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A Cross–sectional Study to Determine the Association between Knowledge and Attitude with Hospital Infection Control Practices

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Abstract:
Aim: To determine the association between knowledge, attitude and hospital infection control practices among medical students.
Methods: A cross-sectional study was done at University of Maiduguri of which 251 medical students participated. Data on knowledge, attitude on the Ebola hemorrhagic fever as well as hospital infection control practices was collected using a self-administered questionnaire. Data analysis was done using IBM SPSS version 22 where association between variables was determined using multiple linear regression.
Results: Mean scores were; knowledge 33(±4.5), attitude 87(±10) and practices 66(±8). Practice was positively correlated with attitude ($r = 0.162$, $p<0.05$) and there was also a significant association between practice and attitude ($b = 0.137$, 95% CI = 0.33-0.24, $p<0.05$).
Conclusion and recommendation: Attitude is a significant predictor of hospital infection control practice. The improvement in health personnel attitudes through funding and positive policies can translate into improved practices.

Keywords: *practice, hospital infection control, predictors, medical students, attitude, knowledge*

1. Introduction

Hospital acquired viral diseases like hemorrhagic fevers have a high propensity for human to human transmission and are continuously becoming an increasing global health problem(Balami, Ismail, Saliluddin, & Garba, 2016). In 2002 the World Health Organization reported over 83,000 viral infections of nosocomial origin worldwide among health personnel(Janjua et al., 2007). The prevalence of these diseases has been reported to be on the rise in some parts of Nigeria (Balami et al., 2016; Olajubu, Osinupebi, Ismail, Bosede, & Deji-Agboola, 2012). This rise in morbidity may be as a result of unfamiliarity with the illness (Balami, Ismail, Saliluddin, & Garba, 2016), or the effect of decades of poor funding and unfavorable policies (Amoran & Onwube, 2013). Despite the intervention by non-governmental organizations and the international community in developing countries, local support is vital to effectively contain the threat posed by these pathogens. Young health care trainees tend to be at the receiving end of a bulk of these diseases as they lack experience and expertise yet are equally exposed during medical training (Cheung et al., 2015; D'Alessandro et al., 2014; Kim, Kim, Chung, & Kim, 2001). Several factors have been reported to be associated with hospital infection control practices (Balami et al., 2016a; Chaudhuri, Baidya, & Singh, 2015; Janjua et al., 2007; WHO, 2011). These findings when consistent and updated can be used to guide stake holders and policy makers in improving the current state of events. This study therefore aims to determine the association between knowledge and attitude of medical students with hospital infection control practices.

2. Methodology

A cross-sectional study was conducted in August 2015 at University of Maiduguri, Nigeria. This involved 251 participants which were medical students in their fourth, fifth and sixth years of training. The response rate was 95.4%.Data on knowledge and attitude about Ebola hemorrhagic fever as well as hospital infection control practices was collected using semi-structured questionnaire adopted from the WHO (WHO, 2008). Knowledge was assessed based on the responses of yes, no or I do not know where one mark was awarded for the right answer and no marks were awarded for wrong answers. Attitude was assessed using a Likert scale with five levels based on agreement, while hospital infection control practices was assessed using a four point Likert scale based on frequency. All variables were collated as continuous variables using IBM SPSS version 22 whereby descriptive analysis was first done as means and standard deviations. Knowledge, attitude and practice was then correlated in bivariate analysis using Pearson's correlation. Subsequently multivariate analysis was also done to determine the association between knowledge and attitude with hospital infection control practices using Multiple Linear Regression. Level of significance was set at $\alpha = 0.05$ and 95% confidence interval.

3. Results

3.1. Descriptive Analysis for Knowledge, Attitude and Practice

In Table 1 is presented the descriptive analysis for knowledge, attitude and practice. From the table it can be seen that the mean knowledge score was 33 (SD ±4.5, 95% CI = 32.76 – 33.87), the minimum score was 19 and maximum score was 42 while the range was 23. For attitude the mean score was 87 (SD ±10, 95% CI = 85.49 – 87.85), the lowest score achieved was 57 and the highest was 107 with a range of 50. In terms of practice, the mean score was 66 (SD ±8, 95% CI = 64.62 – 66.62), minimum practice score was 40 and maximum score 82 making the range 42.

Variable	Mean (±SD)	95% CI	Minimum	Maximum	Range
Knowledge	33 (4.5)	32.76 – 33.87	19	42	23
Attitude	87 (10)	85.49 – 87.85	57	107	50
Practice	66 (8)	64.62 – 66.62	40	82	42

Table 1: Descriptive analysis for knowledge, attitude and practice (N = 251)
Abbreviations; SD, Standard Deviation; CI, Confidence Interval

3.2. Correlation between Knowledge, Attitude and Practice

Table 2 shows bivariate analysis where knowledge, attitude and practice scores were correlated against each other. From the results it can be seen that there was significant correlation between attitude and practice scores ($r = 0.162$, $p<0.05$). However, there was no significant correlation between knowledge and practice scores ($r = -0.015$, $p>0.05$); as well as attitude and knowledge scores ($r = 0.060$, $p>0.05$).

		Practice	Knowledge	Attitude
Pearson Correlation (r)	**Practice**	1.000	-0.015	0.162
	Knowledge	-0.015	1.000	0.060
	Attitude	0.162	0.060	1.000
Significance (p)	**Practice**	.	0.406	**0.005***
	Knowledge	0.406	.	0.173
	Attitude	**0.005***	0.173	.

Table 2: Correlation analysis between knowledge, attitude and practice

From Table 2 based on the correlation between attitude and practice ($r = 0.162$), the r^2 value can be calculated which is $(0.162)^2 = 0.026$. When we convert this to a percentage by multiplying 100, the r^2 value is 2.62.This is the amount of variance in practice shared by attitude scores.

3.3. Multiple Linear Regression

Multiple linear regression analysis was conducted to determine the association between knowledge, attitude and practice of hospital infection control. From the results in Table 2, attitude has a significant linear relationship with practice. And although not significant in this study, a previous research conducted by Janjua et al., 2007 reported an association between knowledge and hospital infection control practice. Putting this into consideration the backward likelihood ratio method was used to determine the ability of knowledge and attitude scores to predict practice of hospital infection control.

3.3.1. Analysis of Goodness of Fit of the Model

Table 3 shows the overall goodness of fit of our regression model. The result shows a significant difference between a model with our predictor variables and that with only the mean ($F = 6.728$, $p<0.05$). 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.

Model		Sum of Squares	Mean Square	F	Sig.
	Regression	425.978	425.978	6.728	**0.010***
	Residual	15765.066	63.314		
	Total	16191.044			

Table 3: ANOVA analysis of goodness of fit

3.3.2. Multiple Linear Regression Model

From the results in Table 4, there was an association between attitude scores and practice of hospital infection control ($b = 0.137$, 95% CI = 0.33-0.24, $p<0.05$). Based on this result the linear regression model for practice can be plotted as

Practice = $\alpha + (b_1X_1)$ where Practice is the outcome variable, α is the b value of the constant, b_1 is the b value for attitude and X_1 is the value of attitude used to predict practice.

Model	B	SE	Sig	95% CI
(Constant)	53.71	4.619	<0.001	44.61 – 62.80
Attitude	0.137	0.053	0.01*	0.033 – 0.242

Table 4: Multiple linear regression model

4. Discussion

The findings in this study show attitude of medical students to be a predictor of their ability to practice hospital infection control, this was similar to a study done in Jordan (Al-Hussami, Darawad, & Almhairat, 2011). Bivariate analysis also showed that attitude and practice were positively correlated among our participants. This would mean as one variable increases the other has a tendency to co-vary. This is similar to what was reported from bivariate analysis on medical students attitude and practice scores in Fiji (Lui, Sarangapany, Begley, Coote, & Kishore, 2014). The variance in practice explained by attitude was quite low in this study, this unexplained variance may be the effect of other factors not included in this research. Nevertheless, the analysis of the models goodness of fit showed the models explained variability of practice to be significantly higher than its unexplained variability. This means that despite high percentage of unexplained variance, attitude scores are still a significant predictor of hospital infection control practice among medical students.

5. Conclusion and Recommendations

The quality of clinical services rendered depends highly of the attitude of care personnel(Rosenbaum, 2008), and when the attitude ratings are poor then patients are always at the receiving end (Sleeper & Bochain, 2013). The poor funding and neglect especially in developing countries has without a doubt contributed highly to this prevailing trend (Olowookere et al., 2015; WHO, 2014). Our findings thus show that if attitude of health care personnel are improved, it has a significant chance of likewise positively translating into better services and patient protection through increased adherence to hospital infection control practices. This can be done through improved funding by stake holders, implementation of sound policies and incentives such as welfare packages and insurance policies. It is most likely that overtime, the ripple effects of these positive changes will be visible on the incidence rates of such highly transmissible nosocomial infections.

6. Ethical Consideration

Ethics committee for research involving humans Universiti Putra Malaysia: UPM/TNCPI/RMC/1.4.18.1/JKEUPM/F2

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