Article

Nursing Students' Perceptions and Attitudes regarding Ebola Patients in South Africa

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Abstract

There is an association between the perceptions of and the attitudes to the willingness of nursing students to treat infectious diseases. However, this relationship between the perceptions, attitudes and willingness to treat rapidly spreading diseases with high fatality rates such as the Ebola virus is still evolving. The aim of this study was to explore and describe nursing students' perceptions of and attitudes to their willingness to treat Ebola patients in South Africa. Data were collected from 495 nursing students who voluntarily participated in a study on perceptions, attitudes and willingness to treat patients with the Ebola virus disease (EVD). A factor analysis was used to measure the association between nursing students' perceptions of and attitudes to their willingness to treat patients with EVD. The results showed that 44.8 per cent of the respondents expressed willingness to nurse patients with EVD. The willingness to care for patients with EVD was higher when family concerns and superstitious beliefs did not matter. Incentives and encouraging hospital settings were perceived to enhance a willingness to care for patients with EVD. The willingness to care for patients with EVD was less when a perceived fear of infection was high. To improve a willingness to care for patients with EVD, the identified perceptions and attitudes should be integrated in nurse training programmes. These factors may have a positive impact on the perceptions of and attitudes to caring for patients with EVD.

Keywords: attitudes; Ebola; nursing students; perceptions

Introduction

The World Health Organization (WHO) pronounced the Ebola outbreak a Public Health Emergency of International Concern in 2014 (Briand et al. 2014). Outbreaks of

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the Ebola virus disease (EVD) were recorded in the Democratic Republic of the Congo, Sudan, Gabon, the Republic of the Congo, and Uganda (WHO 2003). Subsequent outbreaks were documented in other sub-Saharan African countries which include Guinea, Liberia, Mali, Sierra Leone and Nigeria in 2014. Beyond sub-Saharan African countries, the incidence of Ebola has also been reported in the Philippines, Spain and the United State of America. Thus, the Ebola disease has evolved from being a regional problem to a global health concern due to the rapid spreading and the high fatality rates. Fatality rates of the Ebola disease range from 30 per cent to 90 per cent (Baize et al. 2014). About 11 314 deaths out of 28 634 cases were reported in 2015 (WHO 2015a). Out of the 2 127 reported cases in 2014, 1 145 died in the West African outbreak of the Ebola disease (WHO 2015b). About 509 out of 896 health workers who provided healthcare services in Guinea, Liberia and Sierra Leon died of contracting EVD (WHO 2015b).

The rate at which the Ebola virus spreads and its associated fatalities underscore the importance of preparedness of health professionals and potential healthcare workers. However, the thrust of numerous existing studies have been on the EVD and its impact on health professionals (Adongo et al. 2017; Baack and Alfred 2013; Olowookere et al. 2015). Several studies have examined the preparedness of health professionals to provide services during an outbreak of infectious diseases (Adongo et al. 2017; Baack and Alfred 2013). Other studies examined the factors associated with health workers' willingness to care for patients with EVD (Kim and Choi 2016). Some researchers have investigated knowledge, attitude and practice of health workers regarding EVD (Ahmad et al. 2016; Alfaki et al. 2016; Olowookere et al. 2015). However, a few studies have focused on the perceptions of and the attitudes of nursing students to the Ebola pandemic. In their study on knowledge and perception, Aung et al. (2015) found that 54.7 per cent and 55.3 per cent of the nursing students' had good knowledge and favourable perceptions of EVD respectively. This finding may have positive implications on the willingness of these nursing students to treat patients with EVD as professional health workers.

Chilton, McNeill, and Alfred (2016) examined knowledge, perceptions and willingness to treat patients with EVD among 308 nursing students. They found that licenced students had more knowledge of EVD which underscored their willingness to treat these patients. The study further revealed that the willingness to treat EVD was higher among older students. They concluded that promoting the willingness of nursing students to treat EVD required basic knowledge of EVD and training. In another study, students' willingness to treat infectious diseases was higher as qualified health professionals than as students (Milikovsky et al. 2013). They concluded that unwillingness to treat infectious diseases as students were attributes of limited knowledge, negative attitudes and perceptions about infectious diseases.

The existing studies on knowledge, perceptions and attitudes regarding the willingness to treat EVD patients were conducted in countries that have experienced or had threats

of suspected Ebola outbreaks (Ahmad et al. 2016; Aung et al. 2015; Chilton, McNeill, and Alfred 2016). One case of EVD and one death was reported in South Africa in 1996 (Georges et al. 1999). This was later followed by news of a nurse who died in a Johannesburg hospital after contracting the Ebola virus from a Gabonese patient. This sparked fears of the spread of the virus in South Africa, particularly among healthcare workers. Nevertheless, from 1996 to date no official case of EVD has been reported in South Africa. However, transborder and global migration puts South Africa at risk of possible outbreak. Mirrored EVD to HIV/AIDS, South Africa is the hardest hit country by HIV epidemics in sub-Saharan Africa. Furthermore, South Africa as one of the African leading economies has citizens working in countries where Ebola disease outbreaks have been documented.

High death rates among health workers showed contracting the Ebola virus from caring for the patients (Kilmarx et al. 2014). According to the WHO (2015a), the high proportion of infected medical staff could be attributed to a number of other factors such as inadequate staff and protective equipment as well as improper use of the available equipment to manage the Ebola outbreaks. In addition, transmission from patient to healthcare worker has been attributed to the long hours that healthcare workers spend in isolation rooms while providing care to EVD patients. Furthermore, the fear of death due to contracting the disease or quarantine and the stigma associated with EVD have been found to have an influence on the behaviours of healthcare workers towards Ebola patients, subsequently affecting their willingness to care for Ebola patients (Ahmad et al. 2016). Therefore, nursing students' perceptions of and attitudes to the willingness to treat infectious diseases are important in predicting the preparedness to contain disease outbreaks in South Africa. Nursing students are expected to care for EVD patients when the need arises as part of their learning experience, therefore their perceptions, knowledge, and attitudes regarding the diseases are important as potential front-line health workers. The aim of the study was to explore and describe the perceptions and attitudes of nursing students regarding their willingness to care for patients with EVD.

Method

A cross-sectional quantitative study was conducted among 520 nursing students from a university in South Africa in the 2018 academic year. Convenience sampling was used to obtain data from nursing students who had experiences in tending to patients as part of their learning programme.

Measures

Dependent variable: The main outcome variable was the willingness to nurse patients with EVD. The willingness to nurse patients with EVD was assessed by a single question, namely "Would you nurse a patient with EVD?" The response was

measured on a four-point scale from strongly agree (1 point) to strongly disagree (4 points). The responses to this question were dichotomised for binary logistic regression by combining "strongly agree" and "agree" as "Yes", signifying a willingness to nurse, and by coding it as 1, and by combining "disagree" and "strongly disagree" as "No", signifying an unwillingness to care, and by coding it as 0.

Independent variables: The main predictors in the study were perception and attitude. The respondents were asked to rate their level of agreement on the validated 14 statements related to perception and 11 attitudinal statements regarding the caring of patients with EVD on a four-point scale from 1 (strongly agree) to 4 (strongly disagree). Other background characteristics examined were age, gender, level of study, marital status, religion, family type and race. Each of these background variables was categorised.

Data Collection

A self-administered questionnaire was developed and validated by 30 nursing students. Data were also collected on background characteristics of the respondents. A total of 520 self-administered questionnaires were distributed to the respondents in the lecture halls. However, 495 questionnaires were correctly filled and used in the statistical analysis. Permission to conduct the study was obtained from the University Research Committee before the data collection (registration number SHS/18/PDC/16/0307). In addition, consent was obtained from individual respondents who agreed to be part of the study after a thorough explanation of the purpose of the study. The respondents were also made aware that their participation was voluntary. The survey was carried out in the university lecture halls allocated to the nursing department.

Statistical Analysis

Background characteristics and perceptions, attitudes and willingness to care for patients with EVD were analysed using descriptive statistics. Factors analysis of perceptions and attitudinal statements was conducted using the principal component method. Factors were extracted when the eigenvalue is equal to or greater than one. The extracted factors were rotated by the varimax method. Binary logistic regression models were used to examine the effect of the demographic characteristics and factor-analysed perceptions of and attitudes to the willingness to treat patients with EVD using the forward stepwise method. In model 1, associations between background characteristics and the willingness to treat EVD were examined. Factor-analysed perceptions of and attitudes to the willingness to treat patients with EVD were assessed in model 2 while controlling for the background characteristics. Analyses were performed using IBM SPSS version 25. The results were presented as frequencies, percentages, odds ratio and confidence interval.

Results

Demographic Profiles of the Respondents

Table 1 describes the respondents' demographic characteristics. Half of the respondents were in their early twenties. Over three-quarters of them were females. Nearly half (48.6%) were in level 3 of their nursing training whereas less than a quarter had post-basic education. More than three-quarters and over four-fifths were single and Christians respectively. Over 70 per cent indicated monogamy as their family type and the majority (99.4%) belong to the black race. About two-fifths indicated their willingness to nurse patients with EVD.

Table 1: Percentage distribution of respondents by selected background characteristics

Characteristics	**Total (N = 495)**	**Percentage (%)**
Age		
< 20	53	10.7
20–24	248	50.2
25–29	102	20.6
30+	91	18.4
Gender		
Male	64	12.9
Female	431	87.1
Level of study		
Level 1	83	16.8
Level 2	38	7.7
Level 3	241	48.6
Level 4	48	9.7
Post-basic	85	17.2
Marital status		
Single	386	78.0
Married	109	22.0
Religion		
Christianity	492	99.4
Other	3	0.6
Family type		
Single parent	84	17.0
Monogamy	365	73.8
Polygamy	46	9.2

Characteristics	Total (N = 495)	Percentage (%)
Race		
Black	492	99.4
Other	3	0.6
Willingness to nurse patients with EVD		
No	273	55.2
Yes	222	448
Total (%)	495	100

Perceptions of Patients with EVD

Table 2 summarises the respondents' perceptions of caring for patients with EVD. About two-thirds of the respondents disagreed that their parents would be against their involvement in caring for patients with EVD. Those who agreed that their mothers, fathers and sibling would be opposed to their caring for Ebola patients had higher percentages compared to those who disagreed among family factors. The percentage that disagreed that an Ebola patient has committed an undesirable act or that undermined their culture by given funeral rites to a person who died of EVD was higher than those that agreed. A total of 81 per cent disagreed that lynching or putting a curse on them would hinder them from caring for patients with EVD. Slightly over half (52.4%) disagreed that violence against them would not deter them from caring for patients with EVD. Over 70 per cent disagreed that they would abandon an Ebola patient and discriminate against persons who survived Ebola in the same house.

Table 2: Percentage distribution of respondents who agreed or disagreed with perceptions

Perception statements	Agreed N (%)	Disagreed N (%)
Family-related factors		
My parents will protest against my involvement in caring for an Ebola patient	43 (32.6)	89 (67.4)
My mother will never allow me to work in a hospital where Ebola patients are admitted or being treated	301 (60.9)	193 (39.1)
My father will never allow me to work in a hospital where Ebola patients are admitted or treated	290 (58.9)	202 (41.1)
My siblings will forsake me if they find out that I am involved in nursing Ebola patients	272 (55.3)	220 (44.7)
My husband/wife/partner will never allow me to work in a hospital where Ebola patients are admitted or being treated	226 (45.7)	268 (54.3)

Perception statements	Agreed N (%)	Disagreed N (%)
Being involved in nursing an Ebola patient can lead to divorce or separation from my partner or spouse	274 (55.6)	219 (44.4)
Cultural and community factors		
According to our culture, anybody inflicted by Ebola has committed undesirable acts which they are paying for	256 (48.1)	273 (51.9)
Our culture is undermined by not allowing family members or the community to perform the last rites for individuals that died of the Ebola virus. Therefore, I cannot work in a system that shows disrespect for our people	115 (23.3)	378 (76.7)
It is dangerous to go against the wish of our people. They fear being infected by you if you nurse an Ebola patient. If you do, they can lynch you or put a curse on you. Therefore, I will never engage in nursing patients with the Ebola virus	93 (18.8)	401 (81.2)
My community may ostracise me if my relative allows me to participate in nursing Ebola patients	152 (30.8)	341 (69.2)
My greatest fears for not willing to participate in nursing Ebola patients are stigma and the possibility of xenophobic attack	144 (29.1)	350 (70.9)
Even if am ready to work in a facility where Ebola patients are being treated, the risk of threat of violence against me by our community people will make me to think way more than twice	235 (47.6)	259 (52.4)
Because of the fear of rejection by our community, I cannot participate in nursing an Ebola patient	324 (65.6)	170 (34.4)
In case there is an outbreak, Ebola patients should be abandoned in faraway bush and be left to die there so as to stop the epidemic	71 (14.4)	422 (85.6)

Attitudes to Patients with EVD

Table 3 presents the respondents' attitudes to caring for patients with EVD. Less than half (48.5%) of the respondents were of the opinion that the current protective measures are ineffective. Over 60 per cent (68.1%) and 55.5 per cent agreed that poor hospital infrastructure and no insurance respectively would hinder them from nursing Ebola patients. Furthermore, about 73.0 per cent of the respondents agreed that the current medication for treating the Ebola virus does guarantee survival. About 63.7 per cent and 72.6 per cent agreed that poor hygienic conditions and inadequate resources would militate against nursing Ebola patients. Higher percentages, 64.6 per cent and 55.2 per cent, of the respondents disagreed that they would work in wards where Ebola patients are treated even if they were offered a special salary and comprehensive

insurance package respectively. However, over 60 per cent agreed that adequate counselling for professional health workers and the availability of a vaccine could motivate them to nurse Ebola patients.

Table 3: Percentage distribution of respondents who agreed or disagreed with attitudinal statements

Attitudinal statements	**Agreed N (%)**	**Disagreed N (%)**
Issues related to working conditions and precautionary measures		
Since patients who survive the Ebola disease still carry the virus, I cannot risk my life by living in the same house with such a patient, talk less of giving nursing care to Ebola patients	142 (28.8)	351 (71.2)
Patients show that the current protective measures are ineffective. Therefore, I cannot expose myself to the risk	239 (48.5)	354 (51.5)
The infrastructure in the hospitals are good that I will advise any nurse or doctor to get involved in the care of Ebola patients in the case of any outbreak	335 (68.1)	157 (31.9)
As a student nurse, I have no insurance cover, therefore I cannot risk my life by accepting to work in a hospital where patients with the Ebola virus are being treated	274 (55.5)	220 (44.5)
Since the current drugs being used for treating Ebola patients do not guarantee that one will survive in the case of an infection, I cannot take the risk of nursing such cases in the event of an outbreak	360 (73.0)	133 (27.0)
Hygiene when working in a facility for treating Ebola patients, the possibility of cross-infection is possibly limited. Therefore, I do not mind being posted to a health facility/ward/unit for treating Ebola patients in the case of an outbreak	314 (63.7)	179 (36.3)
If resources for the care of Ebola patients are adequate, I do not mind to nurse cases of Ebola	358 (72.6)	135 (27.4)
If a special salary pay package is offered, I will accept to be posted to a ward for the care of Ebola cases	174 (35.4)	317 (64.6)
Apart from a good financial reward, there should be a comprehensive insurance package for me to accept to nurse patients suffering from Ebola	220 (44.8)	271 (55.2)
Working in a ward for nursing Ebola patients can be very risky	310 (631)	181 (36.9)
What can make me accept to work in a ward where Ebola patients are being treated is the availability of a vaccine that can protect me	295 (59.7)	199 (40.3)

Factor Analysis

Table 4 shows that the proportion of the variance in willingness to nurse Ebola patients explained by each of the perceptions and attitudinal statements is given as communality. Seven factors that were extracted had eigenvalues over Kaiser's criterion of 1 which in combination explained the 67.1 per cent of variance in willingness to nurse Ebola patients. Loading as factor 1 were statements associated with respondents' perceived family concerns on nursing Ebola patients. Factor 1 had an eigenvalue of 3.9 and explained the 16.8 per cent of variance in caring for patients with EVD. Factor 2 correlates with the provision of incentives as motivation for treating patients with EVD which had an eigenvalue of 2.1 and explained the 9.1 per cent of the total variance. Factor 3 associated with the superstitious belief that Ebola disease is a repercussion for committing a sacrilege explained about 8.9 per cent of the total variance in treating patients with EVD. Factor 4 explained 8.9 per cent of the willingness to treat patients with EVD which relates to the fear of stigmatisation and attacks from the community. Factor 5 which associated attitudes to nurse Ebola patients with fear of being infected, accounted for 8.9 per cent of the total variance. Factor 6 which explained 7.2 per cent of the total variance, associated treating patients with EVD with limited knowledge about the prognosis of Ebola. Factor 7 which explained about 7.2 per cent of the total variance, correlated with infrastructure and hygiene in the hospital environment for nursing Ebola patients.

Table 4: Factor loadings and communality values for perception and attitudinal variables sorted and rotated factor matrix

Factors		**Communality value**	**Eigen value**	**Variance explained (%)**
Factor 1: Perceived family concerns			3.9	16.9
My father especially will never allow me to work in a hospital where Ebola patients are admitted or treated	.871	.829		
My mother especially will never allow me to work in a hospital where Ebola patients are admitted or being treated	.850	.785		
My parents will protest against my involvement in caring for an Ebola patient	.811	.787		
My husband/wife/partner will never allow me to work in a hospital where Ebola patients are admitted or being treated	.728	.715		
My siblings will forsake me if they find that I am involved in nursing Ebola patients	.676	.718		

Factors		Communality value	Eigen value	Variance explained (%)
Being involved in nursing an Ebola patient can lead to divorce or separation from my partner or spouse	.486	.677		
Factor 2: Incentive and reward			2.1	9.1
What can make me accept to work in a ward where Ebola patients are being treated is the availability of a vaccine that can protect me	.686	.557		
Apart from a good financial reward, there should be a comprehensive insurance package for me to accept to nurse patients suffering from Ebola	.572	.683		
As a student nurse, I have no insurance cover, therefore I cannot risk my life by accepting to work in a hospital where patients with the Ebola virus are being treated	.509	.689		
If a special salary pay package is offered, I will accept to be posted to a ward for the care of Ebola cases	.487	.610		
Factor 3: Superstitious attachment to diseases			2.1	8.9
According to our culture, anybody inflicted by Ebola has committed undesirable acts which they are paying for	.750	.664		
In case there is an outbreak, Ebola patients should be abandoned in faraway bush and be left to die there so as to stop the epidemic	.733	.716		
Our culture is undermined by not allowing family members or the community to perform the last rites for individual that died of Ebola	.609	.645		
Because of the fear of rejection by our community, I cannot participate in nursing Ebola patients	.526	.511		
Factor 4: Fear of community stigmatisation			2.0	8.9
Even if am ready to work in a facility where Ebola patients are being treated, the risk of threat of violence against me by our community people will make me to think way more than twice	.778	.749		
My community may ostracise me if my relative allows me to participate in nursing Ebola patients	.704	.750		
My greatest fears for not willing to participate in nursing Ebola patients are stigma and the possibility of xenophobic attacks	.409	.534		
Factor 5: Fear of infection			2.0	8.9
Working in a ward for nursing Ebola patients can be very risky	.826	.706		

Factors		Communality value	Eigen value	Variance explained (%)
Patients show that the current protective measures are ineffective. Therefore, I cannot expose myself to the risk of getting infected by the Ebola virus	.636	.539		
Since the current drugs being used for treating Ebola patients do not guarantee that one will survive in the case of an infection, I cannot take the risk of nursing such cases in the event of an outbreak	.535	.597		
Factor 6: Limited knowledge			1.7	7.2
Since patients who survive the Ebola disease still carry the virus, I cannot risk my life by living in the same house with such a patient, talk less of giving nursing care to Ebola patients	.814	.785		
It is dangerous to go against the wish of our people. They fear being infected by you if you nurse an Ebola patient. If you do, they can lynch you or put a curse on you. Therefore, I will never engage in nursing a patient with the Ebola virus	.772	.687		
Factor 7: Encouraging hospital environment			1.7	7.2
If resources for the care of Ebola patients are adequate, I do not mind to nurse cases of Ebola	.796	.713		
The infrastructure in the hospitals are so poor that I will not advise any nurse or doctor to get involved in the care of Ebola patients in case of any outbreak	.743	.738		
Hygiene when working in a facility for treating Ebola patients, the possibility of cross-infection is possibly limited. Therefore, I do not mind being posted to a health facility/ward/unit for treating Ebola patients in the case of an outbreak	.649	.541		

Logistic Regression

The results of parsimonious logistic regression analysis are presented in Table 5. Model 1 showed that age, level of study and family type were associated with the respondents' willingness to treat patients with EVD. Compared to those who were below the age of 20, the respondents in their early and late twenties showed 69 per cent and 72 per cent reduced odds ratio of reporting willingness to nurse Ebola patients. The respondents who were in level 2 showed significant positive attitudes in stating willingness to nurse Ebola patients compared to those in level 1. Compared to single parents, the respondents in monogamous and polygamous family type were less likely to reporting willingness to nurse Ebola patients. However, gender and marital status were not associated with attitudes to nursing Ebola patients.

In model 2, the effects of demographic characteristics were weakened, whereas factor scores, perceived family concerns, the provision of incentives, cultural or superstitious beliefs, the fear of infection, and the status of the hospital environment were significantly associated with reporting attitudes to nurse patients with EVD. Those who perceived that family concerns would not deter them from performing ethical assignments were more likely to indicate willingness to nurse Ebola patients. Those who indicated that incentives are essential were more likely to state a willingness to care for patients with EVD. Compared to linking diseases to cultural beliefs or superstitions, those who did not were seven times more likely to state willingness to nurse patients with EVD. Those who were afraid of being infected were less likely to report willingness to nurse patients with EVD. A perceived encouraging hospital environment was significantly associated with positive attitudes to nurse patients with EVD.

Table 5: Odds ratio from parsimonious logistic regression models of willingness to treat an Ebola patient by characteristics

	Model 1		**Model 2**	
Variables	**Odds ratio**	**95% CI**	**Odds ratio**	**95% CI**
Age:				
< 20	1.000			
20–24	0.308***	0.150–0.634	–	–
25–29	0.281***	0.122–0.645	–	–
30+	0.663	0.298–1.478	–	–
Level of study:				
Level 1	1.000			
Level 2	3.919***	1.584–9.691	–	–
Level 3	1.628	0.898–2.950	–	–
Level 4	2.080	0.915–4.728	–	–
Post-basic	1.864	0.898–3.870	–	–
Family type:				
Single parent	1.000			
Monogamy	0.338****	0.195–0.584	–	–
Polygamy	0.414*	0.189–0.909	–	–
Factors:				
Factor 1	–	–	3.402***	1.411–8.205
Factor 2	–	–	2.490*	0.944–6.606
Factor 3	–	–	7.634****	2.631–22.167
Factor 5	–	–	0.332*	0.135–0.814
Factor 7	–	–	3.453***	1.527–7.805

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$
****$p \leq 0001$
1.000 Reference category, CI confidence interval

Discussion

The high virulence of the Ebola virus puts nurses at risk because of the constant closeness with EVD patients. About two-thirds of the nursing students indicated a willingness to treat patients with EVD which is similar to a previous study among medical and nursing students at a Nigerian university (Balami et al. 2016). However, this proportion of students reporting a willingness to treat patients with EVD is higher than that reported among health workers in Korea (Kim and Choi 2016). In line with previous studies, an unwillingness to render services may have negative implications of crippling the public heath response to an infectious disease outbreak (Barnett et al. 2012; Gershon et al. 2010). It brings to focus the importance of education to improve the nursing students' perceptions of and attitudes to infectious diseases in general.

The results of this study on nursing students' willingness to treat patients with EVD have a greater bearing on perceptions and attitudes than background characteristics. This was observed after controlling for background characteristics, and is consistent with previous studies that found no association between age and positive attitudes to EVD (Rübsamen et al. 2015). The findings also contradict other studies in Nigeria (Balami et al. 2016) that reported a positive association between the level of study and attitudes to EVD. The finding of willingness to nurse patients with EVD opposed to family-related disapproval may suggest an assertion of moral obligation to treat patients irrespective of the risk involved. This finding is consistent with the report on willingness of medical students to treat infectious diseases in Israel (Milikovsky et al. 2013).

The result also revealed that good incentives could motivate the willingness to care for patients with EVD. This highlights the need for the government to implement a comprehensive insurance scheme and rewards that aim at boosting the moral of health workers who are always at the front line to contain the spread of epidemics. The willingness to nurse patients with EVD among nursing students who did not link EVD to cultural beliefs or clandestine forces is encouraging. Previously, studies in South Africa (Kalichman and Simbayi 2004; Scott 2010) found that HIV/AIDS was associated with supernatural forces or malicious spirits that inflict diseases on people. The implication was that humans cannot contend with malicious spirits if they play a role in the spread of HIV/AIDS. It would appear that massive education to correct misconceptions and perceptions about HIV/AIDS perhaps translated to positive perceptions of and attitudes to a willingness to care for patients with EVD. Overcoming cultural or superstitious beliefs about infectious diseases may contribute to these nursing students availing themselves to render expert services in times of disease outbreak.

Our result is in concert with earlier studies (Balami et al. 2016; Kim and Choi 2016; Narasimhulu et al. 2016) that reported the fear of being infected as a hindrance to the willingness to treat patients with EVD. The fear of unwillingness to respond to

patients with EVD is mirrored to other severe infectious diseases in which health workers perished (Simonds and Sokol 2009; Taylor, Rutkow, and Barnett 2014). On the other hand, health professionals who treat HIV/AIDS patients regularly were not in dread of being infected. This indicates the need for communication between health workers and patients. More important, exposing nursing students to pathophysiology and epidemiology of all possible diseases may translate to positive perceptions and attitudes of willingness to nurse patients.

Positive perceptions of and attitudes to a willingness to treat patients with EVD revolve around an encouraging hospital environment. This underscores the importance of humanistic values and universal precautionary measures in the hospital settings. While nursing students are being equipped to deliver health services to the public, they also anticipate rendering these services in a hygienic and safe environment. This therefore draws the attention of the government to the importance of consistently improving hospital environments for public services.

Conclusion

The findings of the study show actionable dimensions to enhance the willingness to treat patients with EVD. There seems to be a willingness to treat these patients but a major concern gravitates toward safety. Strategies to improve perceptions of and attitudes to a willingness to nurse EVD or any infectious disease should consider motivating nurses through incentives. Furthermore, nursing education need to integrate pathophysiology and epidemiology of infectious diseases as much as possible in the curriculum. The aim would be to equip the nursing students with sufficient knowledge that would translate to positive perceptions and attitudes of willingness to nurse patients as front-line health workers in the event of outbreaks of diseases.

Limitations

The strength of this study is positing possible expectations and preparedness of potential health professionals in the event of disease outbreaks, which are thought-provoking. However, there are limitations to be considered. The sample was from one institution and may not be extrapolated to other nursing institutions in the region. The study used a self-reported questionnaire, which has the tendency of misreporting the actual perceptions and attitudes especially in the face of actual disease outbreaks. The instrument used was designed by the researchers and has only face validity. However, the questions used were adapted from instruments in recent studies which investigated similar objectives, and which we think have minimised the extent of the limitations in the present findings. Furthermore, Cronbach's coefficient alpha of the perceptions and attitudes of willingness to treat Ebola patients was 0.85, indicating good reliability.

Therefore, the study has used a baseline instrument which will add to the emerging research framework on EVD.

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