International Journal of Community Medicine and Public Health
Balami LG et al. Int J Community Med Public Health. 2017 Feb;4(2):560-564
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20170291

Original Research Article

Role of knowledge and attitude in determining standard precaution practices among nursing students

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Received: 27 October 2016
Accepted: 01 January 2017

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ABSTRACT

Background: Standard precaution practice (SPP) is aimed at protecting both patients and health professionals alike. The high rate of occupational hazards among health workers especially in developing countries is counterproductive and therefore requires thorough investigation and intervention. This study aims to determine the role of knowledge and attitude in determining SPP among nursing students.
Methods: This research involved 172 nursing students at the teaching hospital of University of Maiduguri. Sampling was done using simple random sampling. Knowledge and attitude on towards one of the filoviruses (Ebola) including recommended SPP towards its prevention were assessed by a self-administered questionnaire after written consent. For bivariate correlation, Pearson's correlation was used between knowledge and SPP, attitude and SPP, then knowledge and attitude. Subsequently the determinants of SPP were analyzed by multiple linear regression using SPSS (IBM Inc.) version 22. Significance level was 0.05 at 95% confidence interval.
Results: The mean scores were knowledge 26.27(±6.6), attitude 80(±8.9) and SPP 61.08(±9.04). Correlation results was significant between knowledge and SPP ($r=0.485$, $p<0.05$) as well as knowledge and attitude ($r=0.134$, $p<0.05$). Knowledge of nursing students was a significant determinant of SPP ($b = 0.663$, 95% CI = 0.48-0.84, $p<0.05$).
Conclusions: There is an association between knowledge and SPP despite the low level of knowledge among respondents. Improvements in the nursing program curriculum is recommended.

Keywords: Attitude, Determinants, Knowledge, Nursing students, Practice, Standard precaution

INTRODUCTION

Health workers are exposed to occupational hazards such as filovirus infection on a daily basis while performing their duties.[1] Standard Precaution Practice (SPP) popularly known as infection control measures are put in place to prevent such accidents however, the high rate of health personnel infected in medical centers across developing countries suggests there is poor compliance with these measures.[1–3] Only about 5% of health personnel in developing countries have access to optimum standard precaution services.[4] Nurses in particular due to the nature of their job and the close contact they have with patients are more at risk of such contagious diseases.[5–7] Nursing students on the other hand are even more vulnerable during training and skill

acquisition.[8–10] This makes them a group of interest that require close monitoring as well as repeated evaluation of their competence. In Nigeria, recent statistics report alarming figures of hospital transmitted infections across health centers.[1,11] This exponential pattern of incidence in nosocomial infections has been attributed to poor expertise [12,13], lack of support from government agencies [14,15] manifesting in poor compliance with SPP. [4,12-15] To solve this problem intervention needs to be made and with urgency. Studies have reported several modifiable factors to be associated with SPP.[1,16–18] However, few studies have explored the role of these factors in Nigeria. With proper investigation these can serve as a blueprint for administrators, decision makers and government officials when designing and implementing intervention programs. This study therefore aims to update this body of knowledge by determining the effect of knowledge and attitude on SPP in Nigerian nursing students.

METHODS

About 172 undergraduate nursing students at the University of Maiduguri Teaching Hospital participated in this study. The attendance sheets were used as a sampling frame to select respondents using simple random sampling with probability proportionate to size. Students in their first, second and third years of training were selected after a written consent and the response rate was 84.7%. The data collection instrument was a pre-tested knowledge, attitude and practice survey questionnaire adopted from the WHO.[19] Its validity was assessed by experienced public health specialists while its reliability was determined using the internal consistency method.[20] The alpha values were 0.80, 0.67 and 0.82 for knowledge, attitude and SPP sections respectively. The knowledge section assessed aspects such general knowledge, signs and symptoms, management and prevention of the Ebola hemorrhagic fever. Attitude questions were mainly on risk perception, willingness to treat patients, stigmatization of patients and confidence level in handling such patients. The practice section assessed frequency in SPP such as use of barriers and personal protective equipment, disposal of sharps, sterilization and disinfection and personal hygiene. All three variables of interest were collected on an interval scale. IBM SPSS, IBM Inc. version 22 was used for all data analysis. Measures of central tendency and dispersion were first calculated for all variables and reported as means, standard deviations and ranges. The three variables were then correlated using Pearson's correlation. All variables were then entered into the Multiple Linear Regression model to determine the effect of knowledge and attitude on SPP using backward likelihood ratio. Level of significance was set at $\alpha = 0.05$ and 95% confidence interval.

RESULTS

Descriptive analysis is summarized in Table 1. Measures of central tendency and dispersion such as the mean, standard deviation and range are presented for all variables. The average or mean knowledge score was 26.27 (SD±6.6, 95% CI = 25.27 – 27.26), the lowest score was 13 and highest was 39. The average attitude score was 80 (SD±8.9, 95% CI = 78.65 – 81.33), minimum score was 51 while maximum was 100. SPP average score was 61.08 (SD±9, 95% CI = 59.72 – 62.44), lowest SPP score was 42 and the highest at 82.

Table 1: Descriptive analysis for knowledge, attitude and SPP (N = 172).

Variable	Mean (±SD)	95% CI	Minimum	Maximum	Range
Knowledge	26.27 (6.6)	25.27 – 27.26	13	39	26
Attitude	80 (8.9)	78.65 – 81.33	51	100	49
SPP	61.08 (9)	59.72 – 62.44	42	82	40

Abbreviations; SD, Standard Deviation; CI, Confidence Interval.

The participant's knowledge, attitude and SPP scores were correlated in a bivariate analysis as illustrated in Table 2. A significant linear relationship existed between respondents knowledge and SPP scores ($r=0.485$, $p<0.05$) as well as knowledge and attitude ($r=0.134$, $p<0.05$). There was however no statistically significant linear relationship between attitude of respondents and their SPP scores ($r=0.096$, $p>0.05$).

Based on the correlation between knowledge and SPP ($r = 0.485$). The amount of variance in SPP explained by knowledge can be calculated using the r^2 value which is $(0.485)^2 = 0.235$. To interpret this in terms of a percentage we then multiply by 100 which gives 23.5. Therefore based on our findings, 23.5% of the variance in SPP in our study population was explained by their knowledge.

To determine the effect of knowledge and attitude on SPP, multivariate analysis was done using multiple linear regression. The goodness of fit of the regression model is displayed in Table 3. Based on this findings, our model was a significantly better predictor of SPP compared to using only the mean SPP score as a reference ($F = 52.15$, $p<0.05$). Therefore, it is concluded that our model has a good fit. The Durbin Watson test of independent errors

statistic was 1.72 which shows there is no autocorrelation between residual errors. Multicollinearity diagnostics show a variance inflation factor of 1.0 and a tolerance of 1.0 which are within acceptable ranges to show lack of collinearity across predictors.

Table 2: Correlation between knowledge, attitude and SPP.

		SPP	Knowledge	Attitude
Pearson correlation (r)	SPP	1.000	0.485	0.096
	Knowledge	0.485	1.000	0.134
	Attitude	0.096	0.134	1.000
Significance (p)	SPP	.	**<0.001****	0.105
	Knowledge	**<0.001****	.	**0.04***
	Attitude	0.105	**0.04***	.

Table 3: ANOVA analysis of goodness of fit.

Model	Sum of squares	Mean square	F	Significance
Regression	3283.31	3283.31	52.15	**<0.001****
Residual	10702.38	62.96		
Total	13985.69			

Table 4 shows the final multiple linear regression model with knowledge scores as the only significant determinant of SPP after controlling for confounders (b = 0.66, 95% CI = 0.48-0.84, p<0.05). The linear regression equation to predict SPP can then be plotted as

SPP = α + (b_1X_1) where SPP is the outcome variable, α is the b value of the constant, b_1 is the b value for knowledge and X_1 is the value of knowledge used to determine SPP. This can be used to predict SPP using the knowledge score of participant.

Table 4: Multiple linear regression model.

Model	B	SE	Sig	95% CI
(Constant)	43.66	2.49	<0.001	38.75 – 48.57
Knowledge	0.66	0.092	<0.001*	0.48 – 0.84

DISCUSSION

The mean SPP score in this study was 61.8 (±9) which is equivalent to 81% of the maximum score achievable. This is an improvement when compared to an earlier study in Nigeria where as low as 47% compliance was reported.[15] Statistically this result may seem acceptable however, clinically improvements can still be made. Our findings are similar to a study in Hong Kong and Brazil where as high as 71% rate of compliance with SPP was reported.[8,18]

Average knowledge of an infectious disease in this study was 26.27 (±6.6) which is low compared to what is acceptable. However, when these scores were correlated with participants SPP the result was statistically significant (r = 0.485, p<0.05). Similar linear relationship was reported in a study among undergraduate nurses in Australia.[21] Bivariate analysis also showed that about a fourth of the variance in SPP was explained by respondents knowledge (r^2 = 0.235). These results suggest knowledge and SPP scores co-vary and therefore, as one variable changes the other has a tendency to follow suit. Although this does not show causality, it proves to an extent that improvement in knowledge could positively translate into better SPP.

Multivariate analysis while controlling for confounders showed knowledge of nursing students was also a significant predictor of SPP, this correlated with findings from a study across health centers in Pakistan.[16] Also in India, health workers with more knowledge have been reported to have better compliance with SPP in prevention of infectious diseases.[22] The use of personal protective equipment was also reported to be associated with knowledge among Nepalese workers.[23]

All these findings stress that in order improve SPP it is vital to have highly knowledgeable health workers most especially in the nursing sector considering the nature of their job.[24] A limitation to solving this problem in developing countries however is the migration of skilled health workers to developed countries for access to better working conditions, favorable policies and higher salaries.[25] This unfortunately leaves behind a backlog of understaffed health centers with ill experienced workers in regions endemic to most known infectious diseases. Urgent changes therefore need to be made by educating and subsequently retaining skilled staff.

CONCLUSION

This study has established the role of knowledge as a determinant of SPP among undergraduate nursing

students. Despite the poor knowledge of infectious diseases, the participants still demonstrated an acceptable level of self-reported practice of standard precaution. This is an improvement from previous studies in Nigeria.

Recommendations

Both knowledge and SPP are modifiable factors that continue to change overtime. The relationship between these two variables illustrates the need for considering them in tandem during policy making and designing intervention programs. The nursing program is short and mostly clinically based in most centers which might contribute to the poor knowledge. To improve this, the duration as well as theoretical aspect of their training could do with some improvement in intensity while retaining the clinical component. This in turn will translate into better practices thus lowering the burden of hospital acquired infections.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee of University of Maiduguri Teaching Hospital as well as the Ethics Committee for Research Involving Humans at Universiti Putra Malaysia: UPM/TNCPI/RMC/1.4.18.1/JKEUPM/F2.

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Cite this article as: Balami LG, Surani IB, Saliluddin SM, Garba SH. Role of knowledge and attitude in determining standard precaution practices among nursing students. Int J Community Med Public Health 2017;4:560-4.