



International Journal of Advanced Community Medicine

E-ISSN: 2616-3594
P-ISSN: 2616-3586
IJACM 2018; 1(2): 41-46
Received: 08-03-2018
Accepted: 09-04-2018

Mohammed Goje
Department of Veterinary
Public Health and Preventive
Medicine, University of
Maiduguri, Nigeria

Ahmed Dahiru Balami
Centre for Disaster Risk
Management and
Development Studies,
University of Maiduguri,
Nigeria

Musa Jarma
Shehu Sule College of Nursing
and Midwifery, Damaturu,
Nigeria

Suleiman Dauda
Shehu Sule College of Nursing
and Midwifery, Damaturu,
Nigeria

Correspondence
Ahmed Dahiru Balami
Centre for Disaster Risk
Management and
Development Studies,
University of Maiduguri,
Nigeria

Knowledge, attitude, self-efficacy and practice of standard precaution measures by nursing and midwifery students in Damaturu, North-Eastern Nigeria

Mohammed Goje, Ahmed Dahiru Balami, Musa Jarma and Suleiman Dauda

Abstract

It is expected that the habit of observing standard precaution measures among nurses should have been developed during the course of their training in school. The aim of this study was to determine the knowledge, attitude, self-efficacy and practice of standard precaution measures among nursing and midwifery students in Damaturu, Nigeria. This study utilized a cross-sectional study design, in which self-administered questionnaires were used to collect information from the respondents. A total of 125 respondents participated in the study. Spearman's correlation revealed significant positive correlations between knowledge and practice ($r=0.455$, p -value <0.001) and between self-efficacy and practice ($r=0.391$, p -value <0.001). Higher age was significantly associated with higher knowledge and higher practice; while higher school year was associated with higher knowledge and higher self-efficacy, but not higher practice. There is the need to replicate similar study among the professional nurses, to determine the need or not, for retraining.

Keywords: Standard precautions, nursing students, knowledge, self-efficacy, practice, Nigeria

1. Introduction

The World Health Organisation (WHO) defines standard precautions as measures employed to reduce the risk of transmitting blood borne and other pathogens from recognised and unrecognised sources ^[1]. It comprises of observing of hand hygiene; using personal protective equipment like gloves, masks and goggles; safe injection practices and safe handling of potentially contaminated surfaces in the patient's environment, and respiratory hygiene ^[2]. Non-observance of standard precautions could result in nosocomial infections, and nurses, being constantly exposed to blood and blood products, have high chances of getting infected by blood-borne infections like HIV and Hepatitis B. Standard precautions, are among the evidence-based interventions developed to reduce the incidence of health care associated infections ^[3]. In a tertiary health centre in Benin, Nigeria, only 25.4% of the nursing students had correct knowledge of universal precautions, with the remaining having either incorrect knowledge or no knowledge of it at all. Also, 57.7% of them were engaging in an unsafe practice of re-capping needles after use ^[4]. In a pre-intervention survey among undergraduate nursing students in Calabar, only 7.1% and 6.7% of them could appropriately explain the meaning of standard precautions and universal precautions respectively ^[5]. In contrast, good knowledge of universal precautions was reported among nursing students in Jos, but however, only 48.7% did not recap needles after use while 52.6% used gloves consistently ^[6]. In Nigeria, compliance with standard precautions has generally been poor even among professional nurses ^[7-10]. There also seems to be a wide knowledge-practice gap, as reported among nurses in a tertiary health centre in Gombe, that while 88.75% of them were aware of standard precautions, only 43.75% of them observed them always ^[11]. Inculcating into nursing students, the practice of standard precautions in the course of their training, is likely to make a great impacts in promoting such practices, even after graduation. The aim of this study was to determine the knowledge, attitude, self-efficacy and practice of standard precaution measures among nursing and midwifery students in Damaturu, Nigeria.

2. Materials and Methods

The study area was Damaturu, the Yobe State capital in north-eastern Nigeria, and the study was conducted at the Shehu Sule College of Nursing and Midwifery, Damaturu. It is a tertiary institution, responsible for training nurses and midwives. The training consists of classroom teachings and clinical postings in hospitals and other health centres. The aim of the clinical postings is for these students to acquire the practical skills of what they had learnt in class. The study utilised a cross-sectional study design, and the criteria for inclusion into the study was to be a registered student of the school, who must have also had some clinical attachment experience. Permission to conduct the study as well as ethical clearance were obtained from the office of the school management (SSN/ETHICS/USP/Vol.No1). Only students who were absent on the day of the study were excluded. Structured self-administered questionnaires were used to collect data from the respondents. This questionnaire consisted of questions on socio-demography, knowledge, attitude, self-efficacy and practice of standard precaution measures. For the knowledge section, each question had three options: 'Yes', 'No', and 'I don't know'. A correct answer was scored one (1), while a wrong answer was scored zero (0). For attitude, general attitude towards standard precautions was assessed with four questions, each with responses on a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'; as well as attitude towards specific measure for which eight questions were used, which had responses on a 5-point Likert scale which ranged from 'very unnecessary' to 'very necessary'. Seven questions were used to assess self-efficacy, each with responses on a 4-point Likert scale ranging from 'very hard' to 'very easy'. Seven items were used to assess their practice of standard precautions which asked of the frequency with which they performed those procedures. The responses for this section ranged from 'never' to 'almost always'. The obtained data was then analysed using Statistical Package for Social Sciences (SPSS) version 22. The total scores were obtained for each of the four variables by summing up the scores for all their respective items. Normality tests were performed the results showed that assumptions of normality were violated. As such, the mean was used to dichotomise respondents into those with higher or lower knowledge, attitudes, self-efficacy and practice, depending on whether they had scored up to the median and above or whether they had scored less than the median. Data were analysed descriptively and presented as frequency and percentage. Spearman's correlation was used to determine the association between knowledge, attitudes, self-efficacy and practice, while Chi-squared tests were performed to determine the association between socio-demographic factors with knowledge, attitudes, self-efficacy and practice.

3. Results

This study was conducted on the 24th of January, 2017. A total of 125 respondents participated in the study, with no case of refusal to participate, by eligible persons. There

were however instances of non-response to certain items of the questionnaire by some respondents. Table 1 presents their socio-demographic characteristics. Their ages ranged from 18 to 30 years. Most were females (76%) and single (84%). Kanuri (23.2%) and Hausa (23.2%), were the predominant ethnicities, and most were in their third academic year of study (64.8).

Table 1: Socio-demographic characteristics of respondents

Socio-demographic factor	Frequency	Percentage
Age		
Median \pm IQR	24 \pm 5	
Range	(18-30)	
Gender	n	(%)
Male	28	22.4
Female	95	76.0
Missing	2	1.6
Total	125	100
Ethnicity	n	(%)
Kanuri	29	23.2
Hausa	29	23.2
Bade	15	12.0
Ngizim	6	4.8
Others	41	32.8
Missing	5	4.0
Total	125	100.0
Marital status	n	(%)
Single	105	84.0
Married	13	10.4
Missing	7	5.6
Total	125	100.0
Program	n	(%)
Nursing	69	55.2
Midwifery	52	41.6
Missing	4	3.2
Total	125	100.0
Year of study	n	(%)
Year 1	24	19.2
Year 2	16	12.8
Year 3 and above	81	64.8
Missing	4	3.2
Total	125	100.0

Respondents' knowledge of standard precaution measures is presented in Table 2. All respondents agreed that hand washing was a hand hygiene method, and that gloves should always be worn before carrying out an invasive procedure. Only one respondent believed that hand washing was not necessary, after contact with one patient before touching the other; and another respondent, also believed that it was not necessary to wear protective goggles and facemask, when there were chances of blood splashes.

Table 2: Knowledge of universal precaution measures

Statement	Response		
	Yes	No	I don't Know
Standard precautions are applied to all patients irrespective of their diagnosis	115 (92.0)	7 (5.6)	1 (0.8)
Hand washing is a method of hand hygiene	116 (92.8)	0 (0.0)	0 (0.0)
Hands should be washed after contact with one patient before contact with the next	111 (88.8)	1 (0.8)	0 (0.0)
Gloves should always be worn before carrying out invasive procedures	119 (95.2)	0 (0.0)	0 (0.0)
When there are high chances of blood splash, both surgical mask and protective gloves should be worn	121 (96.8)	1 (0.8)	0 (0.0)
Used needles and sharp objects should be discarded in a dustbin	23 (18.4)	95 (76.0)	1 (0.8)
Used needles and sharp objects should be discarded in a sharps container	101 (80.8)	17 (13.6)	1 (0.8)
Used needles should be re-capped before discarding	15 (12.0)	106 (84.8)	0 (0.0)
While in the waiting room, patients with features of respiratory illnesses should wear surgical mask	102 (81.6)	14 (11.2)	4 (3.2)
Blood stained cotton and gauze should be discarded in a refuse dustbin	91 (72.8)	29 (23.2)	2 (1.6)
Blood stained cotton and gauze should be discarded in a bio-hazards bags	87 (69.6)	26 (20.8)	5 (4.0)
The same needle and syringe can be used to inject the same person twice	8 (6.4)	114 (91.2)	1 (0.8)

Table 3 presents respondents' general attitudes towards adopting standard precaution measures. Most believed it was difficult to always observe them (60.0%), and that they were time consuming (64.8%). Most of them however

agreed that observing these measures were very necessary in protecting both their own health (96.8%) and those of their patients (96%).

Table 3: General attitude towards universal precaution measures

Statement	Response				
	Strongly disagree	Disagree	I don't know	Agree	Strongly agree
How strongly do you agree or disagree with the following:					
It is difficult to always observe universal precautions	20 (16.0)	21 (16.8)	5 (4.0)	65 (52.0)	10 (8.0)
It is time consuming to always observe universal precautions	11 (8.8)	30 (24.0)	0 (0.0)	74 (59.2)	7 (5.6)
Observing universal precautions is very necessary in protecting my patient's health	2 (1.6)	0 (0.0)	1 (0.8)	60 (48.0)	60 (48.0)
Observing universal precautions is very necessary in protecting my own health	2 (1.6)	0 (0.0)	0 (0.0)	49 (39.2)	72 (57.6)

Table 4 presents respondents' attitudes towards specific precaution measures. For each of the protective measures, over 90% of the respondents had mentioned that observing them was either necessary or very necessary, with the

exception of asking patients with respiratory symptoms to use a mask, for which 12.8% had mentioned that they were unsure whether it was necessary or not.

Table 4: Attitude towards specific universal precaution measures

Statement	Response				
	Very unnecessary	Unnecessary	Neither unnecessary nor necessary	Necessary	Very necessary
How necessary or unnecessary do you think the following are:					
To always wash your hands after contact with one patient before contact with the next	1 (0.8)	1 (0.8)	3 (2.4)	66 (52.8)	54 (43.2)
To always wash or rub your hands after removing your hand gloves	1 (0.8)	1 (0.8)	4 (3.2)	72 (57.6)	47 (37.6)
To always clean and disinfect re-usable items like thermometer and stethoscope before use on another patient	4 (3.2)	5 (4.0)	4 (3.2)	65 (52.0)	47 (37.6)
To wear protective goggles when there is likelihood of spillage into the eyes	0 (0.0)	1 (0.8)	2 (1.6)	63 (50.4)	59 (47.2)
To wear surgical mask when there is likelihood of spillage into the mouth or nose	0 (0.0)	1 (0.8)	2 (1.6)	61 (48.8)	61 (48.8)
To ask all patients with respiratory signs and symptoms to wear a surgical mask	1 (0.8)	9 (7.2)	16 (12.8)	67 (53.6)	32 (25.6)
To practice universal precaution measures even when other colleagues are not doing so	2 (1.6)	5 (4.0)	8 (6.4)	72 (57.6)	35 (28.0)
To get myself immunised against Hepatitis B virus	0 (0.0)	1 (0.8)	8 (6.4)	51 (40.8)	64 (51.2)

Table 5 presents the respondents' levels of self-efficacies for observing standard precaution measures. For each

protective measure, less than a quarter of them believed they were either hard or very hard to perform.

Table 5: Self-efficacy for performing specific standard precaution measures

STATEMENT	Response			
	Very hard	Hard	Easy	Very easy
How easy or difficult is it for you to:				
To always wash your hands after contact with one patient before contact with the next	0 (0.0)	22 (17.6)	86 (68.8)	17 (13.6)
To always wash or rub your hands after removing your hand gloves	0 (0.0)	6 (4.8)	87 (69.6)	32 (25.6)
To always clean and disinfect re-usable items like thermometer and stethoscope before use on another patient	6 (4.8)	16 (12.8)	73 (58.4)	30 (24.0)
To wear protective goggles when there is likelihood of spillage into the eyes	1 (0.8)	24 (19.2)	68 (54.4)	31 (24.8)
To wear surgical mask when there is likelihood of spillage into the mouth or nose	1 (0.8)	24 (19.2)	68 (54.4)	31 (24.8)
To ask all patients with respiratory signs and symptoms to wear a surgical mask	5 (4.0)	25 (20.0)	70 (56.0)	25 (20.0)
To practice universal precaution measures even when other colleagues are not doing so	5 (4.0)	25 (20.0)	69 (55.2)	25 (20.0)

Respondents' practice of standard precaution measures is presented in Table 6. However, while none of them had mentioned never using any of the protective measures, only 28% reported always complying with them. Hand washing

after removing gloves was the most consistently practiced measure. A large number of them (38.4%) had never asked their patients with respiratory infections to wear a mask.

Table 6: Practice of standard precaution measures by respondents

Statement	Response				
	Never	Rarely	Sometimes	Often	Almost always
How frequently do you perform these tasks					
Washing your hands after contact with one patient before contact with the next	0 (0.0)	10 (8.0)	21 (16.8)	15 (12.0)	79 (63.2)
Washing or rubbing your hands after removing your hand gloves	0 (0.0)	1 (0.8)	16 (12.8)	18 (14.4)	88 (70.4)
Cleaning and disinfecting re-usable items like thermometer and stethoscope before use on another patient	3 (2.4)	11 (8.8)	17 (13.6)	15 (12.0)	79 (63.2)
Wearing protective goggles when there is likelihood of spillage into the eyes	11 (8.8)	17 (13.6)	24 (19.2)	9 (7.2)	64 (51.2)
Wearing surgical mask when there is likelihood of spillage into the mouth or nose	7 (5.6)	11 (8.8)	22 (17.6)	12 (9.6)	72 (57.6)
Asking all patients with respiratory signs and symptoms to wear a surgical mask	48 (38.4)	12 (9.6)	7 (5.6)	11 (8.8)	46 (36.8)
Practicing standard precaution measures even when other colleagues are not doing so	17 (13.6)	14 (11.2)	29 (23.2)	10 (8.0)	54 (43.2)

The reasons for non-full compliance with the standard precaution measures is presented in Table 7. Only one respondent mentioned that using these protective equipment reduced her skills, while over a half of them (50.4%), had

stated the non-availability of necessary equipment as their reasons for non-compliance with standard precaution measures.

Table 7: Reasons for not fully complying with standard precaution measures

Reasons	Frequency (n)	Percentage (%)
High workload	20	16.0
Time constraint	10	8.0
Poor supervision	33	26.4
Lack of clear protocol	19	15.2
Poor availability of necessary protective equipment	63	50.4
Protective equipment reduce my skills	1	0.8
Low/no support from colleagues	8	6.4

There were significant positive correlations between knowledge and practice ($r=0.455$, p -value <0.001) and between self-efficacy and practice ($r=0.391$, p -value <0.001). None of the other variables showed any significant correlation between them. Table 8 shows factors associated with knowledge, attitude, self-efficacy, and practice of

standard precautions among the respondents. Those on the nursing programme showed higher levels of knowledge on standard precautions compared to their counterparts in midwifery. None of the factors showed a significant association with motivation level.

Table 8: Factors associated with knowledge, attitude, self-efficacy, and practice of standard precautions

Variable		Knowledge		Attitude		Self-efficacy		Practice	
		Lower F (%)	Higher F (%)	Lower F (%)	Higher F (%)	Lower F (%)	Higher F (%)	Lower F (%)	Higher F (%)
Age	<24	26 (66.7)	12 (30.0)	20 (42.6)	36 (54.5)	21 (58.3)	37 (44.6)	36 (63.2)	23 (38.3)
	≥24	13 (33.3)	28 (70.0)	27 (57.4)	30 (45.5)	15 (41.7)	46 (55.4)	21 (36.8)	37 (61.7)
		$\chi^2=10.635$	$P<0.001$	$\chi^2=1.579$	$p=0.209$	$\chi^2=1.901$	$p=0.168$	$\chi^2=7.206$	$p=0.007$
Gender	Male	11 (28.2)	10 (23.8)	11 (22.9)	17 (25.4)	12 (33.3)	16 (18.8)	15 (25.9)	12 (19.7)
	Female	28 (71.8)	32 (76.2)	37 (77.1)	50 (74.6)	24 (66.7)	69 (81.2)	43 (74.1)	49 (80.3)
		$\chi^2=0.203$	$p=0.652$	$\chi^2=0.092$	$p=0.746$	$\chi^2=2.994$	$p=0.084$	$\chi^2=0.649$	$p=0.420$
Marital	Single	34 (91.9)	35 (83.3)	41 (89.1)	57 (87.7)	30 (85.7)	73 (90.1)	51 (89.5)	50 (87.7)
	Married	3 (8.1)	7 (16.7)	5 (10.9)	8 (12.3)	5 (14.3)	8 (9.9)	6 (10.5)	7 (12.3)
		$\chi^2=1.303$	$p=0.254$	$\chi^2=0.054$	$p=0.816$	$\chi^2=0.477$	$p=0.490$	$\chi^2=0.087$	$p=0.768$
Program	Nursing	13 (35.1)	35 (83.3)	29 (61.7)	36 (54.5)	22 (62.9)	47 (56.0)	28 (49.1)	38 (63.3)
	Midwifery	24 (64.9)	7 (16.7)	18 (38.3)	30 (45.5)	13 (37.1)	37 (44.0)	29 (50.9)	22 (36.7)
		$\chi^2=19.166$	$P<0.001$	$\chi^2=0.575$	$p=0.448$	$\chi^2=0.483$	$p=0.487$	$\chi^2=2.401$	$p=0.121$
Year	Year 1	11 (28.9)	2 (4.8)	10 (21.3)	12 (18.2)	3 (8.3)	21 (25.3)	11 (19.0)	13 (21.7)
	Year 2	8 (21.1)	2 (4.8)	5 (10.6)	10 (15.2)	8 (22.2)	8 (9.6)	9 (15.5)	7 (11.7)
	Year 3	19 (50.5)	38 (90.5)	32 (68.1)	44 (66.7)	25 (69.4)	54 (65.1)	40 (65.5)	40 (66.7)
		$\chi^2=16.004$	$p<0.001$	$\chi^2=0.564$	$p=0.754$	$\chi^2=6.614$	$p=0.037$	$\chi^2=0.434$	$p=0.805$

4. Discussion

Majority of the respondents in this study were females (76%), as similarly reported in previous studies among nurses and nursing students in Nigeria [5, 6, 11]. Also, only a 10.4% were married, suggesting either a lower enrolment, or a higher dropout rate among married persons, or delayed marriage amongst those wishing to pursue a career in nursing. This could be inferred, from the higher median age of respondents in this study (24 years), compared to the median age at first marriage of 16.4 and 25.5 years for females and males respectively in north-eastern Nigeria [12]. Almost all of them (92%), knew that standard precautions needed to be applied to all patients, irrespective of their diagnosis, which was even higher than findings among B.Sc. nursing students in a Saudi University, where, 84.38% stated that standard precautions should be applied to all patients [13]. Even though knowledge of the need to wash hands after every patient care was high, there was still room for improvement, as all the prospective nurses could be made aware of it, as reported in a previous study [14]. Though, almost all respondents in this study (92%) believed that Hepatitis B immunization was necessary, it was still less than findings from a similar previous study in Kerala, India, where almost all (98%) considered the vaccination necessary [15]. Even though most of the respondents described practicing the universal precaution measures as being either easy or very easy, as many as 24% said it was either hard or very hard to practice them when their other colleagues were not doing same. This points to the great role played by the work environment, and the need to factor it out in intervention programmes, as even highly motivated workers could get demoralised if they happen to be working amidst non-compliant co-workers.

Findings regarding hand washing were similar to that reported in in Riyadh, Saudi Arabia, where 75.8% of the students reported washing their hands, between patient contacts, while 78% reported disinfecting their hands after removing their hand gloves [16]. The protective measure with the least level of compliance in this study was the use of protective goggles, similar to a previous study among nursing students in the Philippines [17]. A strong correlation had been reported between adherence to standard precautions and availability of the necessary equipment [18, 19], which could be the likely reason why poor availability of the necessary protective equipment was most cited as the reason for non-compliance in this study, as in other previous studies in northern Nigeria [8, 20]. As such, the hospital authorities should ensure that these equipment are made readily available for the health workers. The need for strengthening supportive supervision of nursing care is indicated from the high percentage of those who stated poor supervision as the reason for their non-compliance.

Also, while 79.2% believed it was necessary or very necessary for masks to be worn by patients with respiratory signs and symptoms, a lesser proportion (76%) felt it was either easy or very easy to ask of those patients to use masks, which could be due to fears of being misconceived for stigmatization by those patients, as earlier reports have shown that patients could feel that they are being stigmatised, when personal protective equipment are used even by the health workers while attending to them [8]. A viable option which risks minimal resistance from the patients, is to make masks readily available at the clinics, and make it a rule for them to be worn by all patients

presenting with cough, at the registration centres, after triaging.

The finding of a significant positive correlation between knowledge and practice was in contrast to findings of a previous study which reported no significant association between the two [17]. Being at a higher year of study was expectedly, associated with higher knowledge of standard precautions in this study as in a previous study [4]. The higher knowledge among those with higher age could also be inferred from the relationship between year of study and age, as a person's age increases with the passing of school sessions. Midwives, with respect to their job description, seem more likely to interact more with blood, especially in the labour ward. This makes the higher knowledge reported among nursing students unexpected. The results also suggest that gender and marital status most probably, had no influence on the outcomes of the respondents' trainings in school. Similar to knowledge level, those in higher years of study could be expected to have more experience with those procedures, and as such accounting for the higher self-efficacy among them. Contrasting to these was the finding of no significant difference between year of study with practice, which could be explained by possible burn out by those in higher years of study, from doing it over years, and enthusiasm to conform to standard precaution measures among the newer students.

5. Conclusion

Overall, the results of this study show that the respondents possess very high levels of knowledge, attitude, self-efficacy, and practice for standard precaution measures. It is during the clinical postings that the nursing students are expected to acquire the necessary practical skills for their practice after graduation and as such, it is an opportunity to mould their practices to conform to universally accepted ones. It is recommended that a similar study be replicated among practicing nurses and midwives in the same state, so as to determine if these high levels of practice reported among students also apply to them. This would point out the level of sustainability of the training acquired during school and the need or not, for further interventions in the form of seminars and workshop trainings.

6. Competing Interests

None declared.

7. Acknowledgements

The authors wish to thank the management, staff and students of Shehu Sule College of Nursing and Midwifery, Damaturu, for their support in making this research successful.

8. Funding

No funding was received for this study.

9. References

1. WHO. Standard precautions in health care. Epidemic and Pandemic Alert and Response. Geneva, World Health Organisation, 2007.
2. Centers for Disease Control. Update: Universal Precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus, and other blood borne pathogens in health-care settings. MMWR. 1988; 37:377-388.

3. Siegel JD, Rhinehart E, Jackson M, Chiarello L. Guideline for isolation precautions: preventing transmission of infectious agents in health care settings. *Am J Infect Control*. 2007; 35:S65-164.
4. Ofili AN, Sogbesan SO. Knowledge and Practice of Universal Precautions among Student Nurses at a Nigerian Teaching Hospital. *African Journal of Nursing and Midwifery*. 2003; 5(4):39-43.
5. Edet OB, Edet EE, Samson-Akpan PE. Knowledge of standard precautions among undergraduate nursing students before and after a structured training session in Calabar, Nigeria. *African Journal of Nursing & Health Issues*. 2010; 1(2):73-83.
6. Jonah EY, Bewerang MK, Emmanuel E. Knowledge and Practice of Universal Precautions among Student Nurses in School of Nursing, Jos Nigeria. *International Journal of Public Health Research*. 2014; 2(5):59-63.
7. Sadoh WE, Fawole AO, Sadoh AE, Oladimeji AO, Sotiloye OS. Practice of universal precautions among healthcare workers. *Journal of the National Medical Association*. 2006; 98(5):722-726.
8. Egwuenu SE, Okanlawon FA. Infection control: nurses' knowledge and practice of universal precaution in Delta State, Nigeria. *Afr J Med Med Sci*. 2014; 43(2):127-34.
9. Ogoina D, Pondei K, Adetunji B, Chima G, Isichei C, Gidado S. Knowledge, attitude and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria. *Journal of Infection Prevention*. 2015; 16(1):16-22.
10. Iliyasu G, Dayyab FM, Habib ZG. Knowledge and practices of infection control among healthcare workers in a Tertiary Referral Center in North-Western Nigeria. *Annals of African Medicine*. 2016; 15(1):34-40.
11. Abubakar SM, Haruna H, Teryila KR, Hamina D, Ahmadu I, Babaji M *et al*. Assessment of knowledge and practice of standard precautions among nurses working at Federal Medical Centre Gombe, Nigeria. *Direct Research Journal of Health and Pharmacology (DRJHP)*. 2015; 3(1):1-11.
12. NPC. Nigeria Demographic and Health Survey: National Population Commission, 2013, 2014.
13. Ghalya HA, Ibrahim Y. Knowledge, Attitudes and Sources of Information among Nursing Students toward Infection Control and Standard Precautions. *Life Sci J*, 2014; 11(9):249-260.
14. García-Zapata MR, Souza ACS, Guimarães JV, Tipple AFV, Prado MA, García-Zapata MTA. Standard precautions: knowledge and practice among nursing and medical students in a teaching hospital in Brazil. *International Journal of Infection Control*. 2010; 6:1.
15. Paul B, Pawar A, Kumar D, Sujesh PK. A Study on Knowledge, Attitude and Practice of Universal Precautions among Medical and Nursing Students. *Scholars Journal of Applied Medical Sciences (SJAMS)*. 2014; 2(5E):1821-1823.
16. Colet PC, Cruz JP, Alotaibi KA, Colet MKA, Islam MSS. Compliance with standard precautions among baccalaureate nursing students in a Saudi university: A self-report study. *Journal of Infection and Public Health*. 2017; 10:421-430.
17. Labrague LJ, Rosales RA, Maricel M. Tizon. Knowledge of and Compliance with Standard Precautions among Student Nurses. *International Journal of Advanced Nursing Studies*. 2012; 1(2):84-97.
18. Piai-Morais TH, Orlandi FS, Figueiredo RM. Factors influencing adherence to standard precautions among nursing professionals in psychiatric hospitals. *Journal of School of Nursing*. 2015; 49(3):473-480.
19. Foluso O, Makuochi IS. Nurses and Midwives Compliance with Standard Precautions in Olabisi Onabanjo University Teaching Hospital, Sagamu Ogun State. *International Journal of Preventive Medicine Research*. 2015; 1(4):193-200.
20. Amoran O, Onwube O. Infection Control and Practice of Standard Precautions among Healthcare Workers in Northern Nigeria. *Journal of Global Infectious Diseases*. 2013; 5(4):156-163.