



**PREVALENCE OF INFECTIOUS DISEASES AMONG POLICE PERSONNEL
ATTENDING POLICE CLINICS IN SOUTH EASTERN NIGERIA FROM 2012-2021.**

Ikemereh C.N¹., Obasi K.O²., Ahmed A.B³. Onuzulike, N.M⁴. and Eberendu, I.F¹.

1= Department of Public Health, Imo State University, Owerri. 2=Dept of Environmental Management and Toxicology, Michael Okpara Univ. of Agriculture, Umudike.3=Biology Department, University of The Gambia. 4=Dept of Health education, Alvan Ikoku Federal University, Owerri

Corresponding author: ikemerehcharles@gmail.com

ABSTRACT

The police and other law enforcement agencies are usually the first responders to scenes of events with immense risk of disease transmission and this predisposes them to infectious diseases. The occurrence of infectious diseases among police officers is one of the neglected areas in health and scientific research. Therefore, this work was designed to analyze the prevalence of infectious diseases among police personnel in South Eastern Nigeria from 2012– 2021. The study was designed as a retrospective study involving data from the Central police clinics for the period of ten years covering 2012 – 2021. The study population comprised all the recorded infectious diseases in the police clinics from January 2011 to December 2021, totaling 4513. To avoid duplication, it was the police clinics at the Central police stations in each of the randomly drawn study states were used. Data were obtained from documented and electronic records of the infectious disease units at the police hospitals at Abia, Enugu and Imo states representing the South Eastern states of Nigeria . Occurrences of infectious diseases were analyzed with Chi-squared test to establish associating variables of interest in the study. The probability value (P) was used to interpret the significant level at 5%. The study found the overall rate of occurrence of infectious diseases among police officers as 21.1% in the study area. The disease that recorded the most frequent occurrence over the years was typhoid fever with 27.6%, while malaria, Hepatitis B and HIV rates among police personnel in the study area was found to be 23%, 13.5% and 4.2% respectively. the rate of occurrence of infectious diseases was significant among police personnel in the South Eastern Nigeria, hence a need for concerted effort to remedy this ugly trend.

Keywords: Risk, Infectious, Hepatitis, Typhoid, Retrospective, Malaria

Introduction

Infectious diseases are illnesses caused by harmful organisms (pathogens) that find their way into the body system from the outside through several media. These include viruses, protozoans, fungi and bacteria that are often transmitted from person to person, through bug bites and

contaminated food, water or soil (Cleveland, 2023). These diseases include flu, measles, HIV, Strep-throat, Salmonella, COVID-19 and others.

In 2019, the World Health Organization (WHO) placed two infectious diseases: lower respiratory infections and diarrheal diseases as among the top ten global causes of death (WHO, 2020). Though, deaths as a result of some infectious diseases such as Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) and Tuberculosis (TB) have reduced globally in the recent years; both diseases are still among the ten (10) leading causes of death in low-income countries along with some other infectious diseases such as the lower respiratory infections, diarrhea diseases and malaria (WHO, 2020), In 2020, a pandemic, caused by the virus SARS-CoV-2 (Covid-19) emerged as among the leading causes of death around the globe, causing deaths in many countries including the United States where it was ranked as the third leading cause of death by the Center for Disease Control and Prevention (CDC, 2021).

The occurrence of infectious diseases among police officers is one of the neglected areas in research (CDC, 2022). The duty of the law enforcement agencies especially the police is one of significant personal sacrifice performed globally. There exist growing concerns that the duty and patterns of performing job activities of police officers expose them to the possibility of contracting diseases including life-endangering infectious diseases such as AIDS/HIV, Hepatitis, Tuberculosis (TB), Typhoid fever, Meningococcal meningitis, Acute Respiratory Infection (ARIs), and other serious communicable diseases especially due to regular movements and transfers (Connor and Schwartz, 2005).

In Nigeria, policing activities are not usually an easy type considering the fact that police men and women play enormous and varied roles in the country which permits their interactions and mixture with the general public and environments (Nigeria Police Acts and regulations, 2020), some of which may predispose them to contagious diseases. At the moment, information related to police on infectious disease occurrence and prevention is limited. It therefore becomes imperative to study infectious diseases among police personnel.

Materials and Methods

The study was designed as a retrospective study using secondary data from the central police clinics for the period of ten years covering 2012 – 2021. The study population comprised all the recorded infectious diseases involving police personnel, from January 2011 to December 2021. It was only the police clinics/hospitals at the central police stations in each of the randomly drawn study states were used. Data were obtained from documented and electronic records of the infectious disease units at the police clinics at Abia, Enugu and Imo states representing the South Eastern states of Nigeria.

Results

The data containing the information of the police personnel infected with infectious diseases for the period 2011-2021, within parts of South Eastern Nigeria, shows that, for the police personnel who attended the police hospitals of study, a total of 4513 were diagnosed for infectious diseases within the period. It follows that Abia had 1442 (32%), Enugu State recorded 1552 (34.4%) while Imo State had 1519 (33.6%) of cases.

The overall occurrence of infectious diseases among police officers during 2012 to 2021 period is represented in Figure 3.1. For the entire 4513 police personnel that were examined at the police hospitals within the period studied, those that were infected with diseases were 953

(21.1%), while those without the disease were 3560 (78.9%), leading to an overall rate of 21.1% for infectious diseases among police officers in the study area, for the 2012 to 2021 period.

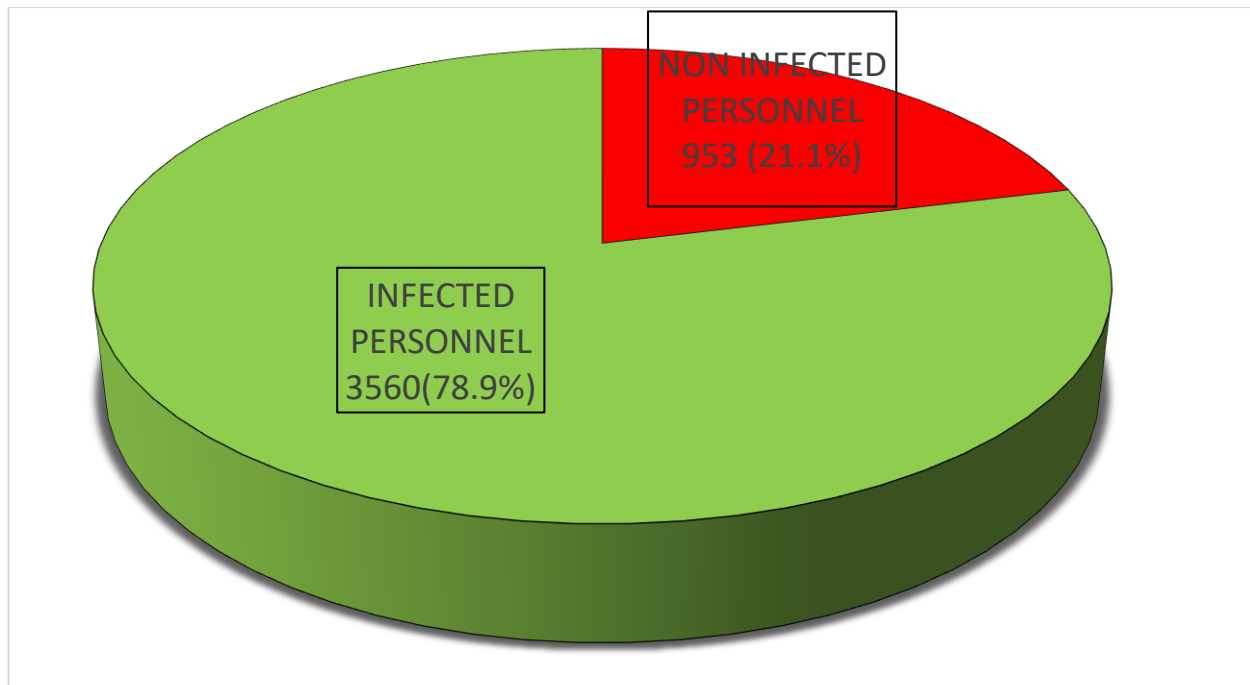


Figure 1: rate of occurrence of Infectious Diseases among Police Personnel Studied (2012 -2021).

Rate of Occurrence of Infectious diseases at each State of Study (2012 -2021)

In figure 2, the rate of occurrence of infectious diseases (2012 -2021) was relatively within 20 – 22% at each of the three states studied. It was highest at Abia State (22.3%) followed closely by Enugu State (21.3%) and then Imo State (19.7%).

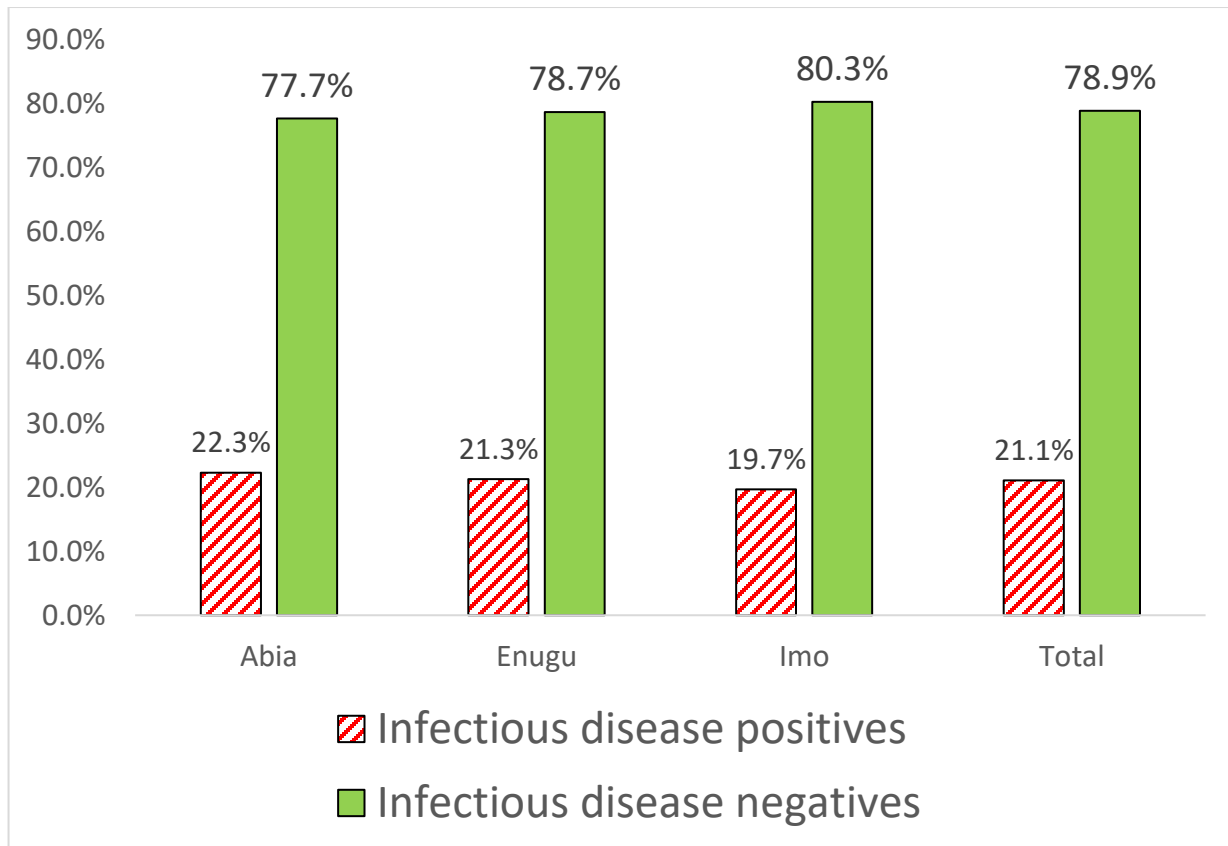
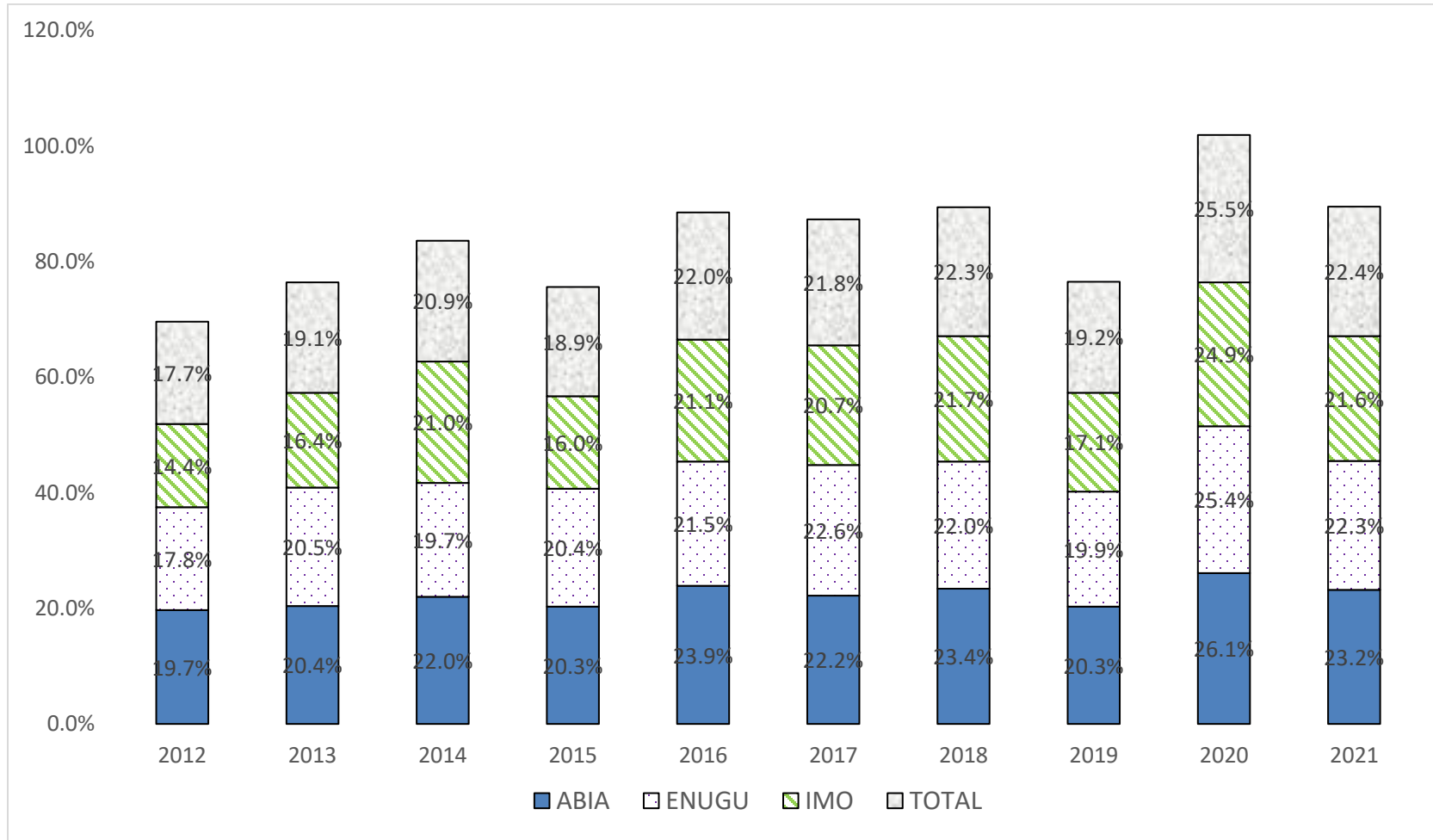


Figure 2: Rate of Occurrence of Infectious diseases at each State of Study (2012 -2021).

Yearly Occurrence rate of Infectious Diseases Among Police Personnel at each Study state in Study states of South Eastern Nigeria (2012 -2021)

The Overall Yearly Occurrence rate of Infectious Diseases among Police Personnel at each Study state in Study states of South Eastern Nigeria (2012 -2021) is on figure 3. It can be observed from the figure that though with not wide proportions, the rate was lowest in Imo state for all through the period. Abia state was highest among the three states in 2012 (19.7%), 2014 (22.0%), 2016 (23.9%), 2018 (23.4%), 2020 (26.1%) and 2021 (23.2%). Enugu state was highest in 2013 (20.5%), 2015 (20.4%), 2017 (22.6%).





Journal of Environmental Health (JEH) ISSN- 0189-5885

<https://www.sehon.org/publications> vol.11 (2) 26-42

Figure 3: Yearly rate of Infectious Diseases among Police Personnel at each Study state, South Eastern Nigeria (2012 -2021).

Trend in the Overall Occurrence of Infectious Diseases Among Police Personnel in South Eastern Nigeria (2012 -2021)

The assessment for trend in the occurrence of infectious diseases is represented on figure 3. It shows that the rate of occurrence of the infectious diseases was found to be relatively stable over the years (2012 -2021). The rate was lowest in 2012 (17.2%) but was highest in 2020 (25.5%), which happened to be the corona virus (COVID-19) pandemic peak year in Nigeria, likely to have triggered more hospital visits.

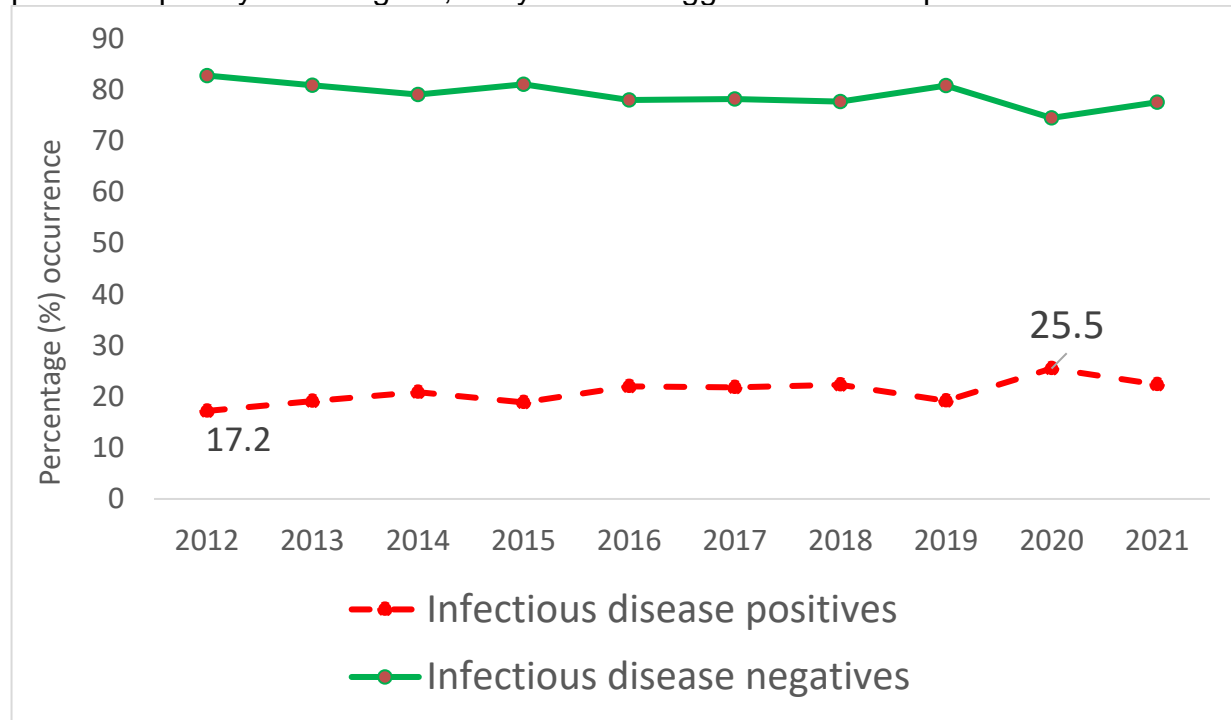


Figure 4: Trend in the occurrence of Infectious Diseases among Police Personnel in South Eastern Nigeria (2012 -2021).

Trend in the occurrence of Infectious Diseases Among Police Personnel in Study states of South Eastern Nigeria (2012 -2021): At each State of Study

The assessment for the trend movement over the years (2012 -2022) in the occurrence of infectious diseases among police personnel at each studied state of South Eastern Nigeria is presented on figure 4, and also much expanded on table 3. It can be observed from both data that the lowest overall rate of infectious diseases was in 2012, at Imo State (14.4%), followed by the rate of 16.0% also in Imo found in 2015. The largest occurrence was in 2020 at Abia State (26.1%), followed by the rates of 25.4% in Enugu State during the same year. Imo State recorded its largest occurrence of 24.9%, in the same 2020. In Abia, the second highest was in 2016 at 23.9%, while the second highest value occurred for Enugu state and Imo State were 22.6% in 2016 and 21.7% in 2018 respectively.

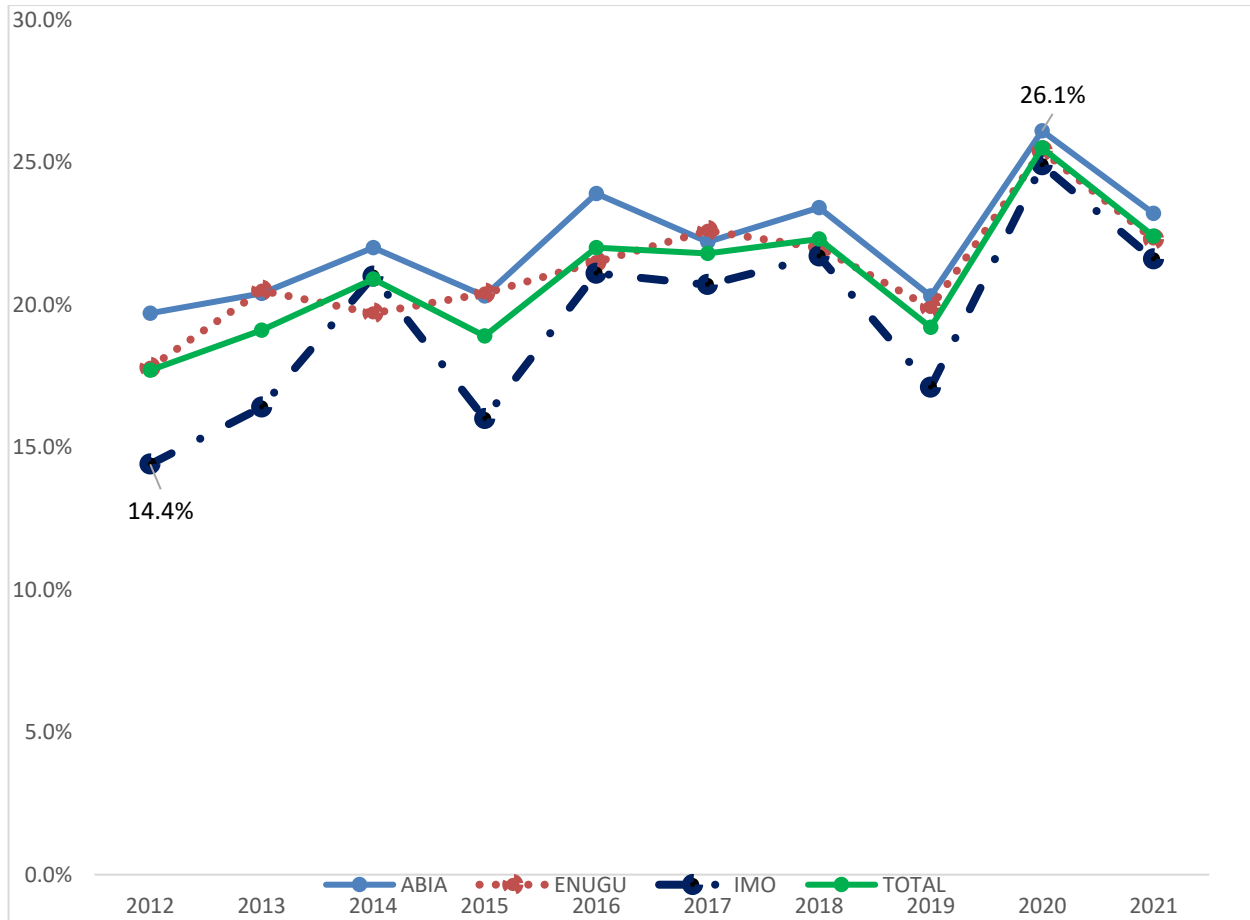


Figure 5: Trend in the occurrence of Infectious Diseases Among Police Personnel in Study states of South Eastern Nigeria (2012 -2021).



Table 2: Yearly Occurrence of Infectious Diseases Among Police Personnel in Study states of South Eastern Nigeria (2012 -2021)

Year	ABIA STATE			ENUGU STATE			IMO STATE			OVERALL		
	Number examined	Infectious disease positives	%	Number examined	Infectious disease positives	%	Number examined	Infectious disease positives	%	Number examined	Infectious disease positives	%
2012	148	29	19.7	191	34	17.8	180	26	14.4	519	89	17.2
2013	138	28	20.4	152	31	20.5	134	22	16.4	423	81	19.1
2014	123	27	22.0	117	23	19.7	124	26	21.0	364	76	20.9
2015	109	22	20.3	128	26	20.4	119	19	16.0	355	67	18.9
2016	134	32	23.9	117	25	21.5	185	39	21.1	436	96	22.0
2017	167	37	22.2	160	36	22.6	164	34	20.7	490	107	21.8
2018	154	36	23.4	164	36	22.0	158	34	21.6	475	106	22.3
2019	123	25	20.3	141	28	19.9	105	18	17.1	369	71	19.2
2020	184	48	26.1	197	50	25.4	193	48	24.9	574	146	25.5
2021	164	38	23.2	188	42	22.3	158	34	21.6	510	114	22.4
Total	1442	322	22.3	1552	331	21.3	1519	300	19.7	4513	953	21.1



Diseases of high incidence rate of occurrence for infectious diseases amongst police personnel in South Eastern Nigeria from 2011 to 2021.

Most frequent infectious diseases among police personnel in South Eastern Nigeria (2012 -2021).

The disease that recorded the most frequent occurrence over the years is typhoid fever (27.6%), followed by malaria (23%). Other frequently occurring infectious diseases found for the period include hepatitis B (13.4%) and respiratory infections (11.2%). The HIV was found as 4.2%, while meningitis and tuberculosis were 3.5% and 2.9% respectively.

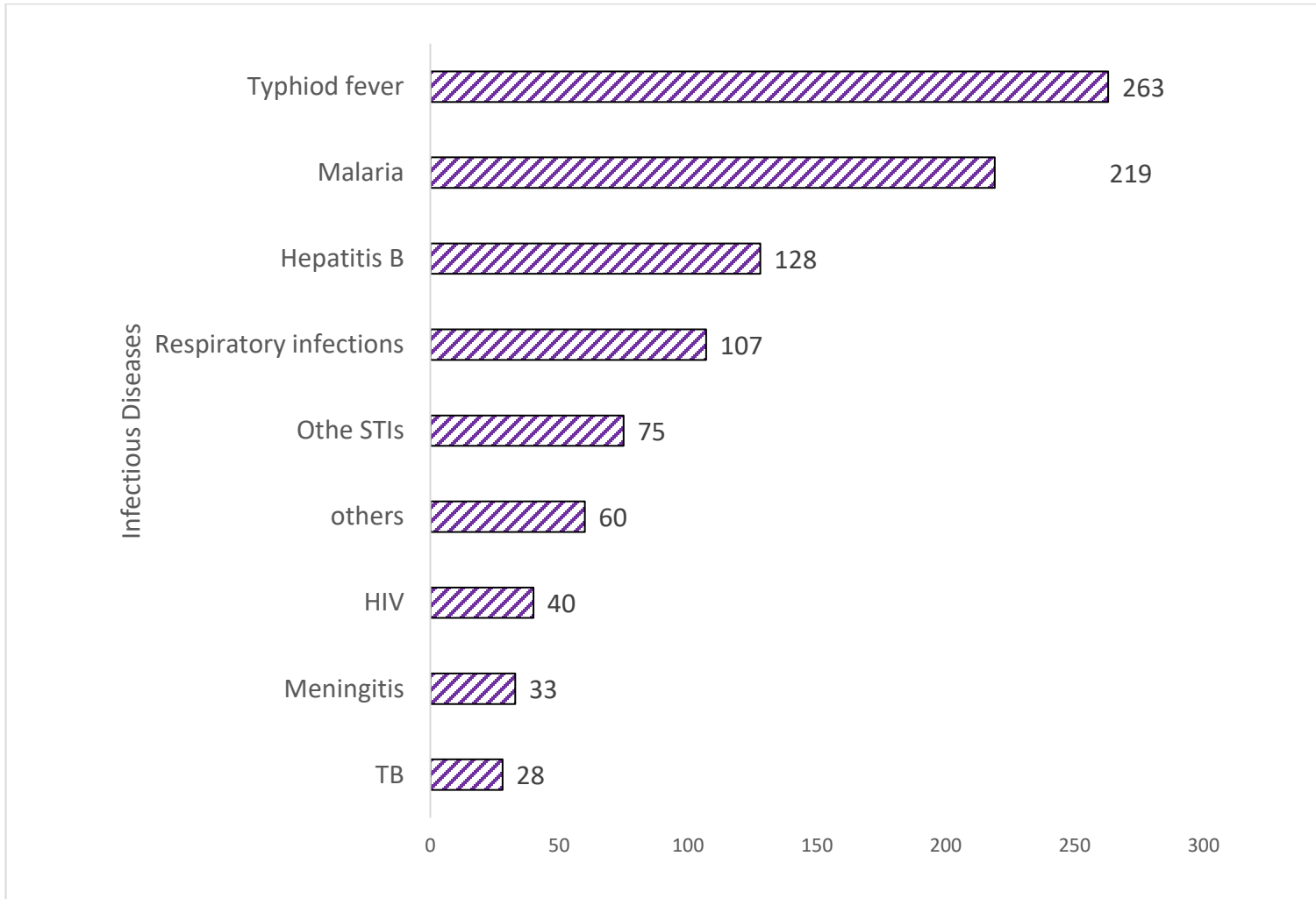


Figure 6: Distribution for Most Frequent Infectious Diseases Among Police Personnel in South Eastern Nigeria (2012 -2021).



Yearly Distribution for Frequency of Occurrence of Infectious diseases among Police personnel (2011 -2021)

Table 3 represents the yearly distribution for frequency of occurrence of Infectious diseases among Police personnel (2011-2021). The table shows that typhoid fever infection was at highest rates in 2013 (35.8%), 2014 (32.9%) and 2019 (32.4%). It recorded the lowest rate in 2020 (19.2%). Malaria disease recorded the highest rate in 2017 (29.9%), and that was closely followed by 29.6% recorded in 2019. The lowest rate of 13.5% was noticed among the police officers in 2012.

Hepatitis B was highest in 2012 (18%), and was lowest in 2020 (11%) HIV was highest in 2012 (5.6%), and was lowest in 2013 (2.5%). Respiratory infections were highest at 26.7% in 2020 (during the peak of Covid-19 virus infection in Nigeria). Next to that was in 2021 (14.9%), while the lowest rate was obtained in 2017 at 5.6%.

HIV disease was also found recorded among the police officers at a rate of 5.6% in 2012, and 5.3% in 2014. The disease lowest rate (2.5%) was recorded in 2014. No meningitis was recorded among the police officers in 2015 while the highest rate of the disease was recorded in 2018 at 4.7% among the officers tested. The highest rate of TB was recorded in 2017 (4.7%), while none was recorded in 2019.

Other sexually transmitted infections (STIs) were also recorded during the period which includes gonorrhoea, candidiasis, staphylococcus, and others. The STIs were highest in 2014 (11.8%) and 2012 (11.2%), and were lowest in 2020 (5.5%), followed by 2017 (5.6%).

Table 3: Yearly Distribution for Occurrence of Infectious diseases among Police personnel (2011 -2021)

Infectious Disease	2012		2013		2014		2015		2016		2017		2018		2019		2020		2021	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Hepatitis E	16	18.0	12	14.8	11	14.1	9	13.2	14	14.6	15	14.0	13	12.3	9	12.7	16	11.0	13	11.4
	5	5.6	2	2.5	4	5.3	3	4.5	4	4.2	5	4.7	4	3.8	3	4.2	6	4.1	4	3.5
Meningitis	4	4.5	3	3.7	2	2.6	0	0.0	4	4.2	4	3.7	5	4.7	2	2.8	6	4.1	3	2.6
T	3	3.4	2	2.5	3	3.9	1	1.5	2	2.1	5	4.7	4	3.8	0	0.0	5	3.4	3	2.6
Malaria	12	13.5	15	18.0	11	14.1	15	22.2	22	22.2	32	29.1	28	26.4	21	29.7	31	21.1	32	28.1
Respiratory infections	8	9.0	6	7.4	7	9.2	5	7.5	6	6.3	6	5.6	8	7.5	5	7.0	39	26.7	17	14.9
Other sexually	10	11.2	7	8.6	9	11.8	7	10.4	8	8.3	6	5.6	8	7.5	5	7.0	8	5.5	7	6.1

transmitted

infections

(STIs)

Others	9	10.	5	6.2	4	5.3	6	9.0	8	8.3	5	4.7	7	6.6	3	4.2	7	4.8	6	5.3
Typhoid fever	22	24.	29	35.	25	32.	21	31.	28	29.	29	27.	29	27.	23	32.	28	19.	29	25.
		7	8	10	9	10	3	10	2	10	1	10	4	10	4	10	2	10	4	4
Total	89	0	81	0	76	0	67	0	96	0	107	0	106	0	71	0	146	0	114	100

Discussion

The rate of occurrence of infectious diseases among police officers studied was found to be 21.1% for the period of study. This rate is high and capable of causing burdens within the force and therefore should be a source of concern considering the role of police in the country. The rate is relatively stable with the three states studied. Likely reason could be to the fact that most police in the area work under the same command leadership and thus are sometimes redeployed within the zone. This is likely to recycle similar activities and living patterns among the police personnel.

In terms of yearly occurrence of the infectious diseases, the patterns of the diseases do not seem to have varied m

uch over the years but moved a bit higher in 2020. The variations are considered normal in this study considering that some infectious diseases emerged within some rare periods. For instance, in 2020, covid-19 infection emerged and caused devastating effects all around the world including Nigeria. The rate of occurrence of the infectious diseases was found to be relatively stable over the years (2012 -2021). The rate was lowest in 2012 but was highest in 2020, which happened to be the corona virus COVID-19) pandemic peak year in Nigeria. While the police clinics studied do not have documented records of police staff affected by covid-19 virus in their respective records, the disease seems to have triggered more hospital visits and test for respiratory related diseases with its high rate of occurrence.

The disease that recorded the most frequent occurrence over the years is typhoid fever (27.6%), followed by malaria (23%). It was not a surprise that both typhoid fever and malaria are endemic infectious diseases in the study area as well as in Nigeria and other areas within the sub Saharan region. However, the rate obtained for malaria is slightly lower than the rate for the general population in the 2021 World Malaria Report that found Nigeria having the 27% of the global malaria cases (WHO, 2021). For typhoid fever, the finding here is higher than the rate of estimated number of typhoid fever cases in low- and middle-income countries (Mogasale, Maskery, Ochiai, Lee, Mogasale, Ramani, Kim, Park, and Wierzba. (2014); WHO Key facts, 2022). The differences are understandable as clear that the incidence of typhoid fever in Africa are yet to be fully understood (Antillón, Warren, Crawford, Weinberger, Kurum, Pak, Marks and Pitzer, 2017).

The rate of occurrence of some other infectious diseases such as hepatitis B, HIV, TB also high among the police, compares to their respective rates at the Nigerian general population. All the diseases were found to be higher than the rate of which each is prevalent in Nigeria and should be a source of concern. Hepatitis B rate was found as 13.5% which is quite high considering the WHO classification of HBV for which at least 8% is high, 2-7% is moderate and less than 2% is considered low (Terrault, Lok, McMahon, Chang, Hwang, Jonas, Brown, Bzowej, and Wong, 2018). The result is higher than 9.5% found in a recent study in Nigeria on general population (Ajuwon, Yujuico, Roper, Recharadson, Sheel, and Lidbury, 2021) and 11.2% found elsewhere in Cameroon (Bigna, Amougou, Asangbeh, Kenne, Noumegni, and Ngo-Malabo 2017). It is however by far higher than estimated for African (WHO, 2021b) and 3.6% estimated rate of the disease at the global population. Elsewhere in the United Kingdom, a study has shown that the rate of hepatitis found among police officers in very much lower (2.8%) compared to what was obtained in the present study (Morgan-Capner, Hudson, & Armstrong, 1988).

Infectious diseases such as HIV and TB recorded higher rates against what is obtainable at the general population. The HIV rate among police personnel in the study area was found as 4.2%, which is hig

her than the reported rate of 3.1% among adult population in Nigeria (NACA, 2016). Also of sexually transmitted infections were found higher than the rate at the general population. It therefore could mean that the police lifestyle activities are poor and especially as their job activities places them at greater risk of interactions and behaviors that are at greater risk for such diseases. Studies have shown that diseases such as HIV and hepatitis B are both associated occupation (Bandaranayake, Salmond, and Tobias, 1991) and poor behaviors (Heiskell and Tang, 1998). The rate for TB (2.9%) is lower than the TB rate in Nigeria reported as 8% (WHO, 2018) yet the rate of occurrence for other airborne associated respiratory diseases was quite high (11.2%). Disease such as tuberculosis and most respiratory infections are usually airborne (Bates, 2020). Frequent redeployments among police officers could be responsible for their occurrences among force men and women. It could therefore imply that proper protective measures are not being taken into account when police are redeployed or sent for assignments that may involve visiting areas of elevated risk of the diseases.

Conclusion

Clearly the rate of occurrence of infectious diseases is significant among police personnel in the South Eastern Nigeria. Hence there is need to overhaul the structure and patterns of operations of police personnel in the study area to foster optimal healthy policing with reduced societal transmission of infectious diseases.

Compliance with ethical standards

Acknowledgement

We wish to acknowledge late. Chief E.C.D. Ikemereh, Mr. W.C. Ikemereh, Prof. A.B. Ahmed, CP. Durosumi O. and Prof. Ozims S.J., for their support and encouragement during the period of research.

References

- Ajuwon, B.I, Yujuico, I, Roper, K,Rechardson, A., Sheel, M. &Lidbury B.A. (2021). Hepatitis B virus infection in Nigeria: a systematic review and meta-analysis of data published between 2010 and 2019. *BMC Infectious Disease* 21, 11:20
- Antillón, M., Warren, J.L., Crawford, F.W., Weinberger, D.M., Kürüm, E., Pak, G.D., Marks, F.V. &Pitzer, V.E. (2017). The burden of typhoid fever in low-and middle-income countries: a meta-regression, approach. *PLoS Negl Trop Dis* 11: e0005376.
- Bandaranayake, D.R., Salmond, C.E. & Tobias, M.I. (1991).Occupational Risk of Hepatitis B for Police and Custom Personnel.*American Journal of Epidemiology* 134 (12): 134:1447–53.
- Bates, J. (2020). Police Departments, Sheriffs' Offices across the U.S. Grapple with COVID-19's Impact on Public Safety—And Their Own. *TIME*, 2020. Retrieved from, <https://time.com/5812833/coronavirus-police-departments/>
- Bigna, J.J., Amougou, M.A., Asangbeh, S.L., Kenne, A.M., Noumegni, S.R.N. & Ngo-Malabo, E.T. (2017). Seroprevalence of hepatitis B virus infection in Cameroon: a systematic review and meta-analysis. *BMJ Open*, 7(6):e015298.
- Centers for Disease Control and Prevention, (2021).www.cdc.gov/nip/recs/adult-schedule.htm.



Center for Disease Control and Prevention- CDC (2022). Parasites: About parasites. Available at: <https://www.cdc.gov/parasites/about.html>.

Cleveland Clinic (2023). Infectious Diseases. Available at <https://my.clevelandclinic.org/health/diseases/17724-infectious-diseases>. Accessed: January 11, 2023.

Connor, B.A. & Schwartz, E. (2005) Typhoid and paratyphoid fever in travellers. *Lancet Infect Dis.*5(10):623–8.

Nigeria police Act (2020). Cap P19LFN 2004, 1st April 1943. Available at <https://refworld.org/docid/54f98f244.html> [accessed 24 December 2023]

Heiskell, L.E. & Tang, D.H. (1998). Aids and Hepatitis: what are the risk to Police Officers? *Police: The Law Enforcement Magazine* 22 (1): 34-36.

Mogasale, V., Maskery, B., Ochiai, R.L., Lee, J.S., Mogasale, V.V., Ramani, E., Kim, Y.E., Park, J.K., & Wierzbica, T.F. (2014). Burden of typhoid fever in low-income and middle-income countries: a systematic literature-based update with risk-factor adjustment. *Lancet Global Health* 2: e570–e580.

Morgan-Capner, P., Hudson, P., & Armstrong, A. (1988). Hepatitis B markers in Lancashire police officers. *Epidemiology and Infection*, 100(1), 145–151. <https://doi.org/10.1017/s0950268800065638>

NACA (2016). 6th National Council on AIDS (NCA) Conference; Innovative Approaches towards HIV Epidemic Control and Programme Sustainability at State Level. Abuja Nigeria. National Agency for the Control of AIDS.

Terrault, N. A., Lok, A. S. F., McMahon, B. J., Chang, K. M., Hwang, J. P., Jonas, M. M., Brown, R. S., Jr, Bzowej, N. H., & Wong, J. B. (2018). Update on prevention, diagnosis, and treatment of chronic hepatitis B: AASLD 2018 hepatitis B guidance. *Hepatology (Baltimore, Md.)*, 67(4), 1560–1599. <https://doi.org/10.1002/hep.29800>

WHO (2018). Guidelines on management of drug resistance TB. In WHO Treatment Guidelines for Drug-Resistant Tuberculosis. *JAMA* 11450. <https://doi.org/10.001/jama.2014.11450>.

WHO (2020). The top 10 causes of death. Geneva, World Health Organization. Available at: <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>. [Accessed: December 4, 2022].

World Health Organisation (2021b). Hepatitis B fact sheet for 2019. Available at: <https://www.who.int/newsroom/factsheets/detail/hepatitis-b>. [Accessed 27 March, 2021].

WHO Key facts (2022). Typhoid fever. Available at: https://www.who.int/news-room/factsheets/detail/typhoid?gclid=EAlaQobChMI686AhrbX_QIVX5BoCR0lcQIZEAAYASAAEgLBfD_BwE. [Accessed: November 14, 2022].