

Peer-Led Educational Intervention and Its Effect On Predisposing Factors of Occupational Risk Prevention Practices Among Medical Waste Handlers in Tertiary Hospitals, Southwest, Nigeria

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Abstract:

The study evaluated the effect of peer-led education intervention on predisposing factors of occupational risk prevention practices among medical waste handlers in South west, Nigeria. The specific objectives were to determine the baseline assessment of the predisposing factors of occupational risk prevention among the participants; and assess the effect of peer- led educational intervention on the predisposing factors in occupational risk prevention at 12th week post intervention follow up among the participants. The study was an interventional study and adopted a two group quasi-experimental design (one experimental group and one control group). Participants of the study were the hospital attendants that served as medical waste handlers working at Olabisi Onabanjo University Teaching Hospital, Sagamu and Federal Medical Centre, Ebute Meta, Lagos. A structured questionnaire was used for data collection to determine the baseline assessment and outcome evaluation of the intervention. Data collected were analysed using descriptive and inferential statistics. The finding revealed that at 12th week post intervention for control and experimental groups, the mean score knowledge of risk prevention for control group is 11.88 ± 4.72 while the experimental group is 17.02 ± 5.02 with mean difference of 5.14; perception mean score of

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risk prevention for control group is 10.54 ± 3.47 while experimental group is 18.02 ± 5.27 with mean difference of 7.48; and mean score of attitudinal dispositions of risk prevention for control group is 13.26 ± 3.05 while the experimental group is 19.74 ± 4.09 . The study concludes that peer led educational intervention programs was effective in improving the knowledge of risk prevention, perception of risk prevention, attitudinal dispositions of risk prevention, reinforcing factors on risk prevention, and enabling factors on risk prevention practices among the medical waste handlers. It was recommended among others that there should be orientation, induction program for new employees, with regular and continuous training for the medical waste handlers.

Keywords: Peer-Led Education, Predisposing Factors, Occupational Risk, Prevention Practices, Medical Waste Handlers,



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Introduction

All workplaces have issues related to occupational safety globally but the commonest with serious implications are in developing countries where safety is not the watchword and where there are few guidelines for monitoring safe occupational environments (WHO, 2022). Health care workers need to protect themselves against infections that are occupationally acquired in the hospital especially blood borne infections that are contracted from needle stick injuries and blood/body fluid splashes (Sagoe-Moses, et al., 2018), they are exposed to them depending on the type, nature and duration of the work, activities and procedure such as medical waste handling (Enwere & Diwe, 2014). These infections are common and to an extent inevitable in the hospital when appropriate preventive measures are not put in place (Tarigan, et al., 2015), they are transmitted among the staff, patients, visitors, and environment (Maduka, 2017). Apart from needle stick injuries and blood /body splashes, toxic exposure to pharmaceutical products, chemical burns from waste treatment activities, air pollution that releases particulate matters during incineration, thermal injuries from open burning and radiation burns from radiology wastes are also health hazards of medical waste handling (WHO,2018).

In most hospitals in Nigeria, the hospital attendants and housekeepers carry out medical waste handling with the cleaning of the hospital environment (Okeah, et al., 2018). Studies reported poor knowledge and practice of medical waste handlers towards risks and preventive measures during waste handling which exposed them to infections and injuries and invariably affected the incidence of occupational risks exposure among them hence, equipping medical waste handlers with essential knowledge of risks involved in their work, preventive measures, correct and appropriate use of equipment may influence their perception, attitude, and practice (Arinze-Onyia, et al., 2018; Mugabi, et al., 2018). Researches reveal that waste handlers have the highest incidence of exposure to biomedical wastes (Sarrotra, et al., 2016), even in developed countries, such as the USA, house keepers in the hospital have been found to have higher numbers of bacterial infections (Sachan, et al., 2018.), higher rates of occupational injuries (Battle, 2018) and in Nigeria, higher rate of hepatitis infection (Elikwu, et al, 2016). Those working in tertiary hospitals are more exposed mainly due to high number of patients with burden of care, and high waste generated which may put burden on the medical waste management with regards to the system, personnel and infrastructure (Abah, 2020).

Exposure to occupational risks is something that can be avoided. According to the Centers for Disease Control and Prevention (CDC), the use of standard precaution and good working practices will lower the risk of transmission of germs among patients and staff when these practices are followed regardless of the status of the patient. Standard precautions are the most fundamental level of infection control measures. They are the minimum level of infection control measures that are required to be utilized in the treatment of all patients. Standard precautions are intended to decrease the risk of transmission of bloodborne and other infections from both identified and unrecognized sources. Handwashing, the correct and appropriate use of personal protective equipment (PPE), medical waste management, safe injection practices, and spill management are the elements of standard precautions that



prevent risk exposures by medical waste handlers (CDC, 2018). All of these must be implemented and monitored with a safe working environment for the staff.

It has been reported that education that is led by peers is effective for the following reasons: first, the peers hear, understand, and personalize messages that can impact their lives and cause behavior change when the training is provided by someone with the same attributes and characteristics as them; second, the peers will together see themselves as role models in the behavior change that is expected of them. Peers are believed to have a non-judgmental stance, the ability to provide support and foster change due to their shared affiliations and in-depth understanding of life experiences, and that people are sensitive to the influence of their peers. This brings us to our third point, which is that people are drawn to other people who have similar perspectives and who are dealing with similar challenges (Ciranka & van den Bos, 2019).

The researchers will be adopting the Precede- Proceed model to guide the planning and implementation of the study. The PRECEDE -PROCEED model is a planning, participatory and community-based model used in planning and changing of behaviour. The model was introduced by Green and friends. The PRECEDE stands for predisposing, reinforcing, and enabling constructs in terms of educational diagnosis and evaluation and the PROCEED section focuses on policies, regulations, and organizations in environmental and educational development. The predisposing factors in this study are knowledge, perception and attitude. The main objective is to evaluate the effect of peer-led education intervention on predisposing factors of occupational risk prevention practices among medical waste handlers in South west, Nigeria. The specific objectives were to:

- 1) determine the baseline assessment of the predisposing factors of occupational risk prevention among the participants
- 2) assess the effect of peer- led educational intervention on the predisposing factors in occupational risk prevention at 12th week post intervention follow up among the participants

Research Questions

These research questions were raised

- 1) What is the baseline assessment of predisposing factors of knowledge, perception and attitude on the risk prevention among the participants?
- 2) What effect would the peer-led intervention have on the predisposing factors in the risk prevention at 12th week post intervention follow up among the participants?

Research hypotheses

The study hypothesizes that

Ho1: There is no significant difference in the effect of the intervention on predisposing factors of occupational risk prevention practice in the control group between baseline and 12th week follow up.

Ho2: There is no significant difference in the effect of the intervention on predisposing factors of occupational risk prevention practice in the experimental group between baseline and 12th week follow up.



Methodology

The study was an interventional study and adopted a two group quasi-experimental design (one experimental group and one control group) which assessed the outcome of the educational intervention. Participants of the study were the hospital attendants that served as medical waste handlers working at Olabisi Onabanjo University Teaching Hospital, Sagamu and Federal Medical Centre, Ebute Meta, Lagos who have direct contact with the segregating, collecting, transporting and disposal of patient's wastes. A minimum of forty-seven (47) participants was required but made up to fifty (50) for each study group, totalling one hundred (100) participants. Multistage and Purposive sampling technique was adopted to select the participants for peer led education from the tertiary hospitals.

The instrument for the study was developed to determine the baseline assessment and outcome evaluation of the intervention. The structured questionnaire item was structured based on the objectives identified for the study. The review of the instrument was done by experts in the field of nursing, community medicine, environmental and occupational health to determine face validity. The content was made valid through items identified in literature review and previous research works to ensure that items adequately measure the constructs of the study.

Data collection was carried out using the instruments designed for the baseline assessment before commencing the intervention and end line at 12th week post intervention to measure changes that would have occurred as the intervention was in three phases. The data in this study was analysed primarily to evaluate the outcome of peer-led educational intervention on occupational-risk prevention practices among medical waste handlers in tertiary hospitals, south-west, Nigeria. The intervention involved didactic interaction focused on arousing awareness of risks of HBV infection while conducting the occupation of the participants who medical waste handlers. Similarly, changes recorded for the experimental group between baseline and post intervention follow-up for all variables of interest were determined by computing Cohen's D ES. Informed consent (written) was acquired from all participants, and they were informed of their right to withdraw from the study at any time without repercussions.

Results

Research Question 1: What is the baseline assessment of predisposing factors of knowledge, perception and attitude on the risk prevention among the participants?

Table 1: Descriptive statistics for predisposing factors of knowledge, perception and attitude on the risk prevention at baseline for control and experimental groups

VARIABLES	Maximum Points on Scale of Measure	CONTROL GROUP N=50		EXPERIMENTAL GROUP N=50	
		$\bar{X}(SE)$	$\pm SD$	$\bar{X}(SE)$	$\pm SD$
Knowledge	24	11.92(0.63)	4.45	9.74(0.46)	3.22
Perception	27	10.20(0.51)	3.64	15.26(0.59)	4.18
Attitudinal Dispositions	27	12.20(0.49)	3.05	16.52(0.43)	3.04



Table 1 shows the descriptive statistics for predisposing factors of knowledge, perception and attitude on the risk prevention at baseline for control and experimental groups. The baseline knowledge of risk prevention mean score of the control group is 11.92 ± 4.45 while the experimental group is 9.74 ± 3.22 . The perception mean score of risk prevention at baseline for control group is 10.20 ± 3.64 while experimental group is 15.26 ± 4.18 . The baseline attitudinal dispositions of risk prevention mean score of the control group is 12.20 ± 3.05 while the experimental group is 16.52 ± 3.04 . It could be concluded that there was no major difference in the baseline predisposing factors of knowledge, perception and attitude of control and experimental group.

Research Question 2: What effect would the peer-led intervention have on the predisposing factors in the risk prevention at 12th week post intervention follow up among the participants?

Table 2: Descriptive statistics for predisposing factors of knowledge, perception and attitude on the risk prevention at 12th week post intervention for control and experimental groups

VARIABLES	Maximum Points on Scale of Measure	CONTROL GROUP N=50		EXPERIMENTAL GROUP N=50		Mean Difference
		$\bar{X}(SE)$	$\pm SD$	$\bar{X}(SE)$	$\pm SD$	
Knowledge	24	11.88(0.67)	4.72	17.02(0.51)	5.02	5.14
Perception	27	10.54(0.49)	3.47	18.02(0.65)	5.27	7.48
Attitudinal Dispositions	27	13.26(0.43)	3.05	19.74(0.58)	4.09	6.48

Table 2 shows the descriptive statistics for predisposing factors of knowledge, perception and attitude on the risk prevention at 12th week post intervention for control and experimental groups. The mean score knowledge of risk prevention at 12th week post intervention for control group is 11.88 ± 4.72 while the experimental group is 17.02 ± 5.02 with mean difference of 5.14 in favour of the experimental group. The perception mean score of risk prevention at 12th week post intervention for control group is 10.54 ± 3.47 while experimental group is 18.02 ± 5.27 with mean difference of 7.48 in favour of experimental group. The mean score of attitudinal dispositions of risk prevention at 12th week post intervention for control group is 13.26 ± 3.05 while the experimental group is 19.74 ± 4.09 . It could be concluded that the peer-led intervention was effective as there was considerable difference between the predisposing factors of risk prevention of control and experimental group at 12th week post intervention.

Test of Hypotheses

Ho1: There is no significant difference in the effect of the intervention on predisposing factors of occupational risk prevention practice in the control group between baseline and 12th week follow up.

Table 3: Inferential statistics of the difference in the effect of the intervention on predisposing factors of occupational risk prevention practice in the control group between baseline and 12th week follow up

VARIABLES	Maximum Points on Scale of Measure	Baseline N=50		Follow-up Post-Intervention N=50		*ES (95%CI)	p-value
		$\bar{X}(SE)$	$\pm SD$	$\bar{X}(SE)$	$\pm SD$		
Knowledge	24	11.92(0.63)	4.45	11.88(0.67)	4.72	0.009(-0.27 to 0.29)	0.950
Perception	27	10.20(0.51)	3.64	10.54(0.49)	3.47	-0.07(-0.35 to 0.21)	0.610
Attitudinal Dispositions	27	12.20(0.49)	3.48	13.26(0.43)	3.05	-0.27(-0.55 to -0.02)	0.067

*ES; effect size of the control group between baseline and follow-up evaluation computed from Cohen's D, the corresponding 95% CI; and p-value is level of significance

Table 4.10 showed that, the difference in the effect of the intervention on knowledge of risk prevention in the control group between baseline and 12th week follow up was not significant (ES=0.009, $p>0.05$). Likewise, the difference in the effect of the intervention on perception of risk prevention in the control group between baseline and 12th week follow up was not significant (ES= -0.07, $p>0.05$). Also, the difference in the effect of the intervention on attitudinal dispositions toward risk prevention in the control group between baseline and 12th week follow up was not significant (ES= -0.27, $p>0.05$).

Ho2: There is no significant difference in the effect of the intervention on predisposing factors of occupational risk prevention practice in the experimental group between baseline and 12th week follow up.

Table 4: Inferential statistics of the difference in the effect of the intervention on predisposing factors of occupational risk prevention practice in the experimental group between baseline and 12th week follow up

VARIABLES	Maximum Points on Scale of Measure	Baseline N=50		Follow-up Post-Intervention N=50		*ES (95%CI)	p-value
		$\bar{X}(SE)$	$\pm SD$	$\bar{X}(SE)$	$\pm SD$		
Knowledge	24	9.74(0.46)	3.22	17.02(0.71)	5.02	-1.17(-1.3 to -0.81)	0.000
Perception	27	15.26(0.59)	4.18	18.02(0.75)	5.27	-0.45(-0.74 to 0.16)	0.002
Attitudinal Dispositions	27	16.52(0.43)	3.04	19.74(0.58)	4.07	-0.60(-0.90 to -0.29)	0.000

*ES; effect size of the control group between baseline and follow-up evaluation computed from Cohen's D, the corresponding 95% CI; and p-value is level of significance

Table 4 showed that, the difference in the effect of the intervention on knowledge of risk prevention in the experimental group between baseline and 12th week follow up was significant (ES= -1.17, $p<0.05$). Likewise, the difference in the effect of the intervention on perception of risk prevention in the experimental group between baseline and 12th week follow up was significant (ES= -0.45, $p<0.05$). Also, the difference in the effect of the intervention on attitudinal dispositions toward risk prevention in the experimental group between baseline and 12th week follow up was significant (ES= -0.32, $p<0.05$).

Discussion of Findings

The findings of the study showed that the baseline knowledge of risk prevention mean score of the control group is 11.92 ± 4.45 while the experimental group is 9.74 ± 3.22 . The perception mean score of risk prevention at baseline for control group is 10.20 ± 3.64 while experimental group is 15.26 ± 4.18 . The baseline attitudinal dispositions of risk prevention mean score of the control group is 12.20 ± 3.05 while the experimental group is 16.52 ± 3.04 . At 12th week post intervention for control and experimental groups, the mean score knowledge of risk prevention at 12th week post intervention for control group is 11.88 ± 4.72 while the experimental group is 17.02 ± 5.02 with mean difference of 5.14 in favour of the experimental group. The perception mean score of risk prevention at 12th week post intervention for control group is 10.54 ± 3.47 while experimental group is 18.02 ± 5.27 with mean difference of 7.48 in favour of experimental group. The mean score of attitudinal dispositions of risk prevention at 12th week post intervention for control group is 13.26 ± 3.05 while the experimental group is 19.74 ± 4.09 . The findings revealed that there were increased in knowledge after intervention.

It was observed in a study on safety practices among employees of the Bandar Abbas oil refinery company that there was an increase in knowledge, attitude, and practice of safety behavior among them following the peer educational intervention. This was discovered in a study on safety practices among employees of the company. It has been found that educational programs including workers' peers are successful in promoting safe practices among the workers. As a result, the use of peer education as a strategy for the promotion of safe work practices in workplaces is strongly advocated. (Rahmani, et al, 2014)

According to the findings of an interventional study conducted by Uchendu, et al (2020) at Ibadan, Nigeria on workers who are exposed to human and animal body fluids, the mean knowledge score among the respondents increased from 22.59 3.4 at pre-test to 22.83 3.2 at post-test, and the mean post-test attitude score (5.10 1.4) was significantly different from the pre-test attitude score (4.49 1.5). There was a significant increase in the proportion of those that perceived others will emulate them if they comply with the guidelines from 71.3% at pretest to 85.4% post-intervention. Before the intervention, 77.2% of the workers perceived they did not have enough information on controlling infection, compared to 16.3% after the intervention. Even though it had been established that training was beneficial, the majority of the time it was handled by health educators. These educators will present the material in order to expand participants' knowledge of the topic, but their attitudes and practices may not be greatly altered.

There was an increase in knowledge after the training, from a knowledge score of 31.97% to 56.56% after the training on awareness and disposal methods of Bio-medical waste, according to a study that was conducted in India on the impact of educational intervention on medical waste knowledge. This study reported that 115 Respondents, which included 51 medical waste handlers, were recruited, and that there was an increase in knowledge after the training. (Singh, Saxena, Kumar, & Kumar, 2021).

Kandeeel and El-Glany (2017) collected a total of 838 respondents for their study on needle stick injuries and sharp injuries among housekeepers in Saudi Arabian hospitals during the years 2011 and 2013. Of those respondents, 73 were housekeepers. It was revealed that the



incidence of needle stick injuries among the housekeepers dropped from 17.8% before the intervention to 2.7% after the intervention. The percentage of people using personal protective equipment (PPE) before the intervention was 20.5%, but after it was 100%. The percentage of people who complied with waste practices rose from 35.6% before the intervention to 78.1% after it. Only 15.1% of people were inoculated against Hepatitis B prior to the intervention, however this number increased to 100% once the intervention was carried out. It was observed that continuing surveillance, education, careful supervision, and positioning of sharp container close to the site of use all contributed to a reduction in the number of events among them.

In a tertiary hospital in Zurich, Switzerland, a randomized controlled trial on the Effectiveness of an edutainment video teaching standard precautions compared to reading of infection control standard operative procedure (SOP) and no intervention showed that the video group scored the highest on knowledge scores at all three trial participants immediately after the intervention. The video group, with a mean score of 27.34 c (85.4%), scored considerably higher than the SOP group, which had a score of 26.03 (81.3%), and the group that did not receive any intervention, which had a score of 25.48 (79.6%). There was no discernible difference between the three groups one month after the completion of the intervention. At the three-month follow-up, the video group once again performed better, scoring a mean of 27.63 (86.3%), in comparison to the standard operating procedure group, which scored a mean of 26.55 (83.0%), and the group that did not receive any intervention, which scored a mean of 26.47 (82.7%).

In a study conducted by Manal et al. (2018) among 92 housekeepers in Khartoum, Sudan on the prevention of blood-borne infections, the researchers found that using a questionnaire and observation checklist, followed by an organized training program, was effective in increasing the knowledge, attitude, and practice of risk prevention among the participants. The researchers also recommended continuous training with clear guidelines and policy on waste management, along with pre-employment screening and Hepatitis B vaccination. The effects of the intervention on knowledge of risk prevention (ES=0.009, $p>0.05$); perception of risk prevention (ES= -0.07, $p>0.05$); and attitudinal dispositions toward risk prevention (ES= -0.27, $p>0.05$) in the control group between baseline and 12th week follow up were not significant.

The effects of the intervention on knowledge of risk prevention (ES= -1.17, $p<0.05$); perception of risk prevention (ES= -0.45, $p<0.05$); and attitudinal dispositions toward risk prevention (ES= -0.32, $p<0.05$) in the experimental group between baseline and 12th week follow up were significant

More than half of the 242 waste handlers in Tekle, et al., (2021) cross-sectional study on assessment of risk safety practices had good knowledge of the risks associated with their jobs and risk practices. Inadequate, inconsistent, and irregular provision of personal protective equipment was observed, as was a generally positive attitude toward safety on the job. The company also performed poorly in areas that may improve its safety practices, including enabling factors, on-the-job training, monitoring, and supervision. It is not surprising that they had poor safety practices like hand washing and PPE compliance when no items were provided for them to utilize.



Conclusion

The study concludes that peer led educational intervention programs was effective in improving the knowledge of risk prevention, perception of risk prevention, attitudinal dispositions of risk prevention, reinforcing factors on risk prevention, and enabling factors on risk prevention practices among the medical waste handlers.

Recommendations

Based on the findings from the study, the following are hereby recommended

1. Medical waste handlers who will serve as educators should be given comprehensive training so that they will also serve as role model to their peers
2. There should be orientation, induction program for new employees, with regular and continuous training for the medical waste handlers
3. Policy and guideline on medical waste management should be made available and develop incentives and punitive system based on strict observation of prevention practices during waste handling

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