

The Effect of Social Cognitive Theory-based Educational Intervention on the Percutaneous Injuries Rate and their Reporting among the Registered Nurses in Selected County Hospitals in Kenya

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Abstract

Introduction: World Health Organization (2010) estimates that over 2.5% of all HIV and other infections in sub-Saharan Africa are transmitted through blood and body fluids exposures. Percutaneous injuries are frequent occurrences to nurses and are not always adequately assessed and/or addressed because of massive under-reporting of the accidents. The objective of the study was to analyse the effectiveness of structured education to Registered Nurses in influencing the compliance with the Standard Precautions and incidence rate of percutaneous injuries in Selected County Referral Hospitals

Methods: This was a prospective Quasi Experimental study. The respondents were registered nurses in the selected hospitals. These nurses were exposed to structured education as the intervention where self-administered Questionnaires and an Observational schedule were used before and after the intervention. The study has employed both descriptive and inferential statistics to analyse the data. Results have been presented in text, tables and graphically.

Findings: The prevalence of percutaneous injuries for the previous year was still high at 32.1% with a mean frequency of 2.1(SD=1.3) injuries per respondent. The annual percutaneous incidence rate was 18.6 and 25.8 injuries per 100 fulltime employees respectively for the study group and the control group after the intervention. Around 70% of the percutaneous injuries are not reported. The self-reported knowledge scores on the Standard Precautions was 58.5%.

Conclusion: Both self-efficacy and collective efficacy of healthcare workers on sharp management is a product of vicarious learning by friendly and conducive environment, motivation and robust cognitive understanding. Educational interventions should be rooted in the Social Cognitive Theory, Thorndike's Principles of Learning for greater impacts and desirable outcomes on nurses.

Key Words: Percutaneous Injuries, Reporting, Needle Stick Injuries

Introduction

The World Health Organization estimates that over three million percutaneous injuries afflict the health workers annually among forty million health workers globally (World Health Organization, 2010). Health workers in Africa experience between up to five percutaneous injuries per year with Nigeria, Tanzania and South Africa reporting an average of 2.4 injuries per health worker

(Mbaisi, Nganga, Wanzala, & Omolo, 2013).

A study to establish the prevalence of percutaneous injuries among the nurses/midwives at a Ugandan hospital determined that 46% of the respondents had experienced percutaneous injuries in the previous year (Odongkara et al., 2012) while

in similar study Rift Valley General Hospital(Kenya), it is estimated around 53% of the nurses had experienced percutaneous injuries in the previous year (Mukthar, Karani, & Kangethe, 2009).

Among blood borne diseases that can be transmitted via percutaneous injuries, HIV infection is the most common and significant one(Amuwo, Lipscomb, McPhaul, & Sokas, 2013). The risk of being infected with HIV from a single prick with a sharp gadget that has been used on an HIV-infected person is thought to be about 1 in 150. The World Health Organization and International Council of Nursing estimate that approximately 2.5% of all HIV infections in sub-Saharan Africa are transmitted through unsafe healthcare injections and other sharp objects. Because of this, the United Nations General Assembly has continuously encouraged the nations of the world to implement precautions to prevent HIV transmission by health workers either to themselves or to others(Phillips, Conaway, Parker, Perry, & Jagger, 2013). While less than 10% of the HIV among health workers is the result of an exposure at work to percutaneous injuries, 95% of the HIV occupational sero-conversions are preventable with practical, low-cost measures and have the co-benefit of preventing exposure to other blood borne viruses and bacteria (Boden, Petrofsky, Hopcia, Wagner, & Hashimoto, 2014).

Antiretroviral treatment reduces both the mortality and the morbidity of HIV infection, but these drugs are expensive and routine access to antiretroviral medication is not available in some countries. Due to the difficulty in treating HIV infection, preventing infection is a key aim in controlling the AIDS (Chughlay, Njuguna, Cohen, & Maartens, 2015).Post-exposure prophylaxis (PEP) is a short term preventive antiretroviral therapy that greatly reduces

the chances of HIV infection after potential infection either through sexual engagement or in the line of duty for health workers. PEP is provided as part of Comprehensive precautions package that reduces the health workers exposures to infectious hazards at works (World Health Organization, 2010).Percutaneous injuries are frequent occurrences in health workers, and are not always adequately assessed and/or addressed because of massive under-reporting of the accidents within the hospital. This has resulted in underestimation of current occupational exposure of health care workers to HIV (Courtenay-Quirk et al., 2016). Therefore this study set out to determine the Effect of Social Cognitive Theory-based Educational Intervention on the Percutaneous Injuries Rate and their Reporting among the Registered Nurses in Selected County Hospitals in Kenya. The study's null hypothesis was there is no significant difference in the incidence rate per fulltime employee of percutaneous injuries between the interventional and the control group.

The Theoretical Framework: Social Cognitive Theory is a theory developed by Albert Bandura in 1960s and improved in late 1980s.The gist of The Social cognitive Theory according to (Bandura (2010), is that human beings learn by observing others(vicarious learning), within the context of social interactions in a setting herein referred to as the environment but subject to ones cognition which entails ones personality. The learned behaviors are central to ones personality. What makes the Social Cognitive Theory unique is that it proposes that learning considers how people maintain a learned behavior, considers past experiences and is a collective function of Self-Efficacy, goals and Outcome expectancies. The Social Cognitive Theory emphasizes that the dynamic interaction

(Triadic Reciprocal Determinism) between people (personal factors), their behaviors and their environment.

Methods

This was a prospective Quasi- Experimental study precisely Nonequivalent Control Group study whereby the units of observation (nurses) were not be randomly assigned to either study or control groups. The study was undertaken in two county hospitals in Kenya namely Baringo County Referral Hospital as study group and Nandi County Referral Hospital as control group. The study population consisted of Registered Nurses from the two health facilities purposively selected for this study, namely Baringo County Referral Hospital and Nandi County Referral Hospital. This study applied Total Population Sampling (census) owing to relatively small size of the population. The study instrument (tools) was a self- administered semi-Structured Questionnaires. Baseline data was collected initially before the intervention (baseline information), then the intervention (structured education) were administered to the study group as a package of six lessons within two months then followed up for a period of a six months and then the final data was captured. The data collection instruments were reviewed by nursing education experts in the School of Nursing Sciences in the University of Nairobi. All the tools were in English language which is well understood by all the qualified nurses in Kenya. Pretesting was done in a similar facility. Obtaining of Pretest data, administering of structured education to the study group and obtaining of post-intervention data was done by trained enumerators. They delivered their teaching based on an established lesson plans. The instrument was tested for reliability using Split-Half test which yielded a reliability Spearman-Brown coefficient of 0.86 and

thus such tool was considered reliable. The data collection instruments were self - administered structured questionnaires. The same instrument was used for both pretest and post test to both the study and control groups. Written informed consent was obtained from all participants. Ethical clearance was obtained from the University of Nairobi / Kenyatta National Hospital Ethics and Research Committee. Confidentiality, dignity, respect and participants rights were respected. Participation was voluntary with participants reserving their right to withdraw participation at any stage of the study. The data was entered into a computer for analysis using Statistical Package for Social Sciences (SPSS version 20). Both descriptive and inferential statistics was used in analysis. This study adopted a Confidence interval of 95% and a significant level of 0.05.

Findings

This study was conducted in 2016 to 2017 and the response rate for this study was around 91% (n=160). At the respondents were Registered Nurses. The results in the following Table 2 shows that majority of the respondents came from Baringo County Referral Hospital (52%), were of Female gender (73%), were married (76%) and professed Christian faith (99%).

Table 1: The sample of the respondents by some Socio-demographic characteristics

Variable	Categories	Frequency	% (n=145)
Group	Study group	75	51.7
	Control group	70	48.3
Gender	Male	39	26.9
	Female	106	73.1
Marital status	Single	24	16.6
	Married	110	75.9
	Widowed/Divorced	11	7.5
Religion	Christianity	143	98.6
	Islam	2	1.4

The general (for both interventional and control groups) mean age of the respondents is at 36.6 years (SD=7.1) while the specific mean age for the Interventional group, the Baringo County Referral Hospital (BCRH), lower (36.4 years, SD 5.8) than that of the control group, Nandi County Referral Hospital (NCRH), (36.8 years, SD=8.4) as shown in Table 1. The general mean number of practice years (experience) is 12.43 (SD=7.06) but the specific for the respondents in Interventional group (BCRH) was lower (11.4 years, SD 5.8) than that of control group (NCRH) (13.5 years, SD=8.2)

The prevalence percutaneous injuries in the previous year for both the study and control group was 32.1% (n=145) with a mean frequency of 2.1 (SD=1.3).

Table 2: Comparison by group the self-reported PIs incidence rate (Semi-Annual)

Variable	Stage	Frequency N=145	%	X ²	p-value
Group	Study Group	7	9.3%	0.458 ^a	.499
	Control Group	9	12.9%		

A Pearson Chi Square test of independence was calculated comparing the PI incidence rate by the study group and control group. A non-significant interaction was found ($\chi^2(1)$

=0.458, $p>0.05$). The Percutaneous Injuries incidence rate of percutaneous injuries per fulltime equivalent employee in the study group was lower (9.3%, n=75) compared with 12.9% (n=70) in the control group. This translates to 9.3 injuries for study group and 12.9 injuries per a hundred fulltime employee per half a year as shown in Table 2. On a multiple responses analysis, the two commonest in circumstances associated with sustaining PIs is needle recapping (25.1%) and by Procedure clearance (22.3%) as shown in the following figure 1.

An independent t-test was conducted to compare frequency of PIs in Study group and in control group during the post-interventional stage. There was a non-significant differences in the mean frequencies scores in PIs for interventional group (M=1.1, SD=0.4) and control group (M=1.6, SD=0.5), $t(14) = -1.746$, $p>0.05$ as shown in Table 3

Table 3: Comparison of frequency in Reported PIs by Groups

Group	n	freq ^a Mean score	SD	df	t-value	p-value
Study group	7	1.1	0.4	14	-1.746	0.103
Control group	9	1.6	0.5			

Based on the results of the study on applying Pearson Correlation test, the knowledge scores is strongly related to frequency of PI experiencing $r=-0.808$, $p<.01$ as shown in Table 4.

Table 4: The relationship between the knowledge on Standard Precautions and the frequency of Percutaneous Injuries

Scale	Frequency of PIs (no)
Knowledge scores on the Standard Precautions	Pearson Correlation(r) - .808
	p-value .000
	N 16

Based on the results of the study on applying Pearson Correlation test, the knowledge scores is strongly related to frequency of PI experiencing $r=-0.808$, $p<.01$ as shown in Table 4.A simple linear Regression was calculated to predict frequency of PIs based on knowledge scores. A significant

Regression equation was found ($F(1, 14) = 26.25$, $p<.01$) with an R^2 of 0.652. Participants predicted Frequency of PIs = $3.443 - 0.274(\text{Knowledge scores})$ number when knowledge score is measured in numbers.

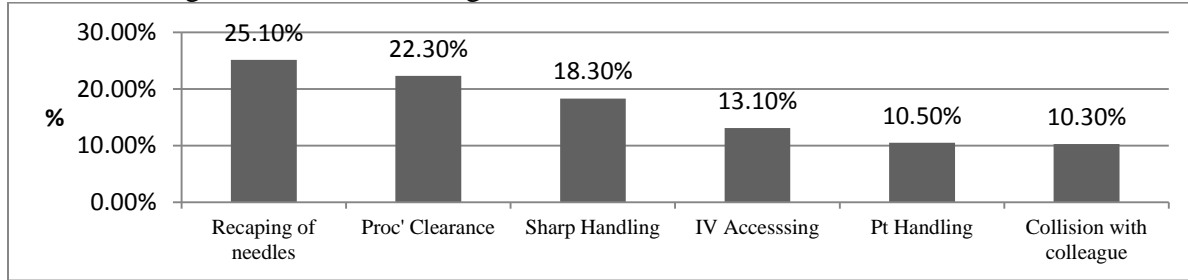


Figure 1: The Circumstances of sustaining Percutaneous Injuries

A Pearson Chi Square test of independence was calculated comparing the reporting of PIs by groups. A non-significant interaction was found ($\chi^2(1) = 6.268$, $p>0.5$). Though a

majority (85.7%, $n=7$) of the PIs were reported in the study group compared to about a half (44.4%, $n=9$) in the control group as shown in Table 5.

Table 5: Comparison by group of Reporting Percutaneous Injuries

Groups	N	Freq'	%	df	Chi Square (χ^2)	p-value
Study group	7	6	85.7%	1	2.861 ^a	.09
Control Group	9	4	44.4%	1		

By use of Chi Square Test of Significance to determine the categorical variables that are significantly related to reporting of percutaneous injuries to the authorities, the only two variables that were significant are age ($p=0.002$) and the fear of contracting HIV infection and stigma ($p= 0.03$). Other factors attributed to reporting but not significantly associated are experience, knowledge of Standard Precautions and unit placements. Binary Logistic regression was used to measure prediction of Reporting by two variables earlier identified to be significant by Chi Square test of independence. It was established that the respondents of age 35years and below had higher odds of reporting injuries compared

to those of over 35 years (AOR 4.3, CI1.7-10.8). Furthermore, it was also established that the respondents who expressed fear of contracting HIV/AIDs as their greatest occupational concern had higher odds of reporting their percutaneous injuries (AOR 2.1, CI 1.6-3.4) as shown in Table 6.

Table 6: The PI Reporting by age categories and its univariate Odds Ratio

Variable	Category	Frequency	%	Unadjusted Odds Ratio(95% CI)	p-value
Age	≤35yrs	17	56.7%	4.3(1.7-10.8)	0.002
	>35yrs	16	23.2%	1.000	
Fear of contracting HIV/AIDs	Yes	22	42.3%	2.1(1.6-3.4)	0.003
	No	9	19.2%	1.000	

Discussion

The prevalence percutaneous injuries in the previous year for both the study and control group was 32.1%(n=145) with a mean frequency of 2.1(SD=1.3). This is within the percutaneous injuries prevalence range between twenty(20%) to forty(40%) percent both locally and regionally in the previous year as reported by a couple of studies (Kaweti & Abegaz, 2016; Lori, McCullagh, Krueger, & Oteng, 2016; Mbaisi, et al., 2013).

This prevalence was higher than the regional as documented In a cross-sectional study done in 2014 among healthcare workers in an Ethiopian referral hospital establishes that 46% of the healthcare workers had sustained atleast one pi intheir professional life and around a quarter(28%) in the previous year(Kaweti & Abegaz, 2016). In similar another descriptive cross-sectional study done in Ghana, it was established that the prevalence of percutaneous injuries in a previous year to the nurses was 28.9%(Lori et al., 2016) locally a study done for all health workers in a county referral hospital in Kenya noted that around 19% of the health workers had been afflicted by percutaneous injuries but about half had afflicted the nurses only(Mbaisi, et al., 2013).

The Percutaneous Injuries incidence rate of percutaneous injuries per fulltime equivalent employee in the study group was lower(9.3%.) compared with 12.9% in the control group. This translates to 18.6 injuries for study group and 25.8 injuries per a hundred fulltime employee anually. This incidence rate of 18.6 to 25.8 were lower than that between 30 to 35 injuries per 100 fulltime equivalent employees that is recorded by Lu, Senthilselvan, Joffe, & Beach (2015). The average frequency of sustaining percutaneous injuries for a nurse was higher

in the control group(1.6) compared to the study group(1.1). Though the findings give credit to the educational intervention applied, the difference was not significant ($p>0.05$) and thus the hypothesis that stated, “there is no significant difference in the incidence rate per fulltime employee of percutaneous injuries between the interventional and the control group”, is hereby accepted. A cross-sectional study done in 2014 that investigated percutaneous injuries and their reporting among healthcare workers established that 24% reported their percutaneous injuries for further management (Kaweti & Abegaz, 2016). Despite the relatively unsatisfactory reporting of percutaneous injuries, a couple of educational interventional studies on nurses showed at least 10% improvement on reporting of percutaneous injuries (Mehrdad, Meshki, & Pouryagub, 2013; Rajkumari et al., 2014; Zawilla & Ahmed, 2013) thus I submit that the differences in reporting pattern between the study group and control group is partially a function of this study’s impact. This study established via Logistic regression that is significantly predictive of reporting with the younger age group(35years and below) having higher likelihood of reporting (AOR 4.3, CI1.7-10.8), the corresponds with as study in Nigeria which stated that the younger health workers with less than ten years experience have high rate of PIs and have as well as higher propensity to report out of fear and anxiety compared with the older health workers(Amira & Awobusuyi, 2014).

Conclusion and Recommendations

A previous year percutaneous injuries prevalence was still high at 32.1% with a mean frequency of 2.1(SD=1.3) injuries per respondent. The percutaneous incidence rate determined was 18.6 injuries per 100 fulltime employees for the study group and 25.8 injuries per 100 fulltime employees for

the control group after the intervention applied. Most (around 70%) of the percutaneous injuries are underreported. Reporting of percutaneous injuries improved from 35.6% to 85.5% in the study group after the educational intervention.

The study submits that both self-efficacy and collective efficacy of healthcare workers on any practical concept including sharp management are a function of vicarious learning supported with friendly and conducive environment, motivation and robust cognitive understanding. It is the proposal of this study that any educational intervention should not be one-off but rather should recur over a considerable period of time as envisaged by Thorndike Principle of Recency. The healthcare settings should adopt a system whereby in every clinical unit there are credible models (consultants) that are charged with the noble duty of re-enforcing standard operating procedures as well as clarifying misconceptions.

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