International Journal of Community Medicine and Public Health
Dotimi DA et al. Int J Community Med Public Health. 2023 Jan;10(1):103-108
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20223532

Original Research Article

Individual factors affecting compliance with standard infection prevention precautions on the use of personal protective equipment among community health practitioners in Bayelsa State, Nigeria

Doris A. Dotimi*, Alfred O. Odongo, Kerochi Atei

Department of Epidemiology and Biostatistics, Mount Kenya University, Thika, Kenya

Received: 30 October 2022
Accepted: 10 December 2022

***Correspondence:**
Dr. Doris A. Dotimi,
E-mail: atibiwilcox@gmail.com

ABSTRACT

Background: Individual factors may have an impact on how well healthcare workers adhere to standards for infection prevention. The aim of the study was to identify individual factors affecting compliance with personal protective equipment (PPE) use among community health practitioners in Bayelsa State, Nigeria.
Methods: Three hundred and fifty-four (354) self-structured questionnaires were manually distributed among community health practitioners who worked at government-owned primary health care facilities in Bayelsa State, Nigeria. Item mean analysis with a criterion mean set at 2.0 was used to analyze the quantitative data of the 3-Likert scale and results were presented in tables, item mean, and percentages.
Results: Individual factors affecting compliance with standard infection prevention precautions on the use of PPE were difficulty to feel veins while wearing PPE (x=2.7), some level of discomfort while performing skills using the PPE (x=2.0), and lack of knowledge of how to use the PPE (x=2.9). It was also revealed that those who complied with the standard infection prevention precaution do so because they understand that the use of PPE prevents them from being infected (x=2.9).
Conclusions: Individual factors that affect compliance with standard infection prevention precautions on the use of PPE among community health practitioners can be modified. It is recommended that community health practitioners should have a positive attitude towards compliance with standard infection prevention precautions, especially in this post-COVID-19 era. The government should conduct continuous in-service training and regular supportive supervision on compliance with standard infection prevention precautions among health workers in the primary health care setting.

Keywords: Individual, Factors, Compliance, Infection, Community health practitioners, Personal protective equipment

INTRODUCTION

The centre for disease control stated that healthcare workers must use one or more of the different personal protective equipment together in different procedures to protect both themselves and their patients.[1] Personal protective equipment (PPE) is defined as special clothing or equipment that protects workers from infectious agents.[1] The use of PPE is a key component of standard infection prevention precautions. Personal protective equipment creates a physical barrier between microorganisms and users, protecting hands, eyes, clothing, hair, and shoes from microbial contamination.[2] PPE in health care includes gloves, aprons, masks/respirators, glasses, and face shield masks.[1] In a report, knowledge was considered as an individual factor that had a positive effect on the use of PPE and other standard precautions through attitude mediation, and the safety environment had a positive effect on the use of standard infection prevention precautions.[3] A study conducted in Asia to assess factors influencing infection precautions among Jordanian nurses found that the majority of nurses (90%) have a good understanding of

infection precautions.[4] Beyamo, Dodicho, and Facha also discovered that an individual's perceived risk influenced the health workers to comply with standard infection prevention precautions in the health facility.[5]

The health belief model is a theoretical model that was used to guide the study. The health belief model can be used to guide health promotion and disease prevention programs. It is used to explain and predict individual changes in health behaviors. It is one of the most widely used models for understanding health behaviors.[6] Key elements of the health belief model focus on individual perception and belief about health conditions, which predict individual health-related behaviors. The model defines the key factors that influence health behaviors as an individual's perceived threat to sickness or disease (perceived susceptibility), the belief of consequence (perceived severity), potential positive benefits of action (perceived benefits), perceived barriers to action, exposure to factors that prompt action (cues to action), and confidence in the ability to succeed (self-efficacy).[6] The health belief model can be used to design short-term and long-term interventions. The five key action-related components that determine the ability of the health belief model to identify key decision-making points that influence health behaviors, such as gathering information to identify the problem; communicating the severity of the health problem; communicating steps to proffer a solution; providing assistance to reduce barrier or obstacles to the solution; and demonstrating actions through skill development activities and providing support that enhances self-efficacy and the likelihood of successful behavior changes.[6]

The model helped the researchers 'to identify the individual factors affecting the compliance with standard infection prevention precautions on the use of PPE and communicate the severity of not complying with standard infection prevention precautions to the community health practitioners and identify the solution to the low-level compliance'

Statement of problem

Dotimi's study in Bayelsa State indicated that the community health practitioners' compliance with infection prevention precautions on the use of PPE and other precautionary measures was low. She further suggested that studies be conducted to investigate the reasons for poor compliance.[7]

There has been no study on the individual factors affecting compliance with standard infection prevention precautions, hence the need to carry out a study to identify individual factors affecting compliance with the use of personal protective equipment among community health practitioners in Bayelsa State. It was believed that the study will illuminate the individual factors and proffer recommendations on how to address them.

METHODS

A descriptive cross-sectional study was used for the study. Cross-sectional studies are a snapshot of the occurrence and characteristics of a disease in a population at a specific point in time.[8]

The study was conducted among community health practitioners in Bayelsa State, Nigeria. Bayelsa State is one of the states in the South-South region of Nigeria, located in the core of the Niger Delta region. The state was carved from Rivers State on 01 October 1996, by the then-military government headed by Sani Abacha. Bayelsa State has a total landmass of 10,773 km^2 (4,159 m^2), with a population of 2,277,961 citizens.[9] The Atlantic Ocean dominates its southern borders, which it shares with Rivers State to the east and Delta State to the west. There are eight local government areas in Bayelsa State. They are: Southern Ijaw, Brass, Ekeremor, Kolokuma/Opokuma, Yenagoa, Nembe, Ogbia, Sagbama, and Yenagoa. The state is bordered by Delta State and Rivers State.[10]

The number of community health practitioners employed by the state government to work in primary health care centers at the time of the study was 511.[11] They provide 'promotive, preventive, curative, and rehabilitative health care services in the primary health care centres in the State'. This cadre of health care providers has gone through formal training in colleges of health technologies, university teaching hospitals, and universities in Nigeria, where they obtained certificates, national diplomas, higher national diplomas, and bachelor's degrees in community health and are licensed to practice by the community health practitioner's registration board of Nigeria.[12]

The Taro Yemen formula was used to determine the sample size of 389. The following is the formula according to uniproject material.[13]

$$n = \frac{N}{1 + Ne^2}$$

Where: n=sample size, N= population size, and e=level of precision or sampling error (which is 0.05)[2].

In Table 1, the number of facilities and population of community health practitioners (CHPs) in each senatorial district was obtained from the office of the Bayelsa State primary health care board. The sample size for health facilities in each senatorial district and the sample size for CHPs in each facility were calculated using the Taro Yemen formula. The summation of the sample sizes of CHPs from each senatorial district is 353 and the summation of a 10% non-response rate from each senatorial district is 36, bringing the total sample size of participants 389. The summation of the sample sizes of health facilities from each senatorial district is 159. The table also shows that at least 2 participants are to be sampled from each facility.

Table 1: Table of respondents from each senatorial district.

S. no.	Senatorial districts	No. of PHC facility	Population of community health practitioners	Sample size with Taroyemen formula			
				PHCF	CHPs	10% non-response rate	No CHP from each selected facility: no. of CHP/PHCF
1	Bayelsa Central	82	211	68	138	14	2.2
2	Bayelsa East	64	192	55.1	129.7	13	2.6
3	Bayelsa West	39	108	35.5	85.0	9	2.6
	Total	185	511	159	353	36	
					Total=389 (353+36)		

A multistage sampling procedure was adopted to recruit 389 community health practitioners for the study.

Stratified sampling technique

Bayelsa State was divided into three senatorial districts: Bayelsa Central, Bayelsa East, and Bayelsa West.

Simple random sampling

Simple random sampling without replacement was used to select 159 health facilities for the study, 2 CHPs from each selected facility in the central senatorial district and 3 CHPs from each selected facility in the East and West senatorial districts.

Inclusion criteria

Only community health practitioners working at government-owned primary health centers in Bayelsa State were allowed to be enrolled in the study; and only community health practitioners who gave verbal consent were recruited in the study.

Exclusion criteria

Other 'healthcare workers' in government-owned primary healthcare centers were excluded from the study. Also, community health practitioners who did not give their consent and/or were mentally deranged were excluded from the study.

The instrument for data collection was a structured questionnaire developed from the standard infection prevention precaution scale. The questionnaire has two sections. Section A collected information on the demographic data of the participants, and section B focused on individual factors affecting compliance with standard infection prevention precautions on the use of PPE. The primary items' Likert scale scores ranged from 3 to 1. There were three (3) responses of "always" (3), "sometimes" (2), and "never" (1).[14] The psychometric properties of the test were assessed for face and content validity based on predetermined objectives. In addition, the researcher ensured that the evaluation covered all aspects of the construct. This was done to ensure that the content was accurate. A test, study, or estimation strategy's substance should cover all applicable parts of the subject it tries to survey to acquire exact outcomes.[15] A Cronbach's alpha coefficient of 0.80 was obtained, indicating that the instrument had very high dependability.

Approvals were obtained from the ethical review committee of Mount Kenya University and the Bayelsa State health research and ethics committee (BSHREC) before the commencement of data collection. Informed consent forms were signed by participants before recruitment into the study. The questionnaires were distributed manually by the investigators and the research assistants. Data collection lasted for 6 months (01 August 2021 to 01 February 2022).

Three hundred and eighty-nine questionnaires were manually distributed, but only 354 (91%) were correctly filled and returned. The analysis was based on the data collated from 354 respondents. The collected data were analyzed using descriptive statistics (item mean analysis approach, percentages, and frequency). The criterion mean for the analysis was 2.0 because the 3-Likert scale was used (3+2+1=6/3=2.0).[14] The decision rule states that any grand mean or item mean greater than or equal to the criterion mean (2.0) is accepted as an individual factor affecting the compliance with standard infection prevention precautions on the use of PPE, while any grand mean or item mean less than the criterion mean (2.0) is rejected as an individual factor affecting the compliance with standard infection prevention precautions on the use of PPE among community health practitioners in Bayelsa State. The results from the questionnaire were triangulated using the focus group discussions

RESULTS

Response rate

A total of 389 questionnaires were administered, but only 354 (91%) were correctly filled and returned, which was considered high for making quality inferences. The data obtained were subjected to descriptive statistics with a criterion mean of 2.0. and results presented in frequency, percentages, and mean.

Socio-demographic information

The distribution of selected demographic data for this study is shown in Table 2. The majority (139; 39.3%) were 48 years and older. The "mean age" of the CHPs was 42 ('SD'=11.3). The majority (217; 61.3%) were males. The majority (343; 96.8%) were Christians. The majority (39; 11%) were widows, and the majority (119; 33.6%) have been in service for over 20 years.

Individual factors affecting participants' adherence to standard infection prevention precautions on the use of PPE

Decision rule

Any grand mean or item mean greater than or equal to the criterion mean of 2.0 is accepted as an individual factor affecting compliance with standard infection prevention precautions on the use of PPE and any grand mean or item mean less than the criterion mean is rejected.

Table 3 below indicates that the grand mean is (x=2.6). Individual factors influencing compliance with standard infection prevention precautions on the use of PPE using the criterion mean of 2.0 are that they have difficulty feeling veins while wearing PPE (x=2.7), they experience some level of discomfort while performing skills using the PPE (x=2.0), and they lack knowledge of how to use the PPE (x=2.9). It was also revealed that those who complied with the standard infection prevention precaution do so because they understand that the use of PPE prevents them from being infected (x=2.9)

Table 2: Participants socio-demographic data.

Variables	Total	%
Age (years)		
18- 27	40	11.3
28-37	90	25.4
38-47	85	24
48-above	139	39.3
Total	354	100
Mean age=42 (SD=11.3)		
Sex		
Males	217	61.3
Females	137	38.7
Total	354	100
Religion		
Christianity	343	96.8
Islam	2	0.6
Others	9	2.5
Total	354	100
Marital status		
Single	40	11.3
Married	190	54
Divorced	85	24
Widowed	39	11
Total	354	100
Years of service		
1-10	66	12.3
11-20	72	20.3
21-30	119	33.6
31 and above	97	27.4
Total	354	100

Table 3: Individual factors affecting participants' adherence to standard infection prevention precautions on the use of personal protective equipment (PPE).

S. no.	Items	Always	Sometimes	Never	TWS	Mean	Decision
1	I don't wear gloves because they make it difficult to feel veins	270 (810)	45 (90)	39 (39)	939	2.7	Accepted/fair
2	The use of PPE prevents me from being infected	339 (1017)	10 (20)	5 (5)	1042	2.9	Accepted /high
3	I feel discomfort while performing skills using the PPE	32 (96)	290 (580)	32 (32)	708	2	Accepted/low
4	I don't use the PPE because I don't know how to use them	319 (957)	18 (36)	17 (17)	1010	2.9	Accepted /high
		960/4=240 (68)	363/4= 91 (25.6)	93/4=23 (6.5)	Total	10.5	
			Grand mean=10.5/4=2.6				

Criterion mean=2.0.

DISCUSSION

A study conducted among community health practitioners revealed that the level of compliance with standard infection prevention precautions among the community health practitioners in Bayelsa State was low and suggested that further studies be conducted to investigate factors affecting their compliance with standard infection prevention precautions.[7] In order to address this issue, the researchers investigated the individual factors affecting compliance with standard

infection prevention precautions on the use of personal protective equipment (PPE) among community health practitioners in Bayelsa State. Table 3 showed that individual factors affect the extent of compliance with standard infection prevention precautions on the use of PPE (x=2.6; 68%) because the grand mean is higher than the criterion (2.0). These individual factors include difficulty feeling veins while wearing PPE (x=2.7), some level of discomfort while performing skills using the PPE (x =2.0), and lack of knowledge of how to use the PPE (x=2.9). Amoran and Onwube indicated in their study that a lack of knowledge on how to use PPE affected the level of compliance among healthcare workers.[16] Kim and Lee also confirmed that individual factor has a significant relationship with compliance with standard infection prevention precaution (46.7%).[17] In an Ethiopian study compliance was low among healthcare workers due to insufficient knowledge poses devastating consequences in PHC, interventions such as staff on standard infection prevention precautions and consistent managerial support are required.[13,18]

Difficulty to use the PPE was found to be an individual factor affecting compliance with standard infection prevention precautions on the use of PPE. This confirms the findings of a study on barriers to precautions which reported that one of the reasons PPE was not used (18.5%) was difficulty in performing the work.[19] Similarly, Madan et al. studies have shown that the reason for not using PPE is the discomfort caused by the PPE.[20] Neves and his colleagues concluded that the use of PPE is determined by personal values and beliefs as well as work experience, but the decision to use PPE is up to the individual.[21] Another study on PPE use among healthcare professionals found that the reason for not using PPE was discomfort caused by PPE and that PPE was not easy to use when the temperature was high, because it is not made of breathable material, it causes sweating during hot climate.[22,23]

CONCLUSION

Individual factors affecting compliance with standard infection prevention precautions when using PPE include difficulty feeling veins while wearing PPE, discomforts caused by PPE, and a lack of knowledge about how to use the PPE. The community health practitioners at primary health care centers in Bayelsa State need to be trained on how to use the complete set of PPEs when discharging their duties.

ACKNOWLEDGEMENTS

Authors would like to thank all community health practitioners and the facility staff for all the roles they played in making this research successful.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Centers for Disease Control and Prevention. About COVID-19. 2019. Available at: https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick.html. Accessed on 24 October 2022.
2. Yildiz CC, Kaban HU, Tanriverdi FS. COVID-19 pandemic and personal protective equipment: Evaluation of equipment comfort and user attitude. Arch Env Occup Health. 2022;77(1):1-8.
3. Ogoina D, Pondei K, Adetunji B, GIsichei C, Gidado S. Knowledge, attitude, and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria. J Infect Prev. 2015;16(1):1-6.
4. Zeb A, Muhammad D, Khan A. Factors Affecting Nurses' Compliance to Standard Precautions in Resource Scarce Settings. Am J Biomed Sci Res. 2018;4(5).
5. Beyamo A, Dodicho T, Facha W. Compliance with standard precaution practices and associated factors among health care workers in Dawuro Zone, South West Ethiopia, cross- sectional study. BMC Health Serv Res. 2019;19(3):81.
6. Champion VL, Skinner CS. The health belief model. Health Behav Health Educ Theory Res Pract. 2008;4(1):45-65.
7. Dotimi DA. Knowledge and practice of standard precautions among primary health care workers in Yenagoa, Nigeria. Acute Chronic Dis Rep. 2020(4):3.
8. NEDARC. Descriptive Study. 2010. Available at: http://www.nedarc.org/statisticalHelp/projectDesign/descriptiveStudy.html#crossSectional. Accessed on 24 October 2022.
9. National Population Commission. Population forecast. 2017. Available at: https://nigerianstat.gov.ng. Accessed on 24 October 2022.
10. Aziza G. Bayelsa State Senatorial Districts with their representatives. 2014. Available at: https://www.aziza.com.ng/read/2022/05/bayelsa-state-senatorial-zones/. Accessed on 24 October 2022.
11. Bayelsa State Primary Health Care Board. Bayelsa inaugurates primary health care board. 2018. Available at: https://thenationonlineng.net/bayelsa-inaugurates-primary-healthcare-board/. Accessed on 24 October 2022.
12. Ibama AS, Dennis P. "Role of Community Health Practitioners in National. Int J Clin Med. 2016;7(7).
13. Uniproject Material. How to calculate a reliable sample size using Taro Yemane Method. 2022. Available at: https://uniprojectmaterials.com/view-blog/how-to-calculate-a-relaible-sample-size-using-taro-yamane-method. Accessed on 24 October 2022.
14. Elendu IC. Fundamentals of research and statistics for students in human kinetics and other educational

disciplines. Port Harcourt. The glory of the latter house publishing company: 2010.
15. Bolarinwa OA. Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. Nigerian Postgrad Med J. 2016;22(4)195-201.
16. Amoran O, Onwube O. Infection control and practice of standard precautions among healthcare workers in northern Nigeria. J Glob Infect Dis. 2013;5(4):156-63.
17. Kim SJ, Lee EJ. Factors influencing emergency department Nurses' compliance with standard precaution using multilevel analysis. Int J Env Res Public Health. 2021;18(11):6149.
18. Haile TG, Engeda E H, Abdo AA. Compliance with Standard Precautions and Associated Factors among Healthcare Workers in Gondar University Comprehensive Specialized Hospital, Northwest Ethiopia. J Env Public Health. 2017;2:13-6.
19. Kang J, O'Donnell JM, Colaianne B, Bircher N, Ren, D, Smith KJ. Use of personal protective equipment among health care personnel: results of clinical observations and simulations. Am J Infect Control. 2017;45(1):17-23.
20. Madan AK, Raafat A, Hunt JP, Rentz D, Wahle MJ, Flint LM. Barrier precautions in trauma: is knowledge enough? Journal of Trauma Acute Care Surg. 2002;52(3):540-3.
21. Neves HC, Souza AC, Medeiros M, Munari DB, Ribeiro LC, Tipple AF. Safety of nursing staff and determinants of adherence to personal protective equipment. Rev Lat Am Enfermagem. 2011;19(2):354-61.
22. Cherrie JW, Semple S, Christopher Y, Saleem A, Hughson GW, Philips A. How important is inadvertent ingestion of hazardous substances at work? Ann Occup Hygiene. 2006;50(7):693-704.
23. Fan J, Jiang Y, Hu K, Chen X, Xu Q, Qi Y, Yin H, Gou X, Liang S. Barriers to using personal protective equipment by healthcare staff during the COVID-19 outbreak in China Medicine. Medicine (Baltimore). 2020;99(48).

Cite this article as: Dotimi DA, Odongo AO, Atei K. Individual factors affecting compliance with standard infection prevention precautions on the use of personal protective equipment among community health practitioners in Bayelsa State, Nigeria. Int J Community Med Public Health 2023;10:103-8.