

Using the Health Belief Model to Describe Factors Influencing Factory Workers' Workplace Safety Practices in Nnewi, Anambra State, Nigeria

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Abstract:- The International Labour Organization reports that a worker dies every 15 seconds due to work-related injuries worldwide. The aim was to determine the factors affecting workers' injury reduction practices using the constructs of the Health Belief Model. The researchers employed a cross sectional descriptive study design. The Anambra State Ministry of Health, Ethical Review Board, approved the research protocol. A 36-item semi-structured interviewer-administered questionnaire and an observation checklist were the instruments for data collection. Majority of the respondents 618 (97.5) were males; the age group 21-40 were 317 (65.8%). Majority, 497(78.6) of the respondents had four or less years of experience at their jobs. Most of the respondents 594 (93.7%) believed that their current job is hazardous (high perceived severity), yet only 141 (22.2%) used protective equipment all the time. Majority, 587 (92.6%) of respondents have had at least 1 job-related injury within the past year and 439 (74.8%) were absent from work due to the injury. Majority 602 (95%) believed that they are likely to develop a job-related health issue (high perceived susceptibility), while 315 (49.7%) fear they will likely lose their job, 432 (68.1%) said they know a predecessor who was injured at work, 423 (97.9%) believed the injury was preventable (cues to action). Comparison of hazard exposure and level of Private Protective Equipment (PPE) use was significant (Chi-square 364.771; $p < 0.001$). Workers' high-perceived susceptibility to workplace injury did not translate to consistent use of protective equipment. Periodic injury prevention trainings (increasing perceived benefits of PPE use) and providing incentives for consistent PPE use could motivate workers to take appropriate action.

Keywords:- Workplace Safety; Hazards; Safety Policy; Hazard Exposure; PPE Use; Safety Practices.

I. INTRODUCTION

Most adults spend 8-12 hours or more at their workplaces representing almost 70% of their entire lives [1]. Some work environments are known to be hazardous and it is not uncommon to hear terms such as "occupational health hazards" discussed among health professionals [2]. Occupational hazards are commonly defined as "occurrences arising out of or in the course of work which could result in fatal or non-fatal occupational injury" [1].

Occupational hazards contribute to majority of the complaints and disability amongst workers [1].

Factory workers are exposed to different machinery or monotonously repeated movements which makes injury at the workplace common among them [1, 4-6]. Some of the monotonous activities associated with factory work include transportation/logistics, storage, mixing, harvesting, etc. Studies have reported a lack of appropriate safety education or health promotion interventions, including but not limited to the lack of training on use of protective equipment or the importance of adherence to health and safety standards in the workplace [7, 8]. Nigeria still records loss of millions of Naira due to worker strikes, infrastructure damage and other worker-grievances-related issues [9]. The 2004 revised Nigerian Factories Act of 1990 is still the only legislation for the enforcement of health and safety standards in Nigerian factories [10, 11]. This study aimed at determining factors affecting factory workers injury reduction practices using the constructs of the Health Belief Model [12]. The following hypothesis was tested:

H_0 : There is no statistically significant relationship between workplace hazard exposure and level of Private Protective Equipment use.

II. METHODS

Nnewi is the second largest city in Anambra State after Onitsha with an estimated population of 391,227 (NPC, 2006). A cross-sectional descriptive study design was used. The sampling frame was six thousand eight hundred and ninety-two (6,892). The sample size for this study was determined using a table by [13] which was 816. A simple random sampling technique was used in selecting six out of the 13 factories that met the inclusion criteria of being a medium or large-scale factory having a staff strength of 500 and above.

A semi structured interviewer-administered questionnaire was used. The questions aimed at collecting data in accordance with some of the constructs of the Health Belief Model; perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy. The socio-demographic section of the questionnaire provided some data for the 'modifying variables' construct. In addition, the researchers adopted the Health and Safety inspection checklist used by inspection officials in the Ministry of Environment. The checklist was used in collecting data on work related health

hazards, availability of safety standards and protective equipment in the various factories which provided data for the 'cues to action' and 'perceived barriers' constructs of the model. The instrument was pre-tested using a test-retest reliability method in two factories in a neighbouring Local Government Area among 41 factory workers (5% of sample size). The Cronbach's coefficient alpha was used to determine the internal reliability of the instrument. With a Cronbach's alpha of 0.7, the instrument was deemed reliable.

Microsoft Excel 2007 and Statistical Packages for the Social Sciences (SPSS) [14, 15] were used for data analysis. Descriptive statistics were determined for all continuous variables while frequencies were determined for all categorical variables. The mean value for the continuous variables was used to determine cut off points for low, moderate and high levels of a particular variable such as knowledge or use of protective equipment. Cross tabs were used to determine the frequencies of these levels (low, moderate and high) with some demographic variables such as age group, years of work experience and number of years spent on current job. The hypotheses were tested using Chi squares.

The Anambra State Ministry of Health Ethical Review Committee provided the ethical clearance for this study. An application for permission to conduct this study was also sent to the Management Board of the participating factories for permission to have access to the factories and the workers. Respondents were given information about the aims and objectives of the research and their role in it. They were informed that their participation was voluntary and that they could opt out of the study at any time without fear of penalty. The field assistants assured them of confidentiality and anonymity during the analysis, reporting and presentation of results. Verbal informed consent was obtained from all respondents before the questionnaire was administered [16].

III. RESULTS

With a response rate of 77.6%, majority, 618 (97.5) of the respondents were males, a little over one third, 215 (33.9%) were between the ages of 26-30. Most of the respondents 381(60.1%) were married and for majority of them, 458(71.9%), the highest educational qualification was secondary. On work experience, 206 (32.5%) had 1-2 years while 292 (46.1%) had 3-4 years of working experience. This includes experience working similar jobs from other factories. As for length of service in their current jobs, 314 (49.5%) had put in 1-2 years of service while over a third of respondents 240 (37.9%) had 3-4 years of service. For income distribution, more respondents, 283 (44.6) fall in the N21, 000 to N 30,000 earning bracket. (Table 1).

Most of the respondents 594 (93.7%) believed that their current job is hazardous (high perceived severity), yet only 141 (22.2%) used protective equipment all the time. Majority, 587 (92.6%) of respondents have had at least 1

job-related injury within the past year and 439 (74.8%) were absent from work due to the injury. Majority 602 (95%) believed that they are likely to develop a job-related health issue (high perceived susceptibility), while 315 (49.7%) fear they will likely lose their job, 432 (68.1%) said they know a predecessor who was injured at work, 423 (97.9%) believed the injury was preventable (cues to action). (Table 2).

Of those exposed to high level of hazard exposure (n=182), 117 (64.3%) were 26-30 years old (the youngest age group in this study). Only 89 (41.6%) from this age group had high level of adherence to safety guidelines out of 214 respondents in this level. Conversely, 85 (45.5%) of those with high levels of adherence were those in the 31-40-year age bracket (Table 3). There was a statistically significant relationship between level of hazard exposure and level of use of private protective equipment ($p < 0.001$) (Table 3).

IV. DISCUSSION

Self-reported health issues, 294 (46.4%) reported having injuries from machines, 56 (8.8%) fell from heights, 127 (20%) had chest injuries. These are similar to findings of a study that assessed occupational issues among artisans and factory workers based in Ifo, Nigeria. The 156 respondents earmarked for the study indicated that the major hazards of their jobs were disorders in muscles, bones, joints, skins and in respiratory organs [17]. The researchers asked if respondents know of a predecessor who had suffered injury due to exposure to a work-related hazard, 432 (68.1%) respondents said yes and of this number, 423 (97.9%) believed the hazard was preventable. A majority, 614 (96.8%) said they were trained to use protective clothing at work and 518 (81.7%) said they were aware of the workplace health hazards. This is similar to a study aimed at determining the awareness of occupational hazards amongst factory workers in a Nigerian sawmill [8].

In this study majority of respondents with moderate levels of exposure to hazards (that is having five or six out of a possible 11 hazardous activities routinely) had low levels of use of protective equipment. Majority of those within the N41,000-N50,000 income bracket had low levels of use of protective equipment. Usually in workplaces, the higher the income level, the more likely the person has more experience on the job, more education and holds some kind of leadership position. Therefore, these results suggest some level of complacency among this category of workers. Similarly, a study investigated the level of compliance of 10 staff of the Federal Ministry of Labour and Productivity, Inspectorate Division; those who were the custodians of occupational safety and health. They found that these workers failed to comply with some OSH regulations which are their duty to enforce![18] Respondents who said their employers did provide protective measures for them were 24 (20.3%), while those with a higher level of education appeared to use more of protective measures [17]. This is in contrast with this study where workers reported having protective equipment but

the use of protective equipment varied by age and work experience. In a study on the awareness of occupational hazards and utilization of safety measures among welders in Kaduna Metropolis Nigeria, age, nature of training, exposure, educational attainment and workers experience were found to be major determinants of workplace safety practices [19].

With respect to awareness of occupation hazard, researchers carried out a cross sectional evaluation on saw mill workers in Nigeria. The result of the survey indicated that majority of the saw mill workers were wood traders and machine operators; less than 20% of the respondents used protective gadgets during their work activities and safety policies and regulations were neither practiced nor enforced [8]. In the current study, all respondents said they were informed about the health effects related to their work and 614 (96.8%) said they were trained to use protective clothing at work and 518 (81.7%) said they were aware of the workplace health hazards. More of those who said they were aware of the workplace health hazards, colleagues at work 122 (19.2%) and friends 127 (20%) were their sources of information. Most of the respondents 594 (93.7%) believed that their current job is hazardous. In a study in Kano Metropolis Nigeria, age, nature of training, exposure, educational attainment and workers experience were major determinants of workplace safety practices [1].

V. CONCLUSION

Age and length of service at the factory had significant influences on the level of exposure to work place hazard, level of safety practice, level of use of protective equipment as well as adherence to the HSE-1990. A greater proportion of those above 40 years of age had moderate exposure to hazard and high levels of adherence to safety practices. The younger workers tended to have lower levels of safety practice and low levels of use of protective equipment which may likely lead to injuries that could lead to absenteeism from work or injuries that could lead to job loss or even loss of life. Those with moderate to high levels of hazard exposure tended to have moderate to high levels of safety practices and use of PPE. An overwhelming majority 630 (99.3%) of respondents agreed that labour unionism could influence adherence of factory workers to safety standards, guidelines and policies. However, the researchers could not determine whether or not the trade unionism's influence is at the organizational or individual levels or both therefore this may require further study on the subject matter.

Peer-to peer communications on adherence to safety measures should be encouraged and all new employees should be trained on safety measures using existing policies. Visible signs should be placed at strategic locations throughout the factory to act as cues to action for safety at work. Regulatory bodies should carry out their periodic visits to factories to ensure adherence to policies are taking place as expected and defaulting factories should be sanctioned as required by law.

Variables	Frequency n (%)
Gender	
Male	618(97.5)
Female	16(2.5)
Age	
21-30	214(33.8)
31-40	187 (29.4)
>40	233 (36.8)
Marital status	
Single	205 (32.3)
Married	381 (60.1)
Divorced	33 (5.2)
Widowed	15 (2.4)
Educational qualification	
Primary	155 (24.4)
Secondary	458 (71.9)
Tertiary	23 (3.6)
Working Experience	
< 1 year	46(7.3)
1-2 years	206 (32.5)
3-4 years	292 (46.1)
5 or more years	90 (14.2)
Length of service with factory	
< 1 year	50 (7.9)
1-2 years	314 (49.5)
3-4 years	240 (37.9)
5 or more years	30 (4.7)

Monthly Income	
<30,000	283 (44.6)
30,000-40,999	117 (18.5)
41,000 and above	234 (36.9)

Table 1:- Respondents’ socio-demographic variables

The Health Belief Model Constructs	Key findings
Perceived susceptibility	<ul style="list-style-type: none"> Majority 602 (95%) believe that they are likely to develop a job-related health issue
Perceived severity	<ul style="list-style-type: none"> Most of the respondents, 594 (93.7%) believe that their current job is hazardous Majority, 587 (92.6%) of respondents have had at least 1 job-related injury within the past year and Of the 587 above, 439 (74.8%) had been absent from work due to the job-related injury
Perceived barriers	<ul style="list-style-type: none"> Majority of respondents, 548 (86.4%) said there was no health and safety policy at their workplace.
Perceived benefits	<ul style="list-style-type: none"> All 634(100%) were informed about the health effects related to their work and 614 (96.8%) said they were trained to use protective clothing at work when they were initially hired.
Modifying variables	<ul style="list-style-type: none"> Age: younger workers were exposed to more hazardous work Work experience: Majority, 497(78.6) had four or less years of experience at their jobs
Cues to action	<ul style="list-style-type: none"> More than half of the respondents, 432 (68.1%) said they know a predecessor who was injured at work Of the 432 above, 423 (97.9%) believed the injury was preventable
Low Self-efficacy in PPE use	<ul style="list-style-type: none"> Only 141 (22.2%) used protective equipment all the time. Comparison of hazard exposure and level of Private Protective Equipment (PPE) use was significant (Chi-square 364.771; p< 0.001).

Table 2:- Key findings using the constructs of the Health Belief Model

Variables	Level of hazard exposure n(%)			Pearson’s Chi square (χ^2)	p-value
	Low	Moderate	High		
Age (years)					
21-30	12 (5.6)	86 (40.2)	116 (54.2)	169.123	<0.001*
31-40	5 (2.7)	120 (64.2)	62 (33.1)		
>40	3(1.3)	226 (97.0)	4 (1.7)		
Working experience (years)				76.749	<0.001*
< 1	5(10.9)	15(32.6)	26(56.5)		
1-2	6 (2.9)	124(60.2)	76 (36.9)		
3-4	6 (2.0)	244 (83.6)	42 (14.4)		
5 and above	3 (3.3)	49 (54.4)	38 (42.2)		
Length of service with current factory (years)				137.564	<0.001*
<1	5(10.0)	16 (32.0)	29(58.0)		
1-2	12 (3.8)	167 (53.2)	135(43.0)		
3-4	3(1.1)	249(92.2)	18 (6.7)		
Level of safety practices				15.258	0.004*
Low	8 (3.3)	180 (75.0)	52 (21.7)		
Moderate	9 (3.4)	100 (38.3)	152 (58.2)		
High	3 (1.3)	152 (65.0)	79 (33.8)		
Level of PPE use				364.771	0.001*
Low	20(5.0)	367(92.2)	11(2.8)		
Moderate	0(0.0)	43 (37.7)	71(62.3)		
high	0(0.0)	22(18.0)	100(82.0)		

*significant at p<0.05 at 95% confidence interval

Table 3:- Comparison of level of hazard exposure and level of protective equipment use

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