021. Human norovirus contamination in water sources: A systematic review and meta-analysis. *Environmental Pollution; **291**:*118164.

Fine, P., Eames, K., Heymann, D.L. 2011. "Herd immunity": a rough guide. *Clinical Infectious Diseases*; **52**:911-916.

Joslyn, M.R., Sylvester, S.M. 2017. The determinants and consequences of accurate beliefs about childhood vaccinations. *American Politics and Research*;**47(3)**: 628–649. https://doi.org/10.1177/1532673X17745342.

Koledade, A.K., Jimoh, O., Ejembi, J., Ibrahim, M.S., Olorukooba, A.A., Umar, A.M., Ahmad, A.E., Eboh, E., Danmoris, S., Zayyad, M.A. 2022. Covid-19 vaccine hesitancy among healthcare workers in Kaduna State, Nigeria. Tropical Journal of Health Sciences; **29(3)**.

MacDonald, N.E., Sage Working Group on Vaccine Hesitancy 2015. Vaccine hesitancy: Definition, scope and determinants. *Vaccine*; **33**: 4161–4164. doi: 10.1016/j.vaccine.2015.04.036.

Melanie Schuster, Juhani Eskola, Philippe Duclos: World Health Organization 2015. Review of vaccine hesitancy: Rationale, Remit and Methods: Elsevier Journal: *Vaccine*; **33**: 4157-4160.

Onohuean, H., Aigbogun Jr, E.O. and Igere, B.E. 2022. Meta-synthesis and science mapping analysis of HIV/HPV co-infection: a global perspective with emphasis on Africa. *Globalization and Health; **18*(1)**:36.

Onohuean, H., Onohuean, E.F., Atim, S.G., Igere, B.E., Iweriebor, B.C. and Agwu, E., 2023. Meta-synthesis of research dynamics

on HIV/AIDs related pre-exposure prophylaxis (PrEP): Africa perspective. *Journal of Medicine Surgery and Public Health*, p.100010

Paterson, P., Chantler, T., Larson, H.J. 2018. Reasons for non-vaccination: Parental vaccine hesitancy and the childhood influenza vaccination school pilot programme in England. *Vaccine*; **36(36)**: 5397–5401.

SAGE Working Group on Vaccine Hesitancy Report of the SAGE Working Group on Vaccine Hesitancy 2014. [(accessed on 26 December 2020)]; Available online: https://www.who.int/immunization/sage/meetings/2014/october/1_Report_WORKING_GROUP_vaccine_hesitancy_final.pdf.

Schwartz, J.L. 2012. New media, old messages: Themes in the history of vaccine hesitancy and refusal. *American Medical Association Journal of Ethics*;**14 (1)**:50–55.

World Health Organization 2018. Assessment report of the global vaccine action plan. Strategic advisory. Group of experts on immunization Geneva 2018 [Available from: https://www.who.int/immunization/global_vaccine_action_plan/SAGE_GVAP_Assessment_Report_2018_EN.pdf. 2018.

World Health Organization 2019. Ten threats to global health in 2019; 2019. Accessed September 15, 2021. https://www.who.int/emergencies/ten-threats-to-globalhealth-in 2019.

Citation: Onoriasakpobare Felix O., Igere Bright E., Chukuka Vivian I., Onianwah Ifeanyichukwu F. Vaccine Hesitancy Among Sub-Sahara African Population: A Narrative Review and Empirical Case of South-South Nigeria. ***Sokoto Journal of Medical Laboratory Science*; 9(1): 40 - 47.** DOI: 10.4314/sokjmls.v9i1.4