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ScopeMed

Health and safety in high-risk work environments: A study of fuel service stations in Ghana

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ABSTRACT

Aim: This descriptive study was conducted to assess the health and safety standards, occupational hazards and health problems among pump attendants in Fuel Service Stations (FSS) in Ghana. **Methods:** Data was collected using structured questionnaires and an observation check-list. A total of 145 pump attendants and 50 FSS managers were randomly sampled from 90 FSS in the Kumasi Metropolis. Fisher's exact test at 5% significance level and binary logistic regression were conducted to test association among study parameters using SPSS 17.0. **Results:** The top three occupational hazards were exposure to extreme weather conditions (99%); inhalation of vehicle exhaust fumes and petrol vapour (98%) and fire outbreaks (88%). Common illnesses experienced by pump attendants are all work-related and were dominated by musculoskeletal disorders [MSDs] (n=141), low-back pain [LBP] (n=81), headaches (62) and dizziness (n = 36). Logistic regression using age, sex and work experience as risk factors for MSDs, LBPs and headaches showed significant association between LBP and age of pump attendants (p = 0.036; 95% CI = 0.16-0.94) whilst MSDs and headaches showed no significant association with the risk factors. Post-employment medical examination habits was poor (22%) among the attendants possibly owing to ignorance of the health risks and the fact that the related costs are self-borne. Although all stations had fire fighting equipment training in their usage was highly associated with work experience of pump attendants; most newly employed attendants (<3years work experience) are not trained in their usage. **Conclusion:** Pump attendants in FSS are predisposed to dire health risks due to their working conditions and require urgent measures to protect them.

KEY WORDS: Occupational health, safety, fuel service stations, pump attendants, occupational illnesses, fire safety, Ghana

INTRODUCTION

Ghana's petroleum industry has over the past few years attracted the attention of a great deal of investors both locally and internationally. This has been triggered by the discovery of oil in large quantities in 2007 and the subsequent commercial production of oil in the last quarter of 2010 [1]. Correspondingly, Fuel Service Stations (FSS) have increased astronomically, becoming ubiquitous sights in city centres across the country. Apart from providing readily available fuel retail points for the general public, the proliferation of these stations have also contributed to employment generation. Nevertheless, there are pressing concerns about the health and safety standards at FSS.

Several empirical studies [2-6] have shown that, FSS provide suitable grounds for fire outbreaks and expose employees to numerous physical, chemical and ergonomic hazards as well. Particularly for pump attendants, Gattas et al. [7] argue that, exposure to diesel, petroleum fumes and fuel components such as benzene and formaldehyde result in adverse mutagenic and carcinogenic effects. Moreover, noise from vehicles, standing for long hours and monotonous movements by pump attendants also expose them to a host of occupational diseases including reduction in hearing acuity, respiratory infections and physical stress [3]. The consequence of unsafe conditions at FSS are not only limited to employees but also to surrounding communities. According to Bokpe [8], between 2007 and 2014, 11 reported LPG-related accidents in Ghana took the lives of 39 people, leaving 186 others with various degrees of injuries. Additionally, in June, 2015 about 80 people lost their lives and properties worth millions of dollars were destroyed by a fire outbreak in a fuel service station in Accra [9].

Despite the glaring evidence of the health and safety risks posed by the emergent oil and gas industry in Ghana, this has been beyond the focus of the lenses of most researchers and regulatory authorities remain adamant to addressing this issue. Several studies conducted since the commercial production of oil and gas in Ghana [1, 10-14] have rather been largely focused on the socio-economic benefits and environmental impacts neglecting the work-related health and safety risks along the value chain of the sector. There is generally, scanty empirical data on health and safety issues in the oil and gas sector and worse still, policy frameworks on occupational health and safety in the sector to ensure compliance with health safety standards are conspicuously missing[15]. The only study conducted on safety issues FSS in Ghana suggested that inadequate provision of Personal Protective Equipment (PPE) to pump attendants leads to exposure to harmful fuel fumes. However, it failed to investigate the common illnesses among the pump

attendants in order to establish whether it is linked to their working conditions. In addition, the study, apart from presenting findings from two regions in the coastal belt of Ghana, did not provide a comprehensive analysis of the existing health and safety standards in the FSS.

We report the findings of a descriptive survey conducted in an unstudied location, Kumasi, in which the commonly experienced illnesses among FSS attendants are compared with illnesses shown by empirical evidence to be acquired from working conditions at FSS. The study also assesses existing health and safety conditions at the FSS in the study location. This includes the work-related hazards and their health effects; existing fire safety measures; medical examination arrangements for pump attendants; training patterns among pump attendants; and access to welfare facilities. The study findings would be useful in the development of health and safety standards for Ghana's downstream oil and gas sector in order to protect life, properties and the environment from avertable disasters.

MATERIALS AND METHODS

Kumasi; the second largest city in Ghana is the capital of the Ashanti Region and the Kumasi Metropolitan Assembly (Figure 1). It is home to about 2million people and is located in the transitional forest zone, approximately 270km North West of the national capital, Accra. It covers a total land area of close to 254 square kilometres and serves a hub for business activities for people all across the West African sub-region. The city has therefore experienced exponential growth in population over the years. Currently, the growth rate of the Kumasi metropolis is estimated at about 5%; twice higher than the national average. The rapid population growth and booming business activities have together translated into increased demand for fuel for numerous purposes.

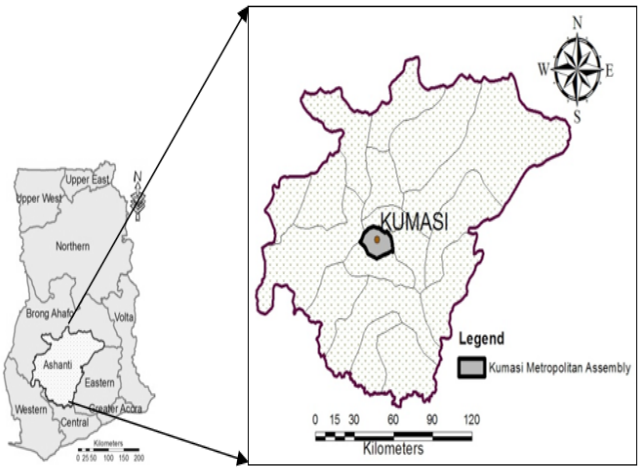

Figure 1. Map of Ghana showing study location

The study was based on a descriptive cross sectional approach comprising of face-to-face interviews using structured questionnaires and extensive field observations using an observation checklist. A total of 145 pump attendants in 90 FSS and 50 FSS site managers were interviewed during the study. The sample size (n) of 90 FSS was computed from the equation below:

$$n = \frac{N}{1 + N(\alpha}$$

Where n = sample size; N = sample frame; α = confidence level

Based on a sampling frame of 127 FSS obtained from a preliminary survey of the study area and a 95% confidence level, a sample size of 96 FSS was obtained for the study. However, out of this number, 90 out of the 96 randomly selected FSS consented to providing information for the study. Pump attendants were also randomly selected from the FSS included in the study. Only one attendant agreed to respond to the study questionnaire in 35 out of the 90 FSS whilst in 55 FSS, two attendants responded to the questionnaire. Response rate for FSS managers in the selected FSS was comparatively lower (56%) in spite of assurance of anonymity and confidentiality. In general, FSS managers, as part of their core duties, are required to ensure adherence to health and safety standards among pump attendants.

The study questionnaire for pump attendants was structured into distinctive sections to acquire information pertaining to respondents' socio-demographic characteristics; occupational hazards; medical examination habits; commonly experienced illnesses; and training on fire safety and emergency fire procedures. For FSS managers, the questionnaires focused mainly on the criteria for the selection of prospective pump attendants for employment; training patterns for pump attendants; training aspects for pump attendants and medical examination requirements. The observation checklist was organized to obtain information on availability and number of fire extinguishers, spill containment apparatus, access to washroom facilities, demarcation of emergency assembly points, access to first aid box and presence of protective canopy at the FSS.

The quantitative data was analysed using SPSS software version 17.0 to compute frequencies, percentages and establish relationships between parameters. Fisher's exact test at 5% significance level was used to determine the association between work experience; training on use of fire extinguisher and training on general fire emergency procedures. Moreover, a binary logistic regression was conducted to determine the relationship between commonly reported illnesses and selected risk factors (age, gender and work experience).

RESULTS

Socio-demographic characteristics of pump attendants

The characteristics of pump attendants are shown in Figure 2. Among the 145 attendants involved in the study, majority (55%) were male and about 83% were single. With the exception of an outlier of 62 years old, the ages of all the study subjects ranged between 20 and 35 years, with an average age of 26±3years. Most attendants (77%) had attained Senior High School education and had been in their current job usually for 1-2 years (Figure 2).

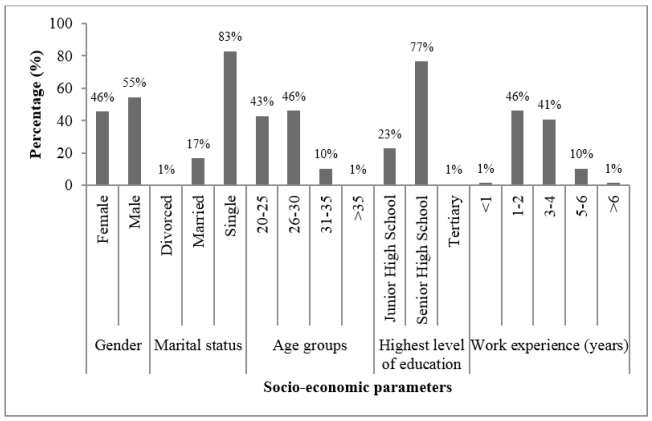

Figure 2. Socio-demographic characteristics of pump attendants

Table 2 shows the common occupational hazards reported among the pump attendants. Reportedly, the two topmost work-related hazards experienced among the attendants are exposure to extreme weather conditions (98.6%) and inhalation of exhaust fumes and petrol vapours (97.9%). Per their work schedule each attendant works on a 12-hour shift; diurnal shift and nocturnal shift. Diurnal shifts starts from 6am to 6pm while nocturnal shifts starts from 6pm to 6am. According to the attendants, they are exposed to intense heat from the sunlight during the diurnal shifts while in contrast, during the nocturnal shift extremely cold weather conditions are usually experienced especially at dawn. Additionally, exposure to rainfall both during the diurnal and nocturnal shifts were reported.

The study findings also point out that, medical examination is an uncommon practice among pump attendants. Only about one-fifth (22%) of the respondents reported ever undertaking post-employment medical examination (Table 1). Out of this number, half (50%) of them paid for their medical examination bills themselves while employers paid for the other half (50%).

The distribution of illnesses commonly experienced by the pump attendants are shown in Figure 3. Overall, musculoskeletal disorders (MSDs) [97%], headaches (56%) and low-back pains (43%) constituted the three topmost illnesses commonly experienced by the attendants. From a cross tabulation of the three topmost occupational illnesses and three selected risk factors; gender, age and work experience of attendants (Table 2) it was shown that, MSDs were more common among male attendants (55%); attendants less than 30 years old (79%); and attendants with working experience of 3 years and above (53%). In contrast, results from the Fisher's exact test indicated that, gender, age and work experience have no statistically significant association ($p>0.05$) with MSDs. Mirroring the pattern of MSDs, headaches were also more prevalent among male attendants (53%); attendants less than 30 years old (78%); and attendants with working experience of 3 years and above (53%). Similarly, no statistically significant association ($p>0.05$) was observed. In contrast to MSDs and headaches, low-back pains were comparatively more common among female pump attendants (53%) while age and work experience showed a similar pattern to MSDs and headaches. Again, none of three risk factors showed a statistically significant association ($p>0.05$) with low-back pains.

Table 2. Occupational hazards and medical examination habits among pump attendants

Study parameter	Study variables	Frequency (n)	Percentage (%)
Work-related hazards	Exposure to extreme weather conditions	143	98.6
	Inhalation of exhaust fumes and petrol vapour	142	97.9
	Fire outbreaks	127	87.6
	Customer confrontations	117	80.7
	Armed robbery attacks	114	78.6
	Vehicular accidents	113	77.9
Post-employment medical examination	No	113	77.9
	Yes	32	22.1
Payment for medical examination	By employee	16	50.0
	By employer	16	50.0

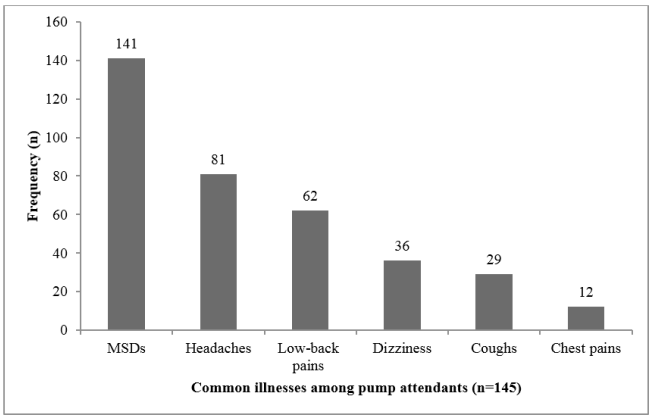

Figure 3. Frequency distribution of common illnesses among pump attendants

Values of the Wald Criterion from the binary logistic regression pointed out that, none of the predictors (age, gender, work experience) significantly contributes to the prediction of MSDs and headaches ($p > 0.05$) among the attendants. Moreover, a test of the full model against a constant only model independently for MSDs and headaches, was not statistically significant (MSDs: $\chi 2 = 2.501$, $p = 0.475$ with df = 3; Headaches: $\chi 2 = 0.872$, $p = 0.832$ with df = 3). This indicates that the predictors as a set do not reliably distinguish between attendants experiencing either MSDs or Headaches or those who do not experience either MSDs or Headaches. Nagelkerke's R raised to the power 2. ie R squared for both MSDs and Headaches were 0.077 and 0.008 respectively signifying a very weak relationship between the predictors and the prediction.

Contrary to MSDs and headaches, age was found to contribute significantly ($p < 0.05$) to the prediction of low-back pains among the pump attendants as per the Wald statistic (Table 3). This suggests that the age of attendants significantly influences the likelihood of experiencing low-back pains. The EXP(B) value of 0.387 suggests that a unit increase in the age of attendants reduces the likelihood of low-back pains by 61.3% and therefore older attendants are less likely to experience low-back pains (Table 3). Attendants who were 30 years and above are between 0.160 and 0.938 times as likely to experience low-back pains. Gender and work experience were however not significant predictors ($p > 0.05$) of low-back pains (Table 3). The Hosmer and Lemeshow goodness-of-fit test statistic was 0.196 (greater than 0.05) implying that the model prediction does not significantly differ from the observed and therefore the model's estimates fit the data at an acceptable level. Overall prediction success was 56.6% (43.1% for attendants without low-back pains and 67.5% for attendants with low-back pains).

Table 1. Relationship between top three occupational illnesses and risk factors

Risk factors		MSDs (N = 141) [n *(%)*]	Headaches (N = 81) [n *(%)*]	Low-back pain (N = 62) [n *(%)*]
Gender	Female	63 *(45)*	38 *(47)*	33 *(53)*
	Male	78 *(55)*	43 *(53)*	29 *(47)*
Age	Less than 30 years	112 *(79)*	63 *(78)*	52 *(84)*
	30 years and above	29 *(21)*	18 *(22)*	10 *(16)*
Work experience	Less than 3 years	66 *(47)*	38 *(47)*	25 *(40)*
	3 years and above	75 *(53)*	43 *(53)*	37 *(60)*

Table 3. Results of Logistic regression of risk factors for low-back pains

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	Age(1)	-0.949	0.451	4.420	1	0.036	0.387	0.160	0.938
	Experience	0.653	0.379	2.962	1	0.085	1.920	0.913	4.038
	Gender	-0.209	0.375	0.311	1	0.577	0.811	0.389	1.691
	Constant	0.184	0.278	0.438	1	0.508	1.202		

a. Variable(s) entered on step 1: Age, Experience, Gender.

Although all the FSS had fire extinguishers, not all attendants were trained in their usage. Close to one-fifth (17%) of the attendants had not been trained in the usage of fire extinguishers while about a third (30%) have no training in comprehensive emergency fire procedures. Generally, training in both aspects of fire safety was significantly associated ($p<0.05$) with work experience (Table 4). Only an insignificant proportion (2%) of attendants with more than 3 years working experience were not trained in the usage of fire extinguishers and fire emergency procedures (10%). This therefore suggests that, attendants with more than 3 years work experience are more likely to be trained in the use of fire extinguishers and emergency fire procedures (Table 4).

Results from FSS managers (N = 50) pointed out that, the criteria for the selection of prospective pump attendants for employment is inconsistent but generally include academic qualification (Table 5). While an insignificant proportion (2%) of FSS managers considers reading and Mathematical skills, a little more than half of the FSS managers (52%) considers academic qualification and reading skills only. In general, almost all (n = 49; 98%) FSS managers consider academic qualification of the prospective pump attendants before employment.

A little more than half of the FSS site managers (52%) trained pump attendants after employment only whereas 46% trained attendants both before and after employment. All FSS site managers interviewed reported training pump attendants in the use of fire extinguishers while surprisingly, less than half (44%) of them trained pump attendants in the fuel pump control. Training of pump attendants, according to the FSS site managers, also included aspects of emergency fire procedures (96%), spillage containment (96%) and use of PPE (90%). In contrast to claims of training on the use of PPE by a good proportion of FSS managers, no pump attendant was observed to be wearing any form of PPE during the survey.

Despite the health risks associated with the work of pump attendants, medical examination is not always required by employers. Reportedly, about half (42%) of employers request for both pre- and post-employment medical examination while 38% require pump attendants to undergo only post-employment medical examination (Table 5). On the contrary, one-fifth (20%) of employers do not require any medical examination whatsoever of pump attendants (Table 5). Medical examination is in most cases at the cost of pump attendants, as confirmed by about two-thirds (68%) of the employers since no comprehensive health insurance scheme is available for them as part of their working conditions. This could account for the poor attitude towards medical examination among the pump attendants.

Table 4. Relationship between work experience and training on fire safety

Training aspects of fire safety		Work experience (years)	
		Up to 3 years n (%)	More than 3 years n (%)
Use of fire extinguisher (Fisher's exact $p < 0.05$; $\chi^2 = 9.151$)	Trained	79 (77)	41 (98)
	Untrained	24 (23)	1 (2)
Fire emergency procedures (Fisher's exact $p < 0.05$; $\chi^2 = 11.487$)	Trained	64 (62)	38 (90)
	Untrained	39 (38)	4 (10)

Table 5. Training and medical examination patterns for pump attendants

Study parameter	Study variables	Frequency, n	Percentage (%)
Training of pump attendants	Before employment only	1	2
	After employment only	26	52
	Before and after employment	23	46
Medical examination	Not required at all	10	20
	Required after employment only	19	38
	Required before and after employment	21	42
Payment for medical examination	By employer	13	32
	By employee	27	68

Systematic field observations carried out during the survey indicated that, all the Fuel Service Stations (N=90) had fire extinguishers, fire alarm systems and spill containment apparatus (Figure 4). In most FSS (79%), between 2 and 5 fire extinguishers were observed whilst spill containment apparatus was also dominated by dried sand stored in a bucket (82.2%). All but two of the Fuel Service Stations had washrooms for personnel and customers. Out of this, only close to a quarter (26.1%) had separate facilities for males and females although there were female employees found in more than half of the Fuel Service Stations. Emergency assembly points were noticeably demarcated in about two-thirds (58%) of the stations while a significant proportion (91%) of the stations had first aid box and protective canopy (86%). Although the protective canopies are supposed to shelter the fuel dispensers and consequently pump attendants, they have been constructed to a height of about 5m with the intention of being able to accommodate heavy duty vehicles as well. The attendants are therefore not fully protected from adverse weather conditions. They are protected from the scorching sun only during the mid-day when the shadow cast by the canopy is directly over the pump islands. Moreover, despite the ubiquity of first aid boxes at the FSS, less than one-fifth (n = 15; 16.7%) of them had personnel who claimed to have been trained to administer first aid. None of the attendants were also observed to be wearing reflective safety vests or nose masks.

DISCUSSION

The distribution of gender, age and educational levels of the FSS attendants indicate a predominance of young adult single males with Senior High School education in this industry. This mirrors the findings of a similar study conducted by Ansah & Mintah [16] in the Central and Western Regions of Ghana and that of Afolabi et al. [4] in Nigeria. Perhaps, this could be due to the physical demands of the work and the long working hours comprising of both 12-hour diurnal and nocturnal shifts. Senior High School graduates are preferred since the cost of engaging them is relatively lower as compared to tertiary education graduates. Moreover, the pattern of work experience among the FSS attendants depicts that about 4 out of 5 (88%) of them were employed over the past four years. This corroborates available literature [1, 10] which suggest a surge in job creation in the downstream oil and gas industry following the production of oil in commercial quantities in Ghana since 2010. Notwithstanding the surge in employment, much focus has not been given to the health and safety of employees in this sector. Generally, employees in the oil and gas industry operate in high-hazard environments which expose them to a wide range of hazards that require proactive and pragmatic measures to effectively manage them. From this study, exposure to harsh weather conditions was reportedly the commonest hazard among FSS attendants, contrary to a study in Nigeria by Afolabi et al. [4] which found fire hazard to be the commonest hazard at FSS. Protective canopies provided in some (86%) of the stations were useless in offering total protection from rainfall and sunlight consequently leaving attendants to the vagaries of the weather. Meanwhile, figures provided by the Ghana Meteorological Agency [17] show that particularly in the harmattan season, the temperature in Kumasi plummets to 11°C while in general, monthly average low temperatures and monthly average high temperatures vary between 11°C and 17°C and between 17°C and 22°C respectively [18]. Studies [19-21] have shown that, when the body fails to compensate and cool itself, exposure to environmental heat can lead to heat stress and heat strain which result in adverse mental and physical effects such as anger, depression, dizziness and reduced performance. Conversely, working in cold environments causes hypothermia even at cool temperatures above 4°C as well as chilblains resulting from repeated exposure to air temperatures between 0°C and 16°C [22]. Cold working environments have also been linked to fatigue, lumbago, finger cold sensation, neck and shoulder stiffness among traffic control workers and construction workers in Japan [23]. Moreover, Price [24] asserts that, exposure to these both temperature extremes could increase the risk of acute cardiovascular events especially for those with cardiovascular disease.

Apart from the exposure to extreme weather conditions, the inhalation of fumes from vehicles and petrol vapour by pump attendants, as reported by 98% of the study subjects, also poses grave health risks [3]. Empirical studies [25, 26] have shown that, fumes from motor vehicles contain volatile organic compounds and carbonyl compounds which are carcinogenic in nature. In a study by Tunsaringkarn et al. [27] in Bangkok, it was concluded that, continued exposure to these compounds is significantly associated with the prevalence of headaches, fatigue, dizziness and throat irritation while benzene, toluene, ethylbenzene and xylene found in gasoline has been shown to have potential of red blood cell toxicity [5]. Further, an empirical study in Iraq involving 48 adult subjects working in gasoline filling stations revealed that long-term exposure to petroleum derivatives increases the risk of liver and hematopoietic toxicity [6].

Against this backdrop, the Occupational Safety and Health Administration (OSHA) stipulates that the average exposure concentration for gasoline for an entire 8-hour working period needs to be below a threshold limit value of 300ppm [28]. Evidently, the 12-hour working shifts for the pump attendants, as gathered from this study, exceeds the OSHA standards and perhaps the exposure limits could also be above the recommended 300ppm possibly putting attendants in harm's way. The over-exposure to petrol vapour and vehicle fumes could be linked to the headaches and dizziness commonly experienced by the attendants.

Ostensibly, both the FSS attendants and their employers are ignorant of these health risks or even if they are aware,

have not given much regard to them. This is evidenced by the poor attitude towards medical screening and disregard for the use of PPEs. Meanwhile, per OSHA health standards, employees who are frequently exposed to hazardous chemicals, including gasoline, are required to undergo regular medical surveillance to protect their health [28]. In line with this, Ghana's Factories, Offices and Shops Act 1970 (Act 328) also generically propose medical supervision for workers whose working conditions make them prone to occupational illnesses. Payment for the cost of such medical examinations, as unequivocally stipulated in the Workmen's Compensation Act 1987 (PNDCL 187), is the responsibility of employers. Moreover, per Ghana's Labour Act 2003 (Act 651), employers have a duty to "take all practicable steps to ensure that the worker is free from risk of personal injury or damage to his or her health during and in the course of the worker's employment or while lawfully on the employer's premises". Therefore, the practice whereby employees pay for their medical examination bills for treatment of conditions possibly related to their line of work, as observed in this study, is therefore in total contravention of these legal provisions. Attendants are, more likely than not, ignorant of these legal provisions and therefore cannot demand for it.

Extensive epidemiological studies would be required to provide empirical evidence on the correlation between the working conditions and the reported common illnesses of FSS attendants. However in the short-term, to forestall the risks, attendants need to be provided with protective clothing including raincoats, reflective vests, jackets, mufflers and gloves to protect against extreme cold weather conditions. Simple shelters such as a tent with fan should be provided to prevent the continuous exposure of attendants to heat and the establishment of short overlapping break periods for attendants during work hours is also suggested. Employers must also protect the health of attendants by instituting compulsory pre- and post-employment health examination and bear the costs associated. This will provide clues to early warning signals of occupational illnesses among FSS attendants.

Inhalation of petroleum vapours among the attendants also needs to be reduced to the barest minimum through the use of nose masks. This will curtail the carcinogenic, mutagenic effects as well as adverse effects on the human reproductive system known to be associated with long term exposure to petroleum vapours [29]. Particularly, considering the fact that a significant proportion of these attendants are youthful and unmarried, this could have serious consequences on their reproductive capabilities in the future. Hazard communication therefore becomes crucial in this case. The attendants need to be educated on the hazards associated with every aspect of their work to ensure that they adhere to safety regulations at the workplace in a bid to ensure their health and safety at the workplace.

Fuel Service Stations are also constantly at risk of fire outbreaks and explosions due to the flammability of the petroleum products [2, 30]. Available literature [31,32] show that, even at very low temperatures (-40°C), petrol releases a flammable vapour which creates a highly flammable atmosphere when mixed with air and can easily burn or explode when ignited. The presence of fire extinguishers, fire alarm systems and spill containment apparatus in all the FSS is therefore a proactive step by employers to deal with fire hazard. Per Ghana's Fire Precaution (premises) Regulations, 2003 (LI 1724), any premise serving as a place of work is required to have among others, fire fighting and fire warning equipment. The provision of these equipment at all the FSS is therefore commendable. Nonetheless, there is still room for improvement regarding the training of attendants on the usage of fire extinguishers and comprehensive fire emergency procedures. Undoubtedly, fire extinguishers are useless if attendants have no knowledge of their usage in case of a fire outbreak. As the study findings indicate, training in these aspects of fire safety is relatively more common among employees with more than three years working experience connoting that efforts to get new attendants trained in fire safety has waned in recent times. Fire safety training programmes are therefore necessary for all attendants in order to provide them with comprehensive knowledge of fire prevention and emergency procedures in case of any fire outbreak in the future. The presence of first aid (91%) and washroom facilities (98%) in a significant proportion of the FSS, as per the systematic observations during the study, is a commendable effort on the part of employers. This is in line with the requirements of the Factories, Offices and Shops Act 1970 (Act 328). It is however crucial to ensure that all FSS provide these facilities for their employees to ensure their welfare.

Pump attendants at FSS perform diverse and highly repetitive physical tasks which have been shown to be a crucial risk factor for work-related musculoskeletal disorders among employees whose work include repetitive physical activities [33-36]. Their work include among others, repeatedly opening fuel tank caps, lifting and inserting fuel nozzle into fuel tank, regulating flow of fuel through the nozzle, replacing fuel nozzle, locking fuel tank cap and in some cases, wiping the windscreens of vehicles. These tasks are performed for each of the several vehicles they service daily throughout their working hours thereby predisposing them to pains in certain body regions such as shoulder, neck and low back. Therefore the predominance of MSDs among all the commonly experienced occupational illness by the attendants are not surprising. Similar to headaches, MSDs is also not correlated with gender, age or work experience and thereby depicts its ubiquity among the pump attendants. For headaches, it has been shown that continued exposure to exhaust fumes and sunlight are critical risk factors [27,37,38]. However, work experience did not show any significant relationship ($p>0.05$) with the prevalence of headaches although it was reported by a little more than half (53%)

of the pump attendants. Therefore, either the exposure to sunlight or both exposure to sunlight and inhalation of exhaust fumes could more likely be the predominant cause of headaches among the attendants.

Low-back pain (LBP), according to available studies [39-41], is a common, inevitable and age-related consequence of life that is dependent on occupation, genetics and personal behaviour. Although the actual cause of this disorder is obscure in most cases [39, 40, 42-44], the risk factors reportedly include incorrect posture, obesity, heavy manual labour, forceful lifting, bending and twisting of the trunk and whole body vibration [45-47]. With regards to age, it is reported that usually, the first episodes of low-back pain occur among people between the ages of 20 and 40 years [48] while another study [46] averred that it is common between the ages of 30 and 50 years. This present study findings confirm that of Deyo & Weinstein [46] which averred that LBP affects men and women equally. Conversely, they are in sharp contrast with the findings of a systematic review of 165 studies on the prevalence of LBP from 54 countries published between 1980 and 2009, which concluded that low back pain are more prevalent among females and those aged 40-80 years [49]. Generally, LBP is known to be self-limiting and difficult to diagnose and treat [44, 50]. It is therefore crucial to adopt preventive strategies including exercise, good posture and use of proper technique with strenuous tasks [43]instead of reactive measures which have been shown to be ineffective.

CONCLUSION

The study shows possible linkage between the working conditions and the commonly experienced illnesses among pump attendants in Fuel Service Stations. Occupational hazards and their health effects on pump attendants have also been identified. Work-related factors such as exposure to sunlight and inhalation of petrol vapour could be linked to headaches and dizziness commonly experienced by the pump attendants. Moreover, the repetitive tasks performed by the attendants predispose them to MSDs while the poor posture during work contributes to the LBPs. With the exception of LBPs which was shown to be associated with age ($p=0.036$; 95% CI = 0.16-0.94) other commonly illnesses were shown to be generic. Despite the health risks, medical examination habits are generally poor among attendants and mostly the cost for such purpose is borne by them. None of the pump attendants used PPE possibly due to ignorance. Although fire safety equipment are present in all the FSS, about a third (30%) of pump attendants lack training in emergency fire procedures; newer attendants are less likely ($p<0.05$) to be trained in fire safety.

The study proposes mandatory standardised training on health and safety standards at FSS for all attendants to conscientize them on the hazards associated with their work. Employers must institute health insurance policies for pump attendants as per the legal provisions and ensure that pre- and post-employment medical examinations are made obligatory for attendants. Personal protective equipment such as nose masks and reflective safety vests should be provided and measures should be put in place to enforce their usage. Most importantly, an occupational health and safety (OHS) policy should be developed specifically to address the peculiar needs of the oil and gas sector in Ghana to mitigate the risks to life, property, and the environment. To deepen understanding of the risks, biomonitoring of pump attendants and workplace ambient air evaluation are required as a further study.

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