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Assessments of occupational injuries among Primary Healthcare Workers in Katsina Local Government, Katsina State

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Abstract

Occupational injuries among healthcare workers (HCWs) represent a critical public health issue, particularly in primary healthcare settings where safety practices may be underemphasized. The present study aimed to assess the risk factors and impact of occupational injuries among primary healthcare workers in Katsina State. Using a cross-sectional design, 288 primary healthcare workers were selected through stratified random sampling. Data collection was performed using a structured questionnaire, and analyzed using descriptive statistics and Chi-square tests. The findings revealed that 80.9% of the respondents were aware of occupational injuries, with a mean knowledge score of 2.84±0.86. Gender (p=0.004) and educational level (p=0.000) significantly influenced knowledge levels, with females and those holding higher degrees demonstrating better awareness. Job roles (p=0.000) and years of experience (p=0.000) also had significant associations, as healthcare workers with six or more years of experience showed higher levels of knowledge. Regarding impacts, 70.4% of respondents reported experiencing occupational injuries, with needlestick injuries being the most common (59.6%). Younger workers (18-35 years) were more affected (p=0.016) compared to older workers, while females (p=0.032), less experienced workers (p=0.032), and full-time employees (p=0.002) were more likely to report impacts, such as reduced efficiency or time off work. Awareness of occupational injuries is high, but gaps in training and access to protective measures persist. Strengthening safety protocols, improving PPE availability, and implementing regular training programs can minimize occupational injuries.

Keywords: Knowledge, Awareness, Risk factors, Occupational injuries, Primary Healthcare workers.

INTRODUCTION

Occupational injuries pose a severe risk to healthcare practitioners worldwide, with poorer nations experiencing a disproportionately high rate of these incidents (Rai *et al.*, 2021). It is often known that there are substantial dangers associated with working in the healthcare sector for healthcare workers (HCWs) (Chikwanka and Chiluba, 2020; Debelu *et al.*, 2023). Healthcare workers are vulnerable to a range of occupational risks and accidents, including those involving fire and explosion, biological, chemical, physical, ergonomics, psychosocial problems, and electrical hazards that could jeopardize their lives or seriously injure them (Mukhtad *et al.*, 2021).

The International Labour Organization (ILO) reports that nearly 2.4 million of all estimated deaths annually are attributable to diseases or illnesses associated to the workplace (Hämäläinen and Takala, 2017). Moreover, healthcare professionals sustain almost 2 million needlestick injuries at work each year (Katsamba, 2024). A considerable number of infections from sharp injuries occurred among healthcare professionals.; These infections resulted in roughly 16,000 instances of hepatitis C (HCV), 66,000 cases of hepatitis B (HBV), and 1,000 cases of HIV (Mossburg *et al.*, 2019). Among the most common occupational dangers for healthcare workers worldwide are needlestick injuries, in particular (Bouya *et al.*, 2020).

According to a survey done in 31 countries, 44.5% (95% CI: 35.7%-53.2%) of healthcare workers had needlestick injuries in the previous year (Bouya *et al.*, 2020). Healthcare personnel are at serious risk from these types of workplace

mishaps because they can expose them to infectious materials and blood (Reis *et al.*, 2019). About 60 different diseases, most notably the human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV), might spread as a result of these mishaps (Maida *et al.*, 2020).

In Nigeria, Healthcare workers are ill-prepared to deal with workplace risks, which leads to illnesses or injuries sustained while doing their jobs (Sengel *et al.*, 2021). Primary healthcare workers encounter a variety of occupational hazards, including biological, chemical, ergonomic, physical, and psychosocial risks. Chemicals like bleach, detergents, solvents, lead, and flammable substances used in healthcare settings can become hazardous. Workers may face physical hazards such as wet floors, slips, falls, and heavy lifting. Additionally, they are exposed to psychosocial hazards including stress, verbal abuse, and violent attacks from patients or their relatives. Biological hazards arise from insufficient access to clean water, inadequate protection against bloodborne diseases, lack of sterile equipment, and poor waste management(Reis *et al.*, 2019). Ergonomic hazards result from poorly designed bed levels and positions (Reis *et al.*, 2019). The Katsina Local Government Area's healthcare system faces several obstacles, such as a shortage of resources, poor training, and a heavy patient load (Katsina State Ministry of Health, 2023). Several factors increase the risk of occupational injuries among healthcare personnel. Despite the critical nature of this issue, there is a notable lack of comprehensive data on the level of knowledge and awareness among primary healthcare workers regarding the risk factors and impacts associated with occupational injuries. Existing studies highlight the widespread prevalence of these injuries, yet regional disparities in research and interventions remain (Helene *et al.*, 2021). The purpose of this research is to determine the knowledge and awareness of risk factors and the impact of occupational injuries among primary healthcare workers in Katsina Local Government.

MATERIALS AND METHODS

Research Design

This study used a cross-sectional design that covered current status, attitudes, and behaviors of a specific population at a single point in time. The study was conducted in Katsina Local Government Area, Katsina State, Nigeria (12.3797^{0}N, 7.6306^{0}E). The area is characterized by its tropical savannah climate and diverse population, with distinct wet and dry seasons. This region serves as an administrative and commercial center with a strong agricultural economy. The healthcare facilities in this area range from small, rural clinics to larger, urban health centers, each serving a wide demographic with varying healthcare needs.

The target population for this study includes Doctors, Nurses, CHEWs, JCHEWs, CHOs, and other support staff who were directly involved in providing healthcare services to the community.

Sampling, Procedure, and Sample Size

The sampling technique involved selecting a representative sample of primary healthcare workers from the designated population of the study. In Katsina LGA, there are 38 primary health facilities spread across 12 wards. From these, 14 health facilities were selected, focusing on those with the largest number of health workers, such as Comprehensive Health Centres, Maternal and Child Health Centres, to represent the others in their respective wards. In wards like Arewa 1 & 2, where health clinics/PHCs had a small number of staff, additional health facilities were sampled to meet the target number of participants.

Using the Cochran's formula for sample size computation, the sample size was determined:

$$N = \frac{Z^2 P\,(1-P)}{e2}$$

- N: Sample size.
- Z: The desired confidence level: 95% (which corresponds to a Z-value of 1.96)
- P: Previous Prevalence rate from the literature review is 75% .
- E: Margin of error, 0.05 (5% margin of error)

$$\frac{(1.96)^2 \times 0.75\,(1-0.75)}{(0.05)2}$$

$$\frac{3.8416 \times 0.1875}{0.0025} = 288$$

Instrument for Data Collection

For this study, a structured questionnaire was developed to collect data on the knowledge, awareness, impact, and risk factors associated with occupational injuries among primary healthcare workers. The questionnaire included both closed-ended and open-ended questions to

capture quantitative data while also allowing for qualitative insights. It was divided into multiple sections, each addressing different aspects of the study, such as demographic information, knowledge and awareness of occupational injuries, specific risk factors, and the perceived impact of these injuries on the personal and professional lives of healthcare workers. The instrument was pre-tested in a pilot study to ensure that it effectively captured the necessary data for the research objectives. To test these instruments and make necessary improvements to enhance their relevance and accuracy, a pilot study was carried out where a small, representative sample of HCWs from primary care facilities in the Katsina Local Government Area was chosen. Prior to the main study, participant feedback was gathered and examined. There were no significant changes made to the instrument following the pilot study.

Method of Data Collection

The questionnaire was sent to the primary HCWs via a Google Form link. The link was shared through WhatsApp, email, and other messaging platforms with those who had smartphones capable of supporting Google Forms. Additionally, printed hard copies of the questionnaires were also made available and distributed in person by the researchers, or face-to-face interviews were conducted to complete the Google Form. This ensured that all participants, regardless of device access, could participate in the study. The researchers fully supported the participants, ensuring that they understood the questions asked, which enhanced the accuracy and validity of the data collected.

Method of Data Analysis

The data collected in this study were analyzed using both descriptive and inferential statistics. Descriptive statistics, such as frequencies, percentages, means, and standard deviations, were used to summarize the demographic characteristics of the respondents and their responses to the questionnaire items. Inferential statistics, such as chi-square tests, were used to examine relationships between variables and to identify factors associated with occupational injuries among primary healthcare workers. Statistical software (SPSS version 29.0) was used to carry out the analysis, and the findings were clearly presented in tables and charts to aid in interpretation and discussion.

Ethical Consideration

The ethical considerations for this study involved obtaining informed consent from all participants, ensuring they fully understood the study's purpose, procedures, and their right to withdraw at any time without any consequences. Participant identities were protected through anonymization of all data, and strict confidentiality was maintained. Special considerations were made for the use of Google Forms for data collection. Participants were assured that the online platform was secure and that their responses would remain confidential. Lastly, ed ethical approval was granted by the Katsina State Ministry of Health Research Committee before data collection.

RESULTS

The study in Table 1 explored the socio-demographic profile of 288 primary healthcare workers. The largest age group was 26-35 years (37.2%), followed by 18-25 years (31.9%), with an average age of 32.3 years (SD = 10.3). There are more female participants (57.3%) as compared to males (42.7%).

In terms of educational qualifications, most respondents (60.1%) had a diploma, while 17% held a bachelor's degree. A smaller percentage had either a Higher National Diploma (HND), a master's degree, or a certificate. Work experience varied, with 29.5% having 3-5 years of experience, followed by 27.4% with 0-2 years, while only 8% had over 16 years of experience (Table 1).

Job roles among participants showed that Community Health Extension Workers (CHEWs) were the most common (21.5%), followed by Environmental Health Workers (16.7%) and Community Health Officers (15.3%). Nurses, laboratory technicians, and Junior Community Health Extension Workers (JCHEWs) also made up a significant portion of the workforce, as shown in Table 1.

Regarding employment status, most respondents (61.1%) worked full-time, while 18.1% were casual workers and 17% were volunteers. No respondents reported working part-time.

Table 1: Socio-demographic Information of the Respondents

Variables	Frequency (n)	Percentage (%)
Age		
18-25	92	31.9
26-35	107	37.2
36-45	51	17.7
46-55	30	10.4
56 and above	8	2.8
Gender		
Male	123	42.7
Female	165	57.3
Educational Background		
Certificate	20	6.9
Diploma	173	60.1
HND	28	9.7
Degree	49	17.0
Masters	13	4.5
Others	5	1.7
Years of Experience		
0-2 years	27	9.4
3-5 years	85	29.5
6-10 years	74	25.7
11-15 years	27	9.4
16 years and above	23	8.0
Job Role		
Nurse	32	11.1
CHEW	62	21.5
Laboratory Technician	36	12.5
JCHEW	29	10.1
CHO	44	10.1
Environmental	48	16.7
Others	37	2.8
Employment Status		
Full time	176	61.1
Part-time	0	0
Casual	52	18.1
Volunteer	49	17.0
Others	11	3.8

Table 2 below shows that the majority (80.9%) were aware of occupational injuries, with an average awareness score of 1.18±0.39. In terms of knowledge, 50.3% rated their knowledge as "Good," while 21.2% rated it "Excellent," 19.8% as "Fair," and 8.7% as "Poor," with an average knowledge rating of 2.84±0.86. Formal training on occupational health and safety was lacking for 56.7% of respondents, while 43.3% had received training. Among those trained, 52.8% received it rarely, 29.6% annually, and 16.8% every 2–3 years, with only 0.8% never having refresher training. The mean training frequency was 2.75±0.89.

Regarding access to occupational safety information, the mean frequency was 2.67±1.06, with 37.2% encountering it "Sometimes," 33% "Rarely," while others reported "Never" (12.5%), "Often" (9.7%), or "Always" (7.6%). Most respondents (92%) were aware of workplace risks, with a mean risk awareness score of 1.08±0.28. Needlestick injuries (67.7%) were the most recognized hazard, followed by infectious diseases (11.5%). A high proportion (92%) knew the proper procedures for managing injuries, and 93.4% were familiar with required PPE, demonstrating strong adherence to safety protocols. However, the low training frequency suggests a need for enhanced workplace safety education (Table 2).

Table 2: Awareness and Knowledge of Occupational Injuries Among Respondents

Variable	Response	Frequency(n)	Percentage(%)	Mean±SD
Are you aware of the concept of occupational injury?	Yes	233	80.9	1.18±0.39
	No	55	19.1	
How would you rate your knowledge of occupational injuries?	Excellent	61	21.2	2.84±0.86
	Good	145	50.3	
	Fair	57	19.8	
	Poor	25	8.7	
Have you received any formal training on occupational health and safety?	Yes	125	43.4	0.57±0.50
	No	163	56.6	
If yes, how often do you receive such training?	Annually	37	29.6	2.75±0.89
	Every 2-3 years	21	16.8	
	Rarely	66	52.8	
	Never	1	0.8	
How often do you encounter information on occupational health and safety?	Never	36	12.5	2.67±1.06
	Rarely	95	33	
	Sometimes	107	37.2	
	Often	28	9.7	
	Always	22	7.6	
Do you know the potential risks associated with your work environment?	Yes	265	92	1.08±0.28
	No	23	8	
Which of the following do you consider as occupational hazards in your workplace?	Needle stick injuries	195	67.7	1.87±1.15
	Chemical exposure	23	7.9	
	Musculoskeletal disorders	19	6.6	
	Infectious diseases	33	11.5	
	Others	18	6.3	
Do you know the proper procedure to follow in case of an occupational injury?	Yes	265	92	1.08±0.28
	No	23	8	
Are you familiar with the types of PPEs required for your role?	Yes	269	93.4	1.06±0.25
	No	19	6.6	

The Table 3 shows the association between knowledge of occupational injuries and sociodemographic factors. Findings showed that age was not significantly associated with knowledge levels (p=0.347). Among respondents aged 18-35, 12.6% had high knowledge, 50.0% had moderate knowledge, and 54.4% had low knowledge, compared to those aged 36 and above, where only 3.3% had high knowledge, 25.0% had moderate knowledge, and 44.1% had low knowledge.

Gender, however, showed a statistically significant association with knowledge (p=0.004). Among male respondents, 6.5% demonstrated high knowledge, 63.4% had moderate knowledge, and 30.1% had low knowledge. In contrast, female respondents had higher knowledge levels, with 10.3% categorized as high, 75.2% as moderate, and 14.5% as low.

Education level significantly influenced knowledge of occupational injuries (p=0.00). Those with certificates or diplomas had 9.7% high knowledge, 58.0% moderate, and 15.2% low knowledge, while individuals with higher degrees had better awareness, with 20.0% having high knowledge, 77.8% moderate, and 22.2% low knowledge (Table 3).

Years of experience also had a significant impact (p=0.000). Workers with 0-5 years of experience had 9.2% high knowledge, 43.7% moderate, and 56.1% low knowledge, while those with six or more years had slightly lower high knowledge (6.8%) but better moderate knowledge (63.6%) and lower rates of poor knowledge (36.4%) (Table 3).

Job role was another factor with a significant association (p=0.00). Nurses and CHEWs exhibited better knowledge levels, with 11.1% having high knowledge, 70.8% moderate, and 18.1% low knowledge, compared to other job roles with 10.9%, 54.7%, and 34.4%, respectively.

Employment status, however, did not show a significant association (p=0.196). Among full-time employees, 9.7% had high knowledge, 60.8% moderate, and 28.4% low knowledge, whereas non-full-time workers had 15.8% in both high and low knowledge categories, with 68.4% having moderate knowledge.

Table 3: Association between knowledge of Occupational Injuries and Socio-demographic variables

Variable	High Knowledge	Moderate Knowledge	Low Knowledge	X^2	P-value
Age group					
18-35	23(12.6%)	91(50.0%)	99(54.4%)	17.61	0.347
36 and above	4(3.3%)	30(25.0%)	53(44.1%)		
Gender					
Male	8(6.5%)	78(63.4%)	37(30.1%)	10.99	**0.004**
Female	17(10.3%)	124(75.2%)	24(14.5%)		
Education					
Certificate/Diploma	21(9.7%)	126(58.0%)	33(15.2%)	78.3	**0.000**
Higher degrees	9(20.0%)	35(77.8%)	10(22.2%)		
Years of Experience					
0-5 years	14(9.2%)	66(43.7%)	85(56.1%)	60.8	**0.000**
6-above years	8(6.8%)	75(63.6%)	43(36.4%)		
Job Role					
Nurse/CHEW	8(11.1%)	51(70.8%)	13(18.1%)	56.6	**0.000**
Other roles	7(10.9%)	35(54.7%)	22(34.4%)		
Employment status					
Full time	17(9.7%)	107(60.8%)	50(28.4%)	91.22	0.196
Non-full time	12(15.8%)	52(68.4%)	12(15.8%)		

Key: Test statistics-Chi square, a level ≤ 0.05

The Table 4 highlights the impacts and risk factors of occupational injuries among primary healthcare workers. A significant proportion of respondents (70.4%) reported experiencing an occupational injury, with needlestick injuries being the most common (59.6%), followed by infections (14.3%) and other minor injuries (23.6%), including cuts and falls. The mean injury score of 0.60±0.49 reflects the high prevalence of needlestick injuries. Regarding the impact on work, 50.7% of respondents stated that their injuries had no effect on their job performance, while 14.3% required time off work, and 18.2% experienced reduced efficiency. The mean impact score of 1.52±0.88 suggests a moderate effect on productivity, though most workers continued their duties without significant disruptions.

The most frequently reported risk factors for occupational injuries included inadequate training (32.3%) and lack of safety equipment (29.5%). Poor working conditions (24.3%) and long working hours (10.8%) were also identified as contributing factors. The mean risk factor score of 1.12±0.45 indicates that multiple elements influence workplace injuries, emphasizing the need for improved training and safety measures. In terms of workplace safety culture, 61.5% of respondents rated it as "Good," while 25.7% described it as "Fair." However, 54.9% felt inadequately protected from workplace hazards, with a mean score of 1.45±0.50, suggesting room for safety improvements (Table 4).

To reduce the risk of occupational injuries, 36.5% of respondents recommended better personal protective equipment (PPE), while 28.1% emphasized the need for increased training. Other suggested measures included enhanced safety protocols (15.9%) and regular

safety audits (6.6%), with a mean score of 0.90±0.42, showing moderate support for these additional interventions.

Table 5 indicates a significant association between the impact of occupational injuries and various socio-demographic factors. Younger workers (18-35 years) were more affected by workplace injuries than older workers (36 and above), with 10.8% of younger workers requiring time off work compared to 4.9% of older workers (p=0.016).

Table 4: Impacts and Risk Factors of Occupational Injuries

Variable	Response	Frequency	Percentage (%)	Mean±SD
Have you ever experienced an occupational injury in your workplace?	Yes	203	70.4	1.30±0.46
	No	85	29.6	
If yes, what type of injury did you sustain?	Needlestick injury	121	59.6	0.60±0.49
	Chemical burn	0	0	
	Back/muscle strain	5	2.5	
	Infection	29	14.3	
	Others	48	23.6	
How did the injury impact your ability to work	Required time off work	29	14.3	1.52±0.88
	Reduced work efficiency	37	18.2	
	Long-term disability	20	9.9	
	No impact	103	50.7	
	Others	14	6.9	
What do you believe are the main risk factors for occupational injuries in your workplace? (Check all that apply)	Inadequate training	93	32.3	1.12±0.45
	Poor working conditions	70	24.3	
	Lack of safety equipment	85	29.5	
	Long working hours	31	10.8	
	Other	9	3.1	
How would you rate the safety culture in your workplace?	Excellent	16	5.6	2.53±0.69
	Good	177	61.5	
	Fair	74	25.7	
	Poor	21	7.2	
Do you feel adequately protected from occupational hazards in your workplace?	Yes	130	45.1	1.45±0.50
	No	158	54.9	
What measures do you think can be implemented to reduce the risk of occupational injuries?	More frequent training	81	28.1	0.90±0.42
	Improved PPE	105	36.5	
	Better reporting system	19	6.6	
	Enhanced workplace safety protocols	46	15.9	
	Regular safety audits	19	6.6	
	Other	18	6.3	

Gender also played a role, as females experienced a higher impact from occupational injuries than males. Specifically, 9.4% of females required time off work, compared to 6.2% of males, with a statistically significant association (p=0.032). Education level influenced the impact of injuries, as those with diplomas or certificates were more affected than those with higher degrees. Among diploma and certificate holders, 9.7% required time off work, whereas only 5.9% of those with higher degrees did (p=0.024). Similarly, workers with less experience (0-5 years) reported a higher impact (13.5% requiring time off) compared to

those with more than six years of experience (5.6%) (p=0.032).

Job roles also influenced the impact of occupational injuries. Nurses and JCHEWs were less affected, with only 4.9% requiring time off work, whereas 11.8% of individuals in other job roles did (p=0.014). Additionally, full-time employees were more impacted than non-full-time workers, with 6.9% of full-time staff requiring time off work compared to 2.7% of non-full-time employees (p=0.002).

Conclusively, the analysis confirms statistically significant relationships between occupational injuries and socio-demographic factors such as age, gender, education, years of experience, job role, and employment status, as indicated by p-values below 0.05 (Table 5).

Table 5: Association between Impact of Occupational Injuries and Socio-demographic Variables

Variable	Required time off work	No Impact	Others impacts	X2	P-value
Age					
18-35	31(10.8%)	105(36.5%)	25(8.7%)	8..24	0.016
36 and above	14(4.9%)	45(15.6%)	25(8.7%)		
Gender					
Male	18(6.2%)	46(16.0%)	9(3.1%)	10.25	0.032
Female	27(9.4%)	104(36.1%)	25(8.7%)		
Education					
Diploma/Certificate	28(9.7%)	102(35.4%)	24(8.3%)	7.48	0.024
Higher Degrees	17(5.9%)	48(16.7%)	10(3.5%)		
Years of Experience					
0-5 years	39(13.5%)	120(41.7%)	29(10.1%)	6.88	0.032
6 and above	16(5.6%)	30(10.4%)	5(1.7%)		
Job Role					
Nurses/JCHEW	14(4.9%)	47(16.3%)	8(2.8%)	13.14	0.014
Others	34(11.8%)	102(35.4%)	26(9.0%)		
Employment					
Full time	20(6.9%)	80(27.8%)	10(3.5%)	18.23	**0.002**
Non-full time	8(2.7%)	38(13.2%)	15(5.2%)		

Key: Test statistics-Chi square, a level ≤0.05,

Table 6 shows that, most commonly suggested improvement to reduce occupational injuries was enhancing Personal Protective Equipment (PPE), cited by 33.7% of respondents, highlighting the need for better protective gear. Regular training sessions were the second most recommended measure (26.4%), emphasizing the importance of continuous education to improve workplace safety.

Additionally, 15.6% of respondents emphasized the need for clear and effective workplace safety protocols, underscoring the importance of well-defined guidelines to minimize risks. Good hygiene practices were recommended by 9.7% of respondents, acknowledging the role of cleanliness in preventing infections and maintaining a safe environment (Table 6).

Furthermore, 7.6% of respondents recommended awareness and sensitization programs to ensure ongoing education on occupational hazards. Lastly, 7.0% proposed other safety measures, covering a range of additional precautions to enhance workplace safety. These findings emphasize the need for improved safety measures, regular training, and strict adherence to workplace safety protocols to protect healthcare workers (Table 6).

DISCUSSION

Among the 288 respondents, most healthcare workers were between 26 and 35 years old (37.2%), indicating a relatively young workforce, which aligns with recent research showing similar age distributions in primary healthcare settings in Nigeria reported by Aluko *et al.*, (2019) in their research investigation on Knowledge, attitudes and perceptions of occupational hazards and safety practices in Nigerian healthcare workers. The predominance of younger health workers could be attributed to the high demand for primary healthcare services, drawing in younger individuals who may be more adaptable to challenging work environments. Gender distribution showed a higher percentage of female workers, with women comprising 57.3% of the workforce compared to 42.7% male respondents. This

pattern aligns with the findings by Rai *et al.* (2021), who also observed a gender imbalance in primary healthcare, particularly in roles like nursing and caregiving, traditionally more populated by women in many low-resource settings. Such gender representation reflects socio-cultural factors that encourage female participation in healthcare roles centered around caregiving and community health.

Table 6: Respondent's Recommendation/suggestion on how occupational injuries can be reduced

S/N	Recommendations	Frequency (n=288)	Percentage (%)
1	PPE improvements	97	33.7
2	More frequent training	76	26.4
3	Workplace safety protocols	45	15.6
4	Good hygiene practices	28	9.7
5	Awareness and sensitization	22	7.6
6	Others	20	7.0
		288	**100%**

Educational level among respondents revealed that 60.1% held diplomas, with only a small fraction (1.7%) in the "Other" category. This aligns with the educational structure of Nigeria's healthcare system, where diploma programs are prevalent and cater directly to roles in community health. This structure potentially meets immediate workforce needs but may limit advanced career progression and specialized expertise. Work experience varied, with nearly 30% of respondents having 3-5 years in the field, while the most experienced group, those with 16 or more years, represented only 8% of the sample. These findings resonate with Abdulmalik *et al.* (2022), who noted that a substantial portion of healthcare workers in similar settings have limited experience due to high turnover rates and the dynamic nature of the workforce. The smaller proportion of seasoned workers may reflect job turnover or a lack of long-term incentives in these roles. In terms of job roles, Community Health Extension Workers (CHEWs) constituted the largest group (21.5%), while Junior Community Health Extension Workers (JCHEWs) represented 10.1%. This composition highlights the essential role of CHEWs in Nigeria's healthcare delivery.

The study findings reveal a high level of awareness of occupational injuries among primary healthcare workers, with 80.9% of respondents familiar with occupational injury concepts and a mean awareness score of 1.18±0.39. Knowledge ratings varied, with most respondents rating their knowledge as "Good" (50.3%) or "Excellent" (21.2%). However, there was a noticeable gap in formal training on occupational health and safety, as over half (56.7%) of respondents had not received training. For those who had, the majority received it infrequently, often only once every few years, underscoring a potential area for improvement in continuous safety education. This finding is similar to the study done by Akkajit *et al.* (2020), which also identified high awareness of occupational hazards among healthcare workers in Nigeria, though it highlighted limited training opportunities as a barrier to knowledge application. Furthermore, the study's data on training frequency (mean of 2.75±0.89) suggests a need for regular training, which is consistent with the studies of Duryan *et al.* (2020), which emphasized annual safety training as essential for retaining knowledge on injury management.

Occupational hazards, such as needlestick injuries, were the most recognized risks, with 67.7% of respondents identifying them, followed by infectious diseases (11.5%). Helena *et al* (2021) reported in their study on Occupational injuries among health care workers at a public hospital in Ghana that needle stick injuries as the most common injuries were needlesticks (27.4% of 318 injuries) and other sharps injuries (26.7%). Needlestick injuries (NSIs) remain a serious health concern for healthcare workers (HCWs). These injuries carry the risk of transmitting dangerous bloodborne diseases, such as HIV, Hepatitis B, and Hepatitis C.

Significant associations were found between socio-demographic variables and knowledge levels. The findings of the study show that younger individuals (aged 18-35) have varying levels of knowledge about occupational injuries, with 12.6% having high knowledge, 50.0% moderate, and 54.4% low. In contrast, older individuals (aged 36 and above) have lower levels of high knowledge (3.3%) and moderate knowledge (25.0%), but a significant portion (44.1%) still have low knowledge. The p-value of 0.347 indicates that this association is not statistically significant. This finding aligns with the findings of Helena *et al.* (2021), which

suggest that younger workers may have more recent training but still lack comprehensive knowledge compared to their older counterparts.

Gender differences are significant, with males showing 6.5% high knowledge, 63.4% moderate, and 30.1% low knowledge. Females, on the other hand, have higher percentages in high (10.3%) and moderate knowledge (75.2%), but lower in low knowledge (14.5%). The p-value of 0.004 indicates a statistically significant association. This suggests that females might be more engaged in safety training or more aware of occupational hazards, which is consistent with the work done by Xu *et al.* (2022) who highlighted the importance of maintaining strong safety measures in healthcare settings in gender studies on workplace safety. Education level significantly impacts knowledge, with individuals holding certificates or diplomas showing 9.7% high knowledge, 58.0% moderate, and 15.2% low knowledge. Those with higher degrees have even higher knowledge levels (20.0% high, 77.8% moderate). The p-value of 0.00 confirms this significant association. This is in line with research by Nwanko and Aniebue (2018), Mathew et al. (2019), Ogoina et al. (2020), and Amin et al. (2021), which indicates that higher education levels correlate with better understanding and adherence to safety protocols.

The impact of occupational injuries also varies significantly with sociodemographic variables. Younger workers (18-35 years) are more affected, with 10.8% requiring time off work compared to 4.9% of older workers. Females are more affected than males, with 9.4% requiring time off compared to 6.2% of males. Education level, years of experience, job role, and employment type all show significant associations with the impact of injuries, with p-values indicating statistical significance.

The most important aspects of these findings are the significant associations between knowledge of occupational injuries and variables such as gender, education level, years of experience, and job role. These findings are consistent with research conducted by Ogoina *et al. (2020) and Rajina et al. (2022), which* highlight the importance of targeted safety training and education, particularly for younger and less experienced workers. Gender differences in safety knowledge and impact also align with broader research indicating that women may be more proactive in safety practices. The significant role of education and job-specific training underscores the need for continuous professional development and tailored safety programs. Thus, the findings of the study emphasize the need for comprehensive safety training programs that consider sociodemographic variables to effectively reduce occupational injuries and enhance workplace safety.

CONCLUSION

The study concludes that occupational injuries remain a significant concern among primary healthcare workers in Katsina LGA, impacting their safety, well-being, and work productivity. Findings indicate that while many healthcare workers are aware of occupational hazards, gaps in formal training, inadequate access to personal protective equipment (PPE), and insufficient injury management systems contribute to persistent risks. Needlestick injuries were identified as the most common hazard, with various factors like gender and job role influencing the extent and impact of these injuries.

RECOMMENDATION

The following recommendations are made based on the study findings:

i. Regular occupational health and safety training should be implemented to improve healthcare workers' awareness, knowledge.
ii. In order to reduce the incidence of needlestick and other preventable injuries, healthcare facilities must ensure that PPE is readily available and that safety rules are strictly followed.
iii. Regular safety audits and risk assessments should be conducted to identify and address workplace hazards proactively.

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