

Assessment of Occupational Health Services in a Petroleum Industry in Lagos, Nigeria

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SUMMARY

A descriptive cross-sectional study was carried out in the Lagos Zone of the largest and oldest indigenous oil and gas company in Nigeria. The purpose was to compare the occupational health facilities and services in the Upstream and Downstream operations of the industry. Data was collected by key informant interviews and a walk-through survey between October and December 2005. There is a laid down policy on Health and Safety for the staff but the provision of facilities and services are not adequate in downstream factories. Provision and utilization of personal protective equipment is also poor in this sector. The upstream sector, however, has adequate provision of occupational amenities as well as personnel. Generally, safety control measures were available but were more adequate in upstream than in downstream operations. A little proportion of the workers showed awareness of the safety measures and policies put in place by management as well as the Federal Government regulation on factory safety and the company's Health Safety and Environment training programmes. Regular factory inspection by government regulatory agencies and the correction of the deficiencies in the provision of occupational health services by the management of the concerned factories are recommended.

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INTRODUCTION

Health hazards in the workplace form a major threat to a large proportion of the world's population. The official working population constitutes a sizeable proportion of the world's adult male (60–70%) and female (30–60%) population and each year, it is expected that 40 million people will join the labour force. Approximately 75% of this labour force is living in developing countries but unfortunately only about 5-10% of workers in developing countries have access to occupational health services at the work place.¹

Occupational Health Service (OHS) is the sum total of the programmes and activities performed for the purpose of

attaining and maintaining the highest level of health and safety of the workers and their families. To achieve the outlined objectives contained in the 1995 definition of occupational health by the joint ILO/WHO committee on Occupational Health, OHS should focus on; health promotion services, disease/hazard preventive services, curative services and rehabilitative services. The overall goal of OHS is to ensure that the fittest workers are employed, that they are protected from both non-occupational and occupational injuries/diseases with the eventual target of decreasing absenteeism, motivating the workers and increasing productivity OHS is usually managed by a multidisciplinary team and the extent of the OHS provided by a company depends largely on its financial status as well as the social conditions and size of the workforce.²⁻⁵

Occupational health service in Nigeria started with some British companies like the United African Company (UAC) and John Holt, and later in 1930 it was adopted by some government establishments like the Nigerian Coal Corporation and the Nigerian Railway Corporation. The laws governing occupational health were first put in place in 1941 with the introduction of the Workmen's Ordinance and this was followed by the Labour Code Ordinance of 1945 and the enactment of Factories Act in 1955 and other subsidiary legislations in the fifties which dealt with health and welfare of factory workers, occupational disease notification, environmental sanitation in factories, stipulation of the proximity of occupational health facilities to the work site and empowerment of health officers to enforce compliance. In order to correct the deficiencies in the previous act, the present legislation regarding occupational health and safety of industrial workers as contained in the Factory Act, Laws of the Federation of Nigeria 1990 was promulgated. The act stipulated the minimum compensation in cases of injuries, accidents and death resulting from work (Workmen's Compensation Act) and laid down the minimum standards for health, safety and welfare of workers in factories^{6,7}. In order to improve productivity and overall national economy, occupational health must be promoted in all registered industries. Occupational health in strategic industries like The Nigerian National Petroleum Corporation (NNPC) should be regularly assessed since the mainstay of the Nigerian economy is still predicated on oil and gas.

The Nigerian National Petroleum Corporation was established by a merger between the then Nigerian National Oil Company and the Ministry of Petroleum Resources by decree No 33 of 1977. The major activities of NNPC may be subdivided into upstream and downstream activities. Upstream activities include those of exploitation and production of crude oil while downstream activities refer to crude oil refining, products

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transportation and distribution. The upstream activities are shared by multinational oil companies. Between 1978 and 1989, the downstream sector was able to construct refineries in Warri, Kaduna and Port Harcourt as well as over 5000 kilometres of petroleum pipelines across the country. The activities and operations of the present NNPC group of companies are done through its subsidiaries, sometimes known as Strategic Business Units (SBUs). There are ten subsidiaries wholly owned by the Nigerian government and two partially owned subsidiaries organized into 6 zones with the headquarters in Abuja. ⁸

The main objectives of this study were to assess and compare the occupational health facilities and services in the upstream and downstream operations of the Nigerian National Petroleum Corporation.

MATERIALS AND METHODS

The study design was qualitative. For this study, we conveniently chose the Lagos zone of the NNPC and limited ourselves to five SBUs which have operational bases and activities in that zone. The selected SBU's are; Pipelines and Products Marketing Company (PPMC), National Petroleum Investment Management Services (NAPIMS), Department of Petroleum Resources (DPR), Nigerian Gas Company (NGC) and Nigerian Engineering and Technical Company (NETCO). The upstream companies are DPR and NAPIMS while the downstream companies are PPMC, NGC and NETCO. The SBUs excluded are mainly administrative in their activities.

Data collection was by key informant interviews and a walk through survey conducted in October -December 2005. Key informant interview was arranged with three (3) key departmental heads of each SBU namely the head of operations (Factory Manager), the head of the safety unit (Safety Officer) and head of the medical unit for the company - fifteen of such persons were interviewed. The themes of these interviews were on overview of the various processes, systems and the hazards exposure profile of the company's production line, the safety measures and policies put in place; as well as the state of occupational health services and facilities available in each factory.

The walk through survey of the factories was conducted to enable familiarization with the various production lines and to directly observe the workers at their jobs, assess the risks involved, evaluate the safety control measures in place and the use of personal protective equipments. A modified factory inspection appraisal sheet based on the factory Act of 1990 was used to assess each SBU's operational base. The inspection was done in the company of the safety officer and an occupational health nurse in each factory. In other to ensure ethical standards in the research procedures, written permission was obtained from the management of each SBU prior to the study. Ethical approval was also obtained from the Ethical Committee of the University of Nigeria Teaching Hospital, Enugu.

A manual content analysis of data was done and tables were constructed by systematic organization and categorization of the information contained in the interview and observation notes.

RESULTS

The selected five SBUs in Lagos zone had a compliment of 888 workers in 5 factories in the upstream sector while the downstream sector had 628 workers in five factories.

Occupational Health Facilities and Personnel

Upstream, each factory had an on-site clinic with 1-2 well equipped industrial ambulances and 2 canteens. Additionally, there were one industrial hospital and 9 retainer private hospitals located outside the factories but within the city serving this sector. While the downstream sector had 3 on-site clinics with one industrial ambulance per clinic and each factory had a canteen. Two (2) factories downstream did not have an on-site staff clinic; one runs only metering stations which are not full fledged depots while the other factory was made up of mainly mobile engineers whose work place could be in any of the offshore and onshore factories. Also downstream were 3 industrial hospitals and 21 retainer private hospitals located outside the factories but within the city.

The full-time occupational health personnel found in each upstream factory included; one industrial physician, one industrial hygienist, 3-4 occupational health nurses, 1-2 ambulance nurses and 1-2 caterers. And for the downstream sector there was only one locum industrial physician who oversees all the factories while the full-time staffs for each on-site clinic were one occupational health nurse and one first aid specialist. One caterer oversaw each factory in this sector.

Table 1: Occupational Health Facilities and Personnel in a Petroleum Industry in Nigeria, 2005

	Upstream No.	Downstream No.
Background information:		
Total number of workers	888	628
Number of factories	5	5
Range of workers per factory	45-50	60-70
Available Facilities:		
Industrial ambulance	8	3
On-site staff clinic	5	3
Industrial hospital	1	3
Retainer Private hospital	9	21
Canteen	10	5
Available Key Personnel:		
Full-time Industrial Physician	5	(Locum) 1
Full-time Industrial Nurse	18	3
Full-time first aid specialist	8	3
Full-time Industrial Hygienist	5	0
Full-time safety engineer	-	-
Nutritionist/Caterer	(contract) 9	(contract) 5

Medical Services

The details of the occupational health services available and their coverage are shown in Table 2. In every SBU, each employee and 8 registered dependants are entitled to free medical treatment. Emergency and routine medical services are handled in the on-site clinics while serious cases including those requiring detailed laboratory investigations are referred to the

company's industrial hospitals. Patients who need specialist care are referred to the relevant retainer private hospitals.

Both pre-employment and periodic medical examinations are routine in both the upstream and downstream sectors. However, the periodic medical examinations are conducted annually in the upstream sector but bi-annually in the downstream sector.

General vaccination against hepatitis B infection, typhoid fever, meningitis, yellow fever, chicken pox and streptococcal pneumonia, is routine for all staff in both sectors and the frequency followed the World Health Organization recommended schedule but there were occasions of vaccine stock outs in the downstream industrial hospitals. Health records were kept in both streams but evaluation of data was done regularly in the upstream factories.

Health promotion services

Personal protective devices in form of safety boots, overall, goggles, hand gloves, cap/helmets, ear muffs and face masks were provided but they were inadequate in quantity and correct sizes in both the upstream and downstream factories. For the year preceding the study, three health education seminars were conducted for the upstream workers while only one was conducted for the downstream workers, though the company policy says it should be done quarterly. Fire drills are organized monthly and regularly for each upstream and downstream factory. Safety posters and alarm system were in place upstream but downstream, the posters were old and faded.

In the upstream factories, each company's Health and Safety (HSE) policy which contains among other things, information on safety practices was regularly updated and made available online to all staff and almost all possess computers irrespective of cadre. Relevant section of the policy was also made available to all contractors who also were routinely trained and made to comply with such in every step of job execution. In addition there were regular training sessions on safety at

commencement of employment as well as on – the – job-supervision in the various units. Regular inspections were conducted by officials of Ministry of Petroleum Resources as well as those of Ministry of Environment at each site regularly on a quarterly basis. Auto -regulatory mechanisms and devices such as alarm systems as well as independent reporting of safety offenders were also seen in place.

In downstream factories however, laid down HSE policies existed as printed booklets but this was only available to a handful of staff. Inspection by government agents was rare, some of the few posters displaying warning safety signs and procedures were insufficient and some of them had faded.

Environmental and social services

The details of the available environmental and social services are shown in Table 2.

Three of the five workrooms upstream and one workroom downstream had a floor-ceiling height > 9 feet and workspace > 400 cubic feet. The others had dimensions less than 9 feet high and spaces less than 400 cubic feet.

Cleanliness was maintained in upstream work environment by sweeping and emptying of refuse bin twice daily. Mopping was also done every morning and walls and ceilings were painted every three years. Downstream, the workrooms were swept every morning and mopping was done weekly. Refuse bins were found in only two of the five workrooms and these were emptied irregularly and were observed overflowing with refuse. Painting of walls and ceilings was last done in 1992. Each of the factories in both upstream and downstream sectors had four toilets; two for males and two for females. Downstream, about 1-2 out of every four toilets in each factory were either broken or not flushing, and in most cases no water and/or toilet papers were available whereas all the 20 sanitary conveniences available upstream were in good working condition. Fumigation of factory premises and clearing of bushes

Table 2: Environmental and Social Services in a Petroleum Industry in Nigeria 2005

Recommended practices	Downstream Provision/Regularity	Upstream Provision/Regularity
Factories with work room >9ft in ceiling height & workspace > 400 cubic ft	3 of 5 factories	1 of 5 factories
Factories provided with ventilation fans & local exhaust outlets & at least 75% functional.	All 5 factories have functional dedustifiers in enclosed spaces & fans	All 5 factories have ceiling & exhaust fans but functionality subject to power availability
Environmental temperature control	All factories with functioning central cooling system	
Sweeping of workrooms	Twice daily	Daily
Refuse disposal in factory	Twice daily & refuse bins seen in all factories	Irregular & refuse bins seen in 2 factories
Washing/mopping of workrooms	Daily	Weekly
Painting of workroom walls, partitions & ceiling	3 yearly	Last painting in 1992
Available toilets & functionality including supply of toilet paper & water to flush	All 20 functional and toilet paper & water supplied regularly	10 of 20 functional and toilet paper & water supply irregular
Fumigation of premises & clearing of bushes	Monthly & regular	Quarterly but irregular. Bushy environment in 3 factories
Catering services	Free lunch at work	Free lunch at work

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were done monthly and regularly in upstream but in downstream factories, they were carried out quarterly and irregularly.

All employees in both sectors are entitled to free lunch while on duty every working day including weekends and public holidays.

DISCUSSION

The NNPC companies operate a Group Occupational Health Services (GOHS) system. The facilities and personnel in the upstream sector are commendable but a helicopter ambulance for off shore emergencies and an occupational psychologist to attend to workers psychosocial problems are needed if the upstream occupational health service is to be rated excellent. The downstream sector has too many industrial and retainer hospitals and few ambulances, industrial nurses, first aid specialists but lacks occupational physicians, hygienists and a psychologist. With about 628 workers and approximately 8 dependents per worker one well managed industrial hospital is ideal and cost effective for the whole downstream sector. Retainer hospitals should offer specialist services that complement rather than duplicate the services provided by the industrial hospitals and so they should be few but carefully chosen. The deficiencies noted downstream have been shown to promote curative medical practice and hampers the delivery of recommended services needed for industrial health, safety and welfare.^{9,10}

The pre-employment medical examinations in the industry are considered adequate provided they remain regular. The specific hazards abound in each production line ought to be considered in scheduling periodic medical examinations if it is not being practised. For example in production units where exposure to benzene is high, monthly full blood counts of workers are necessary while food vendors should undergo six monthly microbiological investigations. Workers immunization ought to be on schedule because the observed vaccine stock outs downstream will make immunization irregular and not give the expected protection.⁵

The NNPC medical policy offers free comprehensive health services to all employees and their dependants in both upstream and downstream sectors. This was also reported by Anibueze who studied an oil location in South Eastern Nigeria in 1991 and agreed that for reasons of very huge financial investments in the petroleum industry as well as having one of the most skilled workforce in the country, safety and health attract much attention in the oil industry.¹¹ This is contrary to the findings of many researchers who worked variously on occupational health services in different parts of Africa^{5,10,12,13}. They all concluded that occupational health services in Africa is not yet developed and also noted that the extent of the OHS provided by a company depends largely on its financial status as well as the social conditions and size of the workforce. It was further observed that, while the big oil marketers make use of both on-site clinics and retained private practitioners, the smaller independent marketers utilize only the services of private medical retainer centres where too much emphasis is laid on curative medicine, at the expense of preventive medicine since the knowledge of occupational health was poor in such centres.

PPE provision is high both upstream and downstream though compliance with their use is low. Compliance to safety measures and the use of PPE have a direct association with the workers' knowledge of their workplace hazards, their level of education as well as their degree of satisfaction with the PPE provided.¹⁴⁻¹⁷ This is more so as the adverse effects of most hazardous materials are felt several years after workers must have probably left the industry. Abeysekera and Shahnava reported that the protection and wearability of PPE are negatively correlated hence, an improvement in the protection performance of a PPE often reduces its comfort thereby limiting its use.¹⁵

The fire drills and fire fighting equipments are optimal in both sectors but most important is the neglected fire prevention measures like prompt sealing of the gasoline leaking loading gantries observed in the downstream fuel depots which should have been accorded highest priority. The health talks given to the downstream workers are not adequate and should be made regular. The work environment and sanitation in the upstream sector were observed to be adequate. Most of the workrooms in downstream factories had inadequate workspace and the over all cleanliness and the sanitary conditions fall short of acceptable standards. Ideally there should be one toilet for every 20 females or 25 males.⁵ The painting of the factories has been neglected for too long downstream.

Management enforcement and even government monitoring of safety standards was higher in upstream but very weak in downstream factories and this is portrayed by the level of compliance. Researchers across Africa blame this on the weak factory inspectorate systems in place and lamented the poor regulatory forces in place. From their findings, one can deduce that generally, in Africa, factory inspectorate systems have inadequate staff and resources to implement the industrial laws which in themselves are neither specific nor comprehensive. "A situation where there were only 68 factory inspectors to 5,895 registered factories (i.e. 1 inspector to 86.7 factories) as at 1995 explains to a large extent why safety laws and regulations are hardly enforced by the ministry of Labour and Productivity due to manpower shortage".^{10,11,18}

The government of Nigeria and management of the NNPC Group may be "favouring" the upstream factories more because they produce crude oil and gas upon which the nation's economy largely depends. Furthermore, this sector is still largely controlled by expatriates who do not compromise international safety and regulation standards for operation.

CONCLUSION

There is a well articulated laid down policy for occupational health practice in both the upstream and downstream sectors of the studied petroleum industry but the implementation of this policy is inadequate in the downstream sector. Whereas there is adequate provision of occupational health facilities and personnel in the upstream sector, the provision is far below standards in the downstream sector. Environmental protection services and equipments are better provided and more utilized in the upstream than downstream factories. This trend corresponds to the higher awareness of HSE and government policies regulations amongst staff in

upstream factories. We recommend regular factory inspections by government regulatory agencies and the correction of the deficiencies noted in the provision of occupational health services by the management of the concerned factories.

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