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ASSESSMENT OF PETROL STATION RISK AND MANAGEMENT STRATEGIES AMONG FUEL ATTENDANTS IN MAIDUGURI, BORNO, NIGERIA

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Abstract

Location and patronage of patrol station services are significant for economic development however their activities exposed workers and patrons to risks and hazards. This study sought to assess the perception of fuel attendants on the risk, associated with their work place environment in Maiduguri. Data was gathered through conducting a questionnaire survey and stratified random sampling techniques was adopted to select 122 respondents from the total 17 petrol stations enumerated in the metropolis. The results revealed, 51.2% of the respondents were between the ages of 18–25 years, which shows that, very young people are the target group required for work at petrol stations in the town. Only 15.6% attended tertiary institutions which could have been important for better understanding of handling task with relative ease. Though job training is vital also, yet, 80.3% of the workers were not formally trained. In terms of health challenges,77.8% of the workers reported dizziness; headache, hunger, hand skin peelings and nausea as the problems they deal with persistently. A given 42.7% have access to First Aid in emergency cases. Unfortunately, 51.6% of these workers were responsible for their medical bills when the need was beyond First Aid case. Draw conclusion here from the findings of the study. Make recommendation based on specific findings. It is therefore important that, management of these facilities, as well as their workers make it a duty to take into account human errors associated with the work, and strictly adhere to work ethics without compromise for effective safety.

Keywords*:* Work place environment, Perception, Petrol station, Risk, Fuel attendants

1.1 Introduction

Although this subjective judgment may vary from person to person, all human endeavors carry some measures of risk. Consequently, its management is expected to be essential whether in big or small organization where its potential is evident (Hansson, 2014). Despite the unfavorable environmental interactions that encourages risk potentials, unfortunately, it seems most urban settlements and organizations in Nigeria focused less on vital domestic or occupational health and safety matters; so, most times create very little room for improvement on the risk mitigating measures (Ahmed, Kutty, Mohammed, Idris and Azmi, 2012). A particular reference is occupational risk endemics at petrol stations in Maiduguri town where unsafe behaviors and activities within their micro-environments are presumed to be the main contributors. In most of these facilities, it is common to witness unhindered public movement without relevance, which sometimes create blockage to free maneuvering of fuel-laden trucks and customers' vehicles. As observed by Matori and Aulia (2010) also, activities at the oil suctioning machines and service bays; restaurants and public toilets; and compressed natural gas refilling units add to environmental

pollution; as a result, constituting risk potential endemic to occupants particularly workers.

1.2 Statement of the problem

Petroleum products are highly flammable substances which consist of toxic pollutants that require friendly handling approach in order for it to optimally satisfy human wants and guarantee safe environments. Despite the advantages of petrol stations where the products particularly PMS, AGO, CNG and DPK are retail, and their contributions to urban economic development; pollutants emissions from their activities have the potentials of overwhelming the environments where such are practiced. In event where these pollutants are inhaled therefore, they can easily transit into lungs, blood streams or deposited on skins, resulting in adverse health effects. Quantity lost through spills and leakages also can contaminate their premises ambient air, and flow to nearby water supply channels or drainages through runoff, flash flood thereby contaminating portable water and soil. Kaltho, Ibrahim and Mshelia (2017) therefore revealed, the aggravation of these environmental menaces could be attributed to absence of adequate environmental risk management regulations or outright negligence of the available ones put in place to control or mitigate petrol stations operation in areas of their location. Consequently, it would be safe to assume that, risk and hazards at these facilities are borne out of carelessness by their proprietors, managements or workers who failed in observing relevant precautionary measures. In turn, workers particularly, and other occupants of the facilities are most times the vulnerable prey to the avoidable potential risk and hazards resulting from the actions. Other negligence comes from the weakness of legislative regulatory enforcement of safety and sustainable environments development measures (Compliance Program Report, 2013). Petrol stations however, are facilities where best safety practices are expected to be holistically practice for safety and optimum performance of workers, and safety of the environment. But in many cases, such are not tenable despite regulatory framework. In Nigeria for instance, Department of Petroleum Resources (DPR Guide, 2010) set minimum safety measures required by petrol stations to observe for operations. However, in the case of Maiduguri, a town witnessing expansion in population as a result of mass human immigration from other towns and villages due to security challenges being experience in the northeast sub-region, the result ushered a huge need for petroleum products in transportation sector and energy generation. To meet up with the demand, the number of petrol station's location keeps increasing steadily (Kaltho, Ibrahim and Mshelia, 2017).

Unfortunately, the premises of many of these stations in turn become centers where people continually congregate for varied reasons with little or no restriction to safety precautions; thereby exposing these occupants to needless risk and hazards. Instances have shown varied activities at the premises of these stations which are perceived as glaring laissez-faire operational practice defaulting the guides. Consequently, there is high probability that, the workers are those majorly exposed to the varied safety jeopardy at the stations (Borno State Fire Service Head Quarters [BSFSHQ] Maiduguri, Statistics Unit, 2019). Based on these envisaged health and environmental concern, the paper assessed the

perceptions of the workers on risk potentials endemics they experienced as they work daily at their facilities in the town.

2.1 Literature Review: Petrol stations services and implications

Location of modern petrol stations began in the 20th century when underground storage with pump and hose dispensing curb were placed on streets for retailing fuels to customers. This shows the facilities' activities are dependent on the environment and people oriented; as a result, they are playing critical role in sustainable development goals. It is therefore important that, stakeholders in the business focus always on implementing environmental management principles by developing techniques and technologies which could gear towards reducing harmful environmental impacts associated with them. The benefits of implementing such tools become necessary so as to aid in saving cost of environmental remediation; and increased environmental awareness and safety at workplace (Redmond, 1991; Wilsson, 1995; Compliance Programme Report, 2013).

Generally, most petrol stations are built with underground fueling installations, and pump machines on forecourt under in a canopy within the station's perimeter; and fuels from the underground tanks are pumped through pipes to the dispensers. Dispensers are the final points where fuel are delivered into vehicles or other containers and financial cost calculated by the machine. Some petrol stations also operate small convenience store or sale other petroleum products as additional business. In some countries, chain stores like supermarkets, discount superstores, warehouse, and other services such as mechanical repairs are provided within petrol stations premises. In most Africa for instance, attendants are employed to pump the fuel to customers. This in turn, subjects them to risk of adverse health effects as a result of inhalation of volatile organic compounds released from this fuel; as their vapor escape into the atmosphere and gets into lungs or deposited on the skin of the employees and individuals residing at close vicinities to such facilities. Against this, advocacy is geared towards proper management and compliance to best practice in handling the petroleum products so as to guarantee safe environment for all (Genovase, 2004; Mark, 2005; Kanye, 2014; Raeesa, Christopher and Jasper, 2015).

Nigeria in African, where petroleum products are highly consumed locally, have their retail services fully handled by pump attendants at petrol stations. However, these products are observed to be potentially hazardous at ambient temperature as they give-off vapors which when mixed with air in given proportion and ignited, can burn with explosive force. They are also potential pollutants which when handle incorrectly can cause damage to environment and harm humans. It's therefore important that, control of risk at the facilities become vital business practice and legal requirements under health and safety at work and other related legislations. In many cities for example, breathing clean air over time has become more of a distant dream; and the challenges are likely to remain, since aside other equipment, automobiles and diesel-fired electricity generators continue to use fuel that contributes greatly to choking of these cities. Consequently, petrol stations are viewed as among the major contributors of air pollutions across the environment. To help mitigate this menace however, fire risk assessment; staff training; vapour recovery

(VRSs) systems; emergency response alarm systems and provision of escape routes should serve as basic preconditions measures for licensing of petrol stations operation (Fire Precautions Workplace Regulation, 1997; Ifeanyichukwu, 2002; Afolabi, Olajide, and Omotayo; 2011; National Fire Protection Association Report, 2011; Ayuba, Mshelia and Dami, 2013).

The need for these control measures' enforcement by responsible agencies is to help in preventing avoidable risk and hazards which could be inimical to the environment. Apart from creating environmental hazards, petroleum products also, can pose health hazard if inhaled, ingested or come into contact with the eyes. In proper environmental management therefore, people and their safety need to be placed at the forefront of concern so as to protect their interest with regard to the environment likely to be affected. This will help in achieving best practicable environmental options required for healthy living and safety of the environment; since these facilities store and handle significant quantities of hazardous chemicals which present unique hazards due to their flammability. Other benefits of implementing environmental management tools in petrol stations business include, cost savings, ability to anticipate liability, increased environmental awareness and safety at workplace. As there are quite a number of environmental issues associated with these activities, ranging from risk of leaks from underground storage tanks, fuel spills, storm water runoff, as well as wastewater from automobile cleaning activities which need to be taken into consideration. Cases of air pollution from evaporative losses of volatile organic compounds in fuel products emitted mainly during bulk deliveries and dispensing operations are also issues of concern. Occupational health and safety issues associated with fuels vapour inhalation by employees and customers, as well as the risk of fire and explosions, are worrisome risk and hazards (FPWR, 1997; Hanekom, 2001; Spencer, 2004; Wanjiku, 2008).

Given these risk and hazard potentials, studies revealed occupants of petrol stations, particularly fuel pump attendants are at high risk of adverse health effects as a result of inhalation of volatile organic compounds released from dispensed fuels. *Benzene, toluene, ethylbenzene* and *xylene* (BTEX) emissions most especially, were found above the recommended limit standards. As such, persistent inhalations of the products fume could subject workers and those prolong occupants to lifetime health challenges, particularly chronic cancer risk. There are also incidences of other potential risk, workers and individuals residing at close vicinities to such facilities could be subjected-to due to continuous inhalation of pollutants from petrol stations activities such as *neurological* and *teratogenic* disorder (Raeesa, Christopher and Jasper, 2015). It is therefore important that, in order to effectively safe guard and create conducive environment where all can achieve optimum potentials, it is always better for everyone to try and appeal to the ethics of situation by doing the right thing particularly at petrol stations micro-environments; bearing in mind the stipulated consequences for violating the right to safe environment. Note, it was as a result of the progressive negative handling off the environment by man that called the need for Sustainable Development as a platform where humans were inspired to evaluate their relationship with the environment. The platform challenged man to critical examines his development

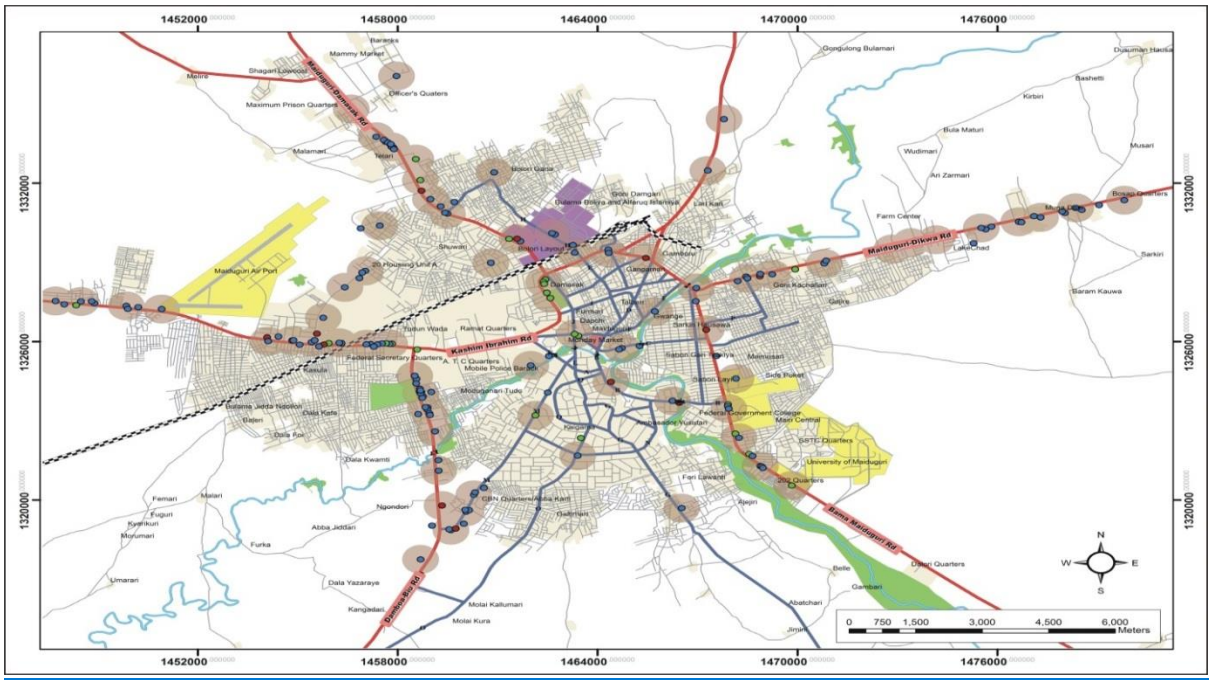
actions which often damage the environment and relegates majority of humanity to risk and hazards conditions (Daly, 1980; Campos-Candel, Llobat-Estellés and Mauri-Aucejo, 2007).

This call become pertinent to petroleum products entrepreneurs to identify and assess risks associated with location of their facilities, and working practice at the facilities; so as to genuinely imbibe the practice of proper regulations that could aid at reducing risk impacts. These entrepreneurs also, are expected to focus more on implementing environmental management practice through development of techniques and technologies capable of reducing harmful environmental impacts for better safety performance and providing smooth meaningful operations for workers and other periodic occupants of the facilities, against risk and hazards (United Nations Report, 2015; Ritter, 2013 in Magambo, 2016), particularly in Maiduguri town where the case was perceived to be glaring in default.

3.1 Methodology

3.1.1. Description of Study Area

Maiduguri town which lies between Latitude 11^0 46'18"N - 11^0 53'21″N and Longitude 13^0 02'23"E -13^0 14' 19″E and covered 137.36 sq km landmass.



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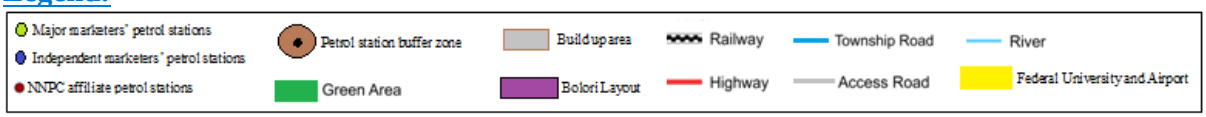

Figure1: Study Area
Source: GIS Unit, Department of Geography, Gombe State University

3.1.2 Data Collection and Analysis

Data were sourced through quantitative and qualitative approach methods. Structured and unstructured questionnaires and interview schedules were therefore used to obtain the required data, and literatures also reviewed for relevant information. One hundred and twenty-two (122) petrol stations workers irrespective of whether they work with independent marketers *(ind.m)*, major marketers *(mj.m)* or NNPC affiliate *(nn.a)* were picked at random as respondents. These respondents were sampled from 7 out of 17 petrol stations routes identified in the study area after their alphabetical placements for effective management.

Following the alphabetical appearance, each routes was attached numerical figure and some with additional asterisk(s) as mark(s) of individual identity, thus:*[1]Airport–Kano route, [2]Ali Kotoko route, *[3]Baga route, [4]Bama route, *[5]Damboa (NNPC Depot) route I, [6]Damboa–Biu route II, *[7]Flour Mills Route, [8]Gamboru–Ngala route, *[9]Giwa Army Barracks route, [10]Gwange–Bulabulin route, *[11]Lagos Street route, [12]Maduganari by-pass route, **[13]Old Maiduguri route, [14]Pampomari by-pass route, **[15]Polo route, [16]Post Office Area, *[17]Sir Kashim Ibrahim route.

Routes with odd numbers and marks of identity (*) were picked as samples; and 9 were identified. However, Old-Maiduguri and Polo routes (with double asterisks) were screened out; given that, each do not have the requisite number of petrol stations convenient for sampling. Hence, 7 routes bearing single asterisk each formed the required samples. From each of these sampled routes, 5 petrol stations were picked at random to give a total of 35, out of which 4 workers: 2 pump attendants, 1 administrative staff and 1 fuel trucks drivers each were picked purposively and issued questionnaires or administered interview.

These workers were selected based on presumed risk vulnerability whilst on duties. For instance, the pump attendants, despite runs shift, yet, spent minimum of 8 hours daily at pumps island dispensing fuel to customers. The fuel trucks drivers are involved in transporting fuel from long distance to petrol stations, actively participate in off-loading fuels, and spend considerable length of time associating with petroleum products. Administrative staff also consistently occupies offices or run around the station's premises. Responses and data obtained from the 122 out of the 140 initial respondents were analyzed using descriptive statistical analyzed using SPSS Version 19.0, and results presented as frequencies and percentages in tables and charts; and findings discussed.

4.1 Results and Discussion

4.1.1 Demographic and Socio-economic Characteristic of respondents

Table 1presents information on the socio - demographic profile of the respondents.

Results indicate that Workers constituting 51.2% were between the ages of 18 – 25 years, followed by 30.6% belonging to the age bracket of 26 – 35 years; whilst 5.8% were within the ages of 46 years and >.

Table 1. Socio-economic characteristics of workers

Workers Stations	Age			Gender			Responsibility as staff at Petrol		
	Years	Freq.	%	Gender	Freq.	%	Responsibility	Freq.	%
	18 – 25	62	51.2	Male	80	65.6	Pump attendant	70	57.5
	26 – 35	37	30.6	Female	42	34.4	Administrative staff	48	39.3
	36 – 45	16	13.2				Petroleum tank drivers	04	3.2
	46 – 55	6	5.0						
	> 55	1	0.8						
Sampled petrol station workers	*Total*	*122*	*100*	*Total*	*122*	*100*	*Total*	*122*	*100*
	Educational level			**Years of experience at Petrol Stations**					
	Education	Freq	%	Experience	Freq.%				
	Non-literate	25	20.7	5 years &<38	31.1				
	Non-formal	16	13.2	6 – 10 67	54.9				
	Primary	39	32.2	11 – 15 12	9.8				
	Secondary	23.	19.0	16 – 20 43.3					
	Tertiary	19	15.6	> 20 years	1	0.8			
	Total	*122*	*100*	*Total*	*122*	*100*			

Source: Fieldwork, 2020

These clearly show that, majority of petrol stations workers in Maiduguri town were young individuals. The perceptions of the proprietors might've been, the age groups are more agile and stronger to withstand vagaries of work at the facilities (Table 1). Male proportion of these workers' population constituted 65.6% whereas the female constitutes 34.4%. This variation in gender representation may not be unconnected with the fact that, economic pressure, culture/tradition, social, security and religious challenges are playing significant role in determining the type of job female engaged-in in the town.

The perceptions of these workers have it that, religion, particularly Islam, and the cultural value of predominant indigenous Northern Nigerians, and which have their reflections on the dominant inhabitants of Maiduguri restricts women from working especially in environment that exposed them to continuous social interaction with men; and petrol station is an example. As such, the 34.4% sampled population used in the study were those who either do not belong to that class of believes, or assumed family responsibility through death of spouse, parents or other economic challenges that compelled them to defile such restrictions.

As evident in Table 1 also, 51.2% of the workers attended either primary or secondary schools as their highest educational attainment, while 33.9% were either non-literates or obtained *quranic* education. Only 15.6% attended tertiary institutions. These shows most of the workers acquired little or no formal education, which could have help them in better understanding of handling task with relative ease at their respective stations. Most of those who constituted the 15.6% (tertiary institutions group) were used as

administrative staff that performs day-to-day documentations. The result further revealed 57.5% were pump attendants; 3.2% were tank drivers; while 23.4% add up to the 15.6% who attended tertiary institution to make up 39.3% of administrative staff.

The higher percent of the pump attendance was likely so because, at each petrol station, fuel retailing is the major work as shown most times by the number of fuel pumping machines available; and this class of workers are the ones responsible for operating the machines, which exposed them more to petroleum products menace. Administrative staff, though stays in confined offices, however, those office structures are located close to fuel dispensers' canopies. Their work also required they periodically monitors activities at the pump island, consequently are also exposure to pollutants emissions.

Years of experience of the workers indicated 54.9% spent between 6 – 10 years working with petrol stations; 31.1% spent 11 - 15 years; whereas 4.1 % spent 16 years and >. It is therefore certain that, most of the workers' experience (86%) fell between few months to 10 years. However, the 13.9% perceived to be more experienced workers did not acquire the requisite experience of managing petroleum products and equipment at their current petrol stations; yet, such knowledge and experience were immensely assisting them in managing situations as they arise at their present work stations.

4.1.2 Inquiries on Workers Experiences and Challenges at Work

Table 2: Inquiry responses by workers

Inquiries	Yes,		No		Total respondents	
	Freq	***%***	***Freq***	***%***	***Freq***	***%***
Whether the workers were trained for the job	24	19.7	98	80.3	122	100
Whether the petrol stations have ever experienced, or are experiencing fuel dispensing machines leakage problem	6	4.6	116	95.1	122	100
Periodic fuel spillage being experienced during fuel dispensing services at petrol stations	50	41.0	72	59.0	122	100
Whether the petrol stations have and use Vapour Recovery system (VRS) for trapping fuel air pollutants	0	0.0	122	100	122	100
Whether the workers use facial marks in the cause of duty as fuel is being off- loaded or dispensed	13	10.7	109	89.3	122	100
Worker's knowledge of health implication associated with work at the petrol stations	38	31.1	84	68.9	122	100
Any confirmed health challenges experienced as a result of working at petrol stations?	27	22.1	95	77.9	122	100

Source: Fieldwork, 2020

As evident, Table 2 shows 80.3% of the workers were not formally trained for the job they were assigned to at their respective stations. In effect, this percentage and even the 14.8% of those trained, suffers products effective handling challenges. Consequently, this95.1% cumulative reported to have been experiencing periodic fuel leakages from dispensing machines with none or little solution coming from them. Moreover, 59% complained of periodic spills in the cause of duties which most time shave no required knowledge on curbing this

challenge, but carefulness; yet, due to pressure of demand, efforts to eliminate or mitigate such occurrences were most times without success.

The entire (100%) studied petrol stations in the town operate without vapour recovery system (VRS), and the same percentage claimed ignorance on the knowledge of the device; so, fuel emissions are let free into the ambient air. The VRS is a devise which aid in trapping volatile air pollutants resulting from fuel dispensing activities for the purpose of mitigating their emission concentrations within petrol stations micro-environments and their subsequent risk factors. Despite the importance of this device as safety measures, the lack of it at all the stations did not deter 89.3% of the workers from working without the use protective clothing against toxic pollutants emissions or content splash. As they were of the opinion that, since their managements were not able to make provisions for these devices and the protective clothing, they assumed none were critical for the work.

This negligence was perceived to be trigged by none or little knowledge on implications of working at petrol stations without using proper protective wears, and lack of training which could've avail these workers the understanding of such implications. As revealed by this finding therefore,68.9% fall in this category lacking the knowledge of health implications associated with their work. In the overall, 77.9% were not able to ascertain whether the periodic health challenges they experienced at one time or the other whilst at work, were actually as a result of the nature of their work. From these expositions therefore, it is clear that, most petrol stations workers in Maiduguri town are not mindful of their personal health and safety, and perhaps their managements might've been exploiting the ignorance to advantage.

4.1.3 Fuels Management and the Environmental Challenges

Information on the management of fuel and its consequent environmental challenges is shown in Figure 1. Spots of periodic fuels spills resulting from difficulty encountered by workers in managing pumping machines, pumping nozzles and during fuels off-loading from fuel trucks were evident in the premises of some petrol stations. The methods employed in managing such incidences as they occurred, revealed 40.2% to have reported that, spilled fuels were left unattended to dry-off in the open

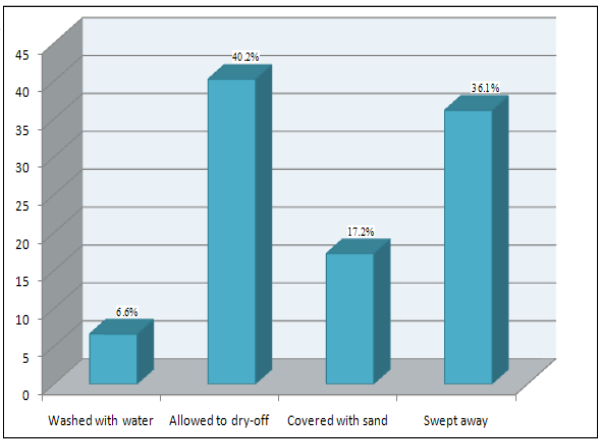

Figure 1: Ways spilled fuel during dispensing services were managed at petrol stations
Source: Fieldwork,2020

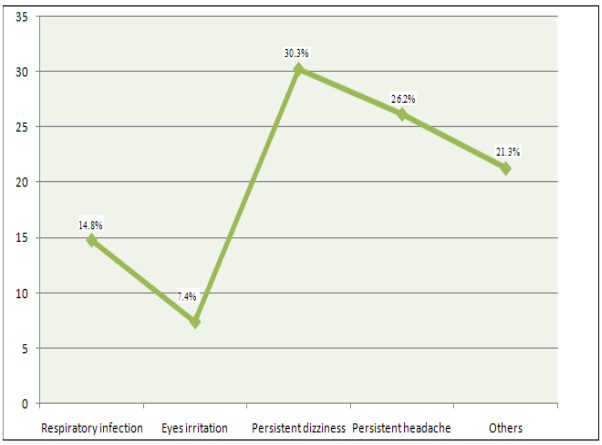

Figure 2: Health challenges experienced by workers as a result of working at petrol stations

6.6% of the workers affirmed that spilled fuels were continually been cleaned-off using water and other cleaning agents as they occur. Whilst 36.1% argued to the fact that, such incidents when occurred were swept away with brooms or brush without cleaning agent. Furthermore, though sand served as excellent agent for sucking-off spilled fuel and neutralizes their odour faster and better, only 17.2% of the workers use sand provided in safety containers at the premises of stations.

Given these findings therefore, the highest responses with 40.2% who allowed spilled fuels to dry-off in the open whenever they occurred shows that, with the volatile nature of Premium Motor Spirit (PMS) particularly, when left in the open, could easily vaporized into ambient air and amount to pollutants. As a result, the petrol stations micro-environments where such incidences were occurring becomes highly saturated with huge dose of the harmful pollutants; though, depending on the amount of the spill. Based on this, there is a strong likelihood that, the poor management of spilled fuel at the petrol stations were key to critical air pollution menace within their micro-environments, and extending to wider realm of the town's macro-environment.

The study also reported perceived health challenges associated with poor fuel management experienced by workers at their facilities. As indicated Figure 2 therefore, 14.8% complained of respiratory infections as the major challenges they perceived to have been the cause as a result of periodic or continual inhalation or ingestion of fuel polluted air when on duty. The perceptions of 7.4% were eyes irritation; being that, fuel vapour easily gets into eyes, resulting in red-pepper-hot sensation and blurs vision. Workers constituting 30.3% reported persistent dizziness, while 26.2% revealed headache. Others (21.3%) enumerated a number of challenges such as persistent hunger, hand skin peels and nausea as the disturbing challenges they perceived are caused by their interaction with petroleum products at their posts (Figure 2). From these findings, though the workers responses were based on perceptions, still it goes to show that, they have been subjected to working under unfriendly conditions

burdened with risk and hazards (FPWR 1997; Dib, *et al.,* 2007; Cezer-Vaz, *et al.*, 2012 and Raeesa*et al.*,2015) as attested by the health challenges claimed.

4.1.4 Medical Challenges Faced by Workers

Figure 3 displays information on medical challenges faced by workers**.** Governed by the high environmental risk and hazards associated with working at petrol stations micro-environments, the medical attention workers were periodically expected to receive suffers varied challenges as shown by their levels of awareness and managerial attitudes towards responsibilities

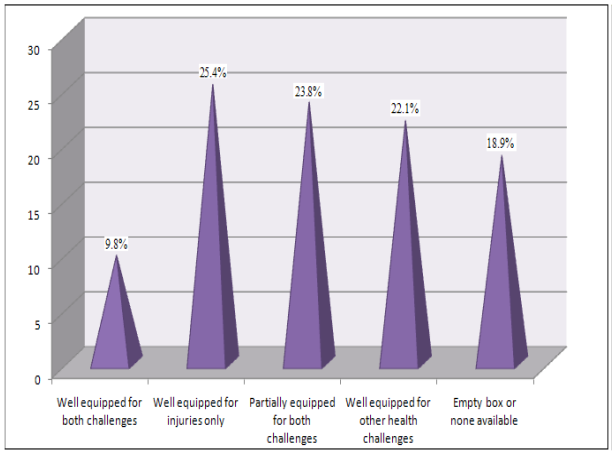

Figure 3: Equipped levels of petrol stations' First Aid containers for handling emergencies
Source: Fieldwork, 2020

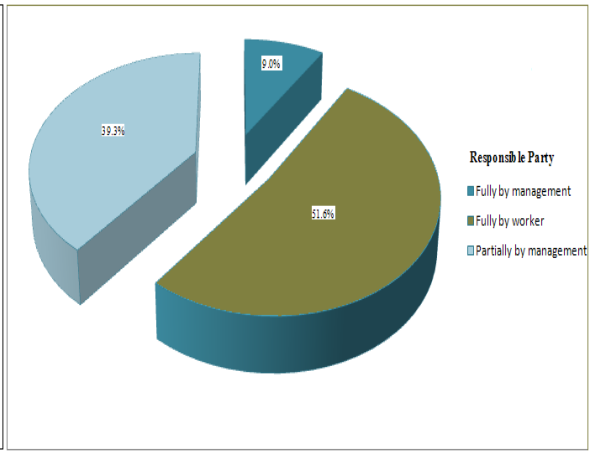

Figure 4: Responsible parties bearing medical bills of workers who suffers health challenges at work

With particular reference to the managements' concern and efforts, 9.8% of the workers attested that, First Aid Containers at their facilities were available and well-stocked with necessary medications for handling urgent cases of injuries and other mild health deterioration. However, 25.4% reported the availability of First Aid Containers with stocked medications but, for handling only minor injuries such as open wound. In an event of other health challenges, workers were left to seek medical assistance in nearby patent medicine stores, pharmacies and perhaps, hospitals (Figure 3).

Furthermore, 23 8% revealed the availability of First Aid Containers at their stations, though scantly equipped with few drugs and open-wound dressing items. In most cases, these were inadequate for handling even the mildest health challenges when they arise. Whereas 22.1% revealed, theirs were stocked with only simply analgesic drugs relevant for handling only mild headache. However, 18.9% reported, the First Aid Containers at their facilities were either non-available or were available but on shelves without medication contents. Workers at these facilities depend on nearby patent medicine stores or pharmacies in an event of accident or other sudden health challenges. In general terms therefore, these results show how petrol stations, being risk and hazards potential environments to work at, yet, most of their managements were reluctant in providing efficient First Aid Services to their workers. This seems to portray that, provision of safe working environment for

workers at petrol stations by most of their managements were non-issue of importance particularly in Maiduguri as indicated in the Figure 3.

Other challenges have to do with responsibilities of medical bills o workers who sought for medical attentions in health facilities like patent medicine stores, pharmacies, clinics or hospitals for health conditions perceived to have direct associated with the nature of their work. From the result, 9% asserted, in such event, their management bears full medical cost. Whereas 51.6% posited that, workers were fully responsible for bearing their medical bills with promises of compensations by their managements which were never fulfill. However, 39.3% of the workers affirmed to their managements bearing responsibility for paying fractional percentages of the bills incurred especially when such health challenges have to do with accident where injuries were sustained (Figure 4). However, this percentage bills were neither uniformly nor regularly paid among the workers. Given this exposition, it is evident petrol stations workers' welfare to a larger extent have not been the priority of most managements despite the risk involved which ideally calls for periodic medical examinations even without signs of health challenges.

4.1.5 Safety measures Awareness and Failure Repercussions' Perceptions

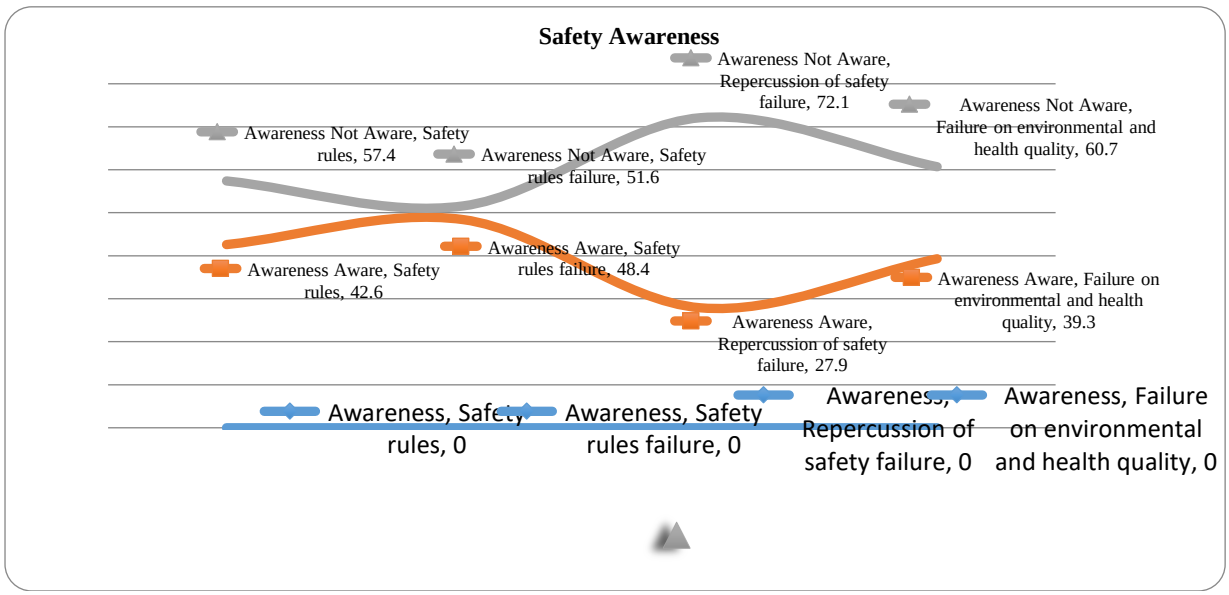

Figure 4: *Perceptions of workers on safety measures*

Source: Fieldwork, 2020

Although imbibing genuine preventive measures against harmful pollutants emissions and other forms of accident consequent of activities at petrol station installations are extremely important, awareness of the workers on basic safety rules observance and the resultant repercussions of failure particularly on the environmental quality and human health are leaving much worries than desire. For instance, as revealed in the study, 57.4% of the workers have declined to being aware of basic safety rules put in place; talk less of their enforcement by their managements; whilst 42.6% claimed to be aware of those safety rules. On safety rules failure, the perceptions of 51.6% workers rest of the claims that, they were not aware of the operational norms of any safety rules at the stations, since they were not given periodic training on the job, rather were left to learn how to manage unpleasant situations as they occurred. So could not ascertain whether there have been pronounced failure in their operational practice on the job; whereas, 48.4% were aware of the rules, but opined to failure in training on how operational procedures on the job should be manage (Figure 5).

Violation of safety rules whether aware or not, does not negate the likelihood of subjecting the defaulter, the occupant of the premises, and the micro-environment in question to needless threat to hazards as the repercussion. From the study however, 72.1% of the workers were not aware that, safety adherence failure could lead to grievous environmental and health challenges. Their perceptions on the issue have to do with religious believe and myths on incidence and accident. To this category of workers, the held strongly to believe that situations were designed by fate; and what will be, will be, no matter how meticulous one is in designing its prevention. Only 27.9% held the perceptions that, most accident and other health challenges witnessed or suffer at the facilities were predominantly repercussion of failure on safety measures (Figure 5).

The study has therefore found that, over the years, significant numbers of petrol stations in Maiduguri town have suffered lost, damages and recorded injuries as a result of machines breakdown, faulty equipment and fire outbreak as attested by workers and corroborated by Borno State Fire Service Head Quarters (BSFSHQ) Maiduguri, Statistics Unit Report (2019). From the result as indicated in the Figure 5 however, 60.7% did not perceived safety measures failure at their petrol station facilities could trigger any form of environmental or health challenges; whereas 39.3% attested that, their facilities have at one time suffered an unfortunate incidence which were attributed to safety measures failure. As attested by these results therefore, it is evident that, though the perceptions of the workers on safety measures adherence varied, yet, it is important to acknowledge the assertion by Cezar-Vaz*et al.*, 2012 that, it is regrettable that knowingly or unknowingly, location and activities at petrol stations are safety and health threat; as they expose their

workers and people who spend considerable length of time within such micro-environment to enormous risks and hazards.

5.1 Conclusion

Summarize your conclusion from your findings are perceived to be encouraged by negligence to stipulated environmental protection regulations. As a result, they are fast becoming worse malignant hampering human and environmental safety. Against this, it has become difficult to achieve injury-free working environments, as well as guaranteeing platform for optimal workers performance. Except genuine efforts are invested therefore, achieving reasonable environmental best practice at these facilities might be a mirage.

5.2 Recommendations

Based on the findings of this research, the following recommendations have been made:

i. It is incumbent petrol stations management provides effective supervisions, and good operational procedures
ii. Emergency services should be contacted no matter how small a situation is
iii. Management and their workers should make it a duty to take into account human error
iv. Workers should be educated

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