

**DANGER, MEN AT WORK:  
THE PITFALLS, THE PERILS AND  
THE PANACEA**

AN INAUGURAL LECTURE,  
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FOLASHADE OLUFUNKE OMOKHODION



UNIVERSITY OF IBADAN

**DANGER, MEN AT WORK:  
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THE PANACEA**

*An inaugural lecture delivered  
at the University of Ibadan*

*on Thursday, 8 September, 2016*

*By*

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I am grateful to God for the singular honour and distinct privilege to deliver this inaugural lecture on behalf of the Faculty of Clinical Sciences of our great University. I am grateful to the University administration and the Dean of my Faculty for the opportunity to give an account of my sojourn in academia up till now. The Department of Community Medicine has gone through metamorphoses from the Department of Preventive and Social Medicine (PSM) at the inception of the Faculty of Medicine in 1948 to the Department of Community Medicine in the year 2000 when the old department of PSM was split into three. The department again changed its name in 2011 to Preventive Medicine and Primary Care when the Department of Health Policy and Management evolved from it. Last year, in 2015 our Department reverted to the name that best describes what we do in Medicine—Community Medicine. We provide services within the community to achieve disease prevention in the populace and thereby reduce the health care burden in hospitals.

The first inaugural lecture from the department of PSM was presented by Professor O.O. Kale and the second by Professor Adefunke O. Oyemade. These lectures were delivered prior to the split of the department in 2000. Professor Asuzu delivered the first inaugural lecture from the new department of Community Medicine and this inaugural lecture is the second from the department.

Community Medicine has several sub-specialty areas including Epidemiology, Reproductive and Family Health and Rehabilitative Medicine. My inaugural lecture today is the first ever at our great University in the sub-specialty of **Occupational Medicine.**



Mr. Vice-Chancellor, Sir, permit me to go back about 4 decades ago to describe my sojourn in the field of Medicine. A little over 40 years ago in 1974, a young girl sauntered into the precincts of this great University to be trained as a physician in the first and best institution in the country. I must make special mention of my tutorial masters and mentors in Medicine, Surgery, Obstetrics and Gynaecology and PSM, Professor Adetuyibi, Professor Ayoola, Professor Olurin, Mr. Itayemi, Professor Ladipo and Professor Kale who provided the strong academic stimulus during my training years that prompted my resolve to return to this great University to teach medical students. That I am here over 40 years later having fulfilled that resolve is a testimony to the faithfulness of God.

My sojourn in academia after graduation started at the London School of Hygiene and Tropical Medicine where, following a recommendation by one of my mentors, I took the Masters and then the PhD in Occupational Medicine working at the frontiers of science in a relatively new discipline of medicine. After the completion of my degrees in the UK, I resisted the lure to proceed to the US and returned home in 1990 to take a job in the department of PSM to make the much needed contribution to Occupational Medicine in Nigeria.

Mr. Vice-Chancellor, Sir, permit me to quote from the scriptures that say, "It is of the Lord's mercies that we are not consumed, because His compassions fail not. They are new every morning: great is thy faithfulness" (Lam 3: 22-23). I stand to testify of God's faithfulness through the years, that I published and did not perish and that I am able to present this lecture as a mark of my contribution to a field of medicine I have come to love.

Occupational medicine is a small specialty; small but very important. There are less than 100 physicians in Nigeria who are qualified in this specialty area. The field of Occupational medicine focuses on the interaction between work and health. Bernardino Ramazzini, an Italian physician (1633-1714),

acclaimed the father of Occupational Medicine was the first to emphasize the need to ask patients the question, "What is your occupation?" as the answer to this question may provide the clue to the aetiology of diseases (Schilling 1981). Ramazzini observed and published several diseases of workers in a treatise, *De Morbis Artificum Diatriba* in 1700. This recommendation holds true even today and we still teach students that the question, "What is your occupation?" should not be taken lightly in the course of clinical history taking. Ramazzini warned about the dangers of occupational exposures to dust in the workplace and made recommendations for the protection of workers. This warning is still timely in the present day Nigeria where occupational exposures have been little controlled and may resemble prevailing exposures in the developed world decades ago. I have focused mainly on this specialty in my research and practice of medicine and I have coined the title of my inaugural lecture to reflect this emphasis and bring to the attention of all my listeners the need to focus on work related ill health with the caption, "**Danger, men at work: the pitfalls, the perils and the panacea**".

At least half of a man's waking hours are spent at work. Exposures in the workplace therefore constitute significant input to the health of workers. If the work environment is healthy, workers are likely to be healthy, but if not, ill health and fatality can be associated with work. Occupational toxicology therefore was the natural beginning of my enquiry in Occupational Medicine. Toxicology is the study of the harmful effects of chemicals in biologic systems. The focus of the research for my PhD was the toxicokinetics of lead in occupationally-exposed workers and controls; to determine if sweat losses in workers in the tropics constituted a significant route of excretion in lead exposed workers or whether it tails off like sodium in sweat of acclimatized persons. Lead is a heavy metal and a poison. It is used in sculpturing, as anti-knock agent in petrol, in ceramics, batteries and as pigments in paints. The toxicokinetics of lead has been studied for decades and routes of absorption, effects on target organs and



excretion mainly in urine are well documented. Excretion through sweat had been reported but the significance of this route as a means to lower the body burden of lead was not clear.

Studies on acclimatized (residing in Nigeria) and non-acclimatized (residing in Britain) subjects showed similar levels of lead in blood and sweat in non-occupationally exposed subjects (Omokhodion and Crockford 1991, Omokhodion and Howard 1991). Sweat Pb levels were about 10% of blood Pb levels in non-occupationally exposed subjects and between 10% - 50% in Pb exposed workers (table 1). These findings therefore showed that sweat is a significant route of excretion of Pb in acclimatized workers and the results were in agreement with isotope studies. The studies on toxicokinetics of lead further showed that sweat Pb correlated better with blood Pb,  $r = 0.7208$  than urinary Pb,  $r = 0.234$ , indicating that sweat levels better reflect the body burden of lead than urinary levels. These studies were then extended to other heavy metals such as Cadmium, Nickel and Manganese and we showed that these toxins, unlike electrolytes, are not conserved in the body while sweating (Omokhodion and Howard 1994). The conclusion of my research endeavour was that sweat losses of toxins was an additional route of excretion in occupationally-exposed workers in the tropics.

**Table 1: Blood and Sweat Levels of Lead in Acclimatized (Nigerian) and Non-Acclimatized (British) Subjects**

Study Population	Nigerian	British
<b>Non exposed</b>		
Pb Blood (ug/dl)	9-13.2	6-13
Pb Sweat(ug/dl)	.85-1.3	.15-1.3
<b>Occupationally exposed</b>		
Pb Blood (ug/dl)	13-36	42-62
Pb Sweat (ug/dl)	7.2-25.6	2-7.5

These studies prompted me to look at the blood lead levels in the Nigerian population when I returned home. I collected samples from patients in the General Outpatient

Department of the University College Hospital, Ibadan and took them to the UK for analysis. My findings showed that blood lead levels of the general adult population in Ibadan ranged from 3 to 27.6 ug/dl in 1992 (Omokhodion 1994). Only 1.5% of the adult population had blood lead levels above the UK action limit of 25ug/dl at the time. Tap water levels in Ibadan were <5ug/l which was well below the WHO standards for drinking water. This was one of the first studies of blood lead levels in the Nigerian population. Previous studies on environmental sources of lead indicated that food and surface water such as streams and rivers had lead levels within acceptable limits (Ndiokwere 1984; Mombeshora, Ajayi and Osibanjo 1981). More recent studies from South East Nigeria reported that lead levels in surface water were within acceptable limits (Igwilu et al. 2010) but that food crops and fruits had high levels of lead (Orisakwe et al. 2012). Several reports of blood lead levels in the Nigerian population have been published since my report in 1994. Many of these have been in control subjects who were being compared to lead-exposed or other study subjects. These studies have recorded high values for control, non-occupationally exposed populations and give a cause for concern as to the reasons for high blood lead levels in the population but also raise the issue of the need for standardized studies by laboratories with internal and external quality assurance programmes for blood lead analysis.

Many laboratories across the world participate in external quality assurance schemes to demonstrate their proficiency in heavy metal analysis and laboratories, especially those based in universities must meet this requirement. Our laboratory at the London School of Hygiene and Tropical Medicine participated in the UK External Quality Assurance Scheme for Pb and Cadmium. This is not the case with most laboratories in Nigeria. What is also striking as one reviews the literature on blood Pb levels in the Nigerian population is that unlike in developed countries where blood lead levels in the general population declined with the introduction of



unleaded petrol, recent studies of blood lead in Nigeria have not shown any decline since lead was removed from petrol, rather, lead levels in blood seems to be on the rise in the Nigerian population. Sources from the Nigerian National Petroleum Corporation indicate that lead was removed from petrol in their refineries since 2003 and that imported petrol is also unleaded. Furthermore, WHO reports that only 3 countries in the world still use leaded petrol, in North Africa and the Middle East. The reason for this trend needs to be unravelled, for if analytical issues are resolved, the rise in lead levels in the environment and the population may mean, as suggested by some authors, that there are other significant sources of lead in our environment; in food and beverages (Maduabuchi et al. 2006; Orisakwe et al. 2012), soil (Nduka et al. 2010), water (Ignatius et al. 2012) and cosmetics (Nduka et al. 2015).

Lead exposure in children has more severe consequences than in adults. Children have more opportunities for lead exposure than adults through hand to mouth activities; ingesting dust, soil and other media contaminated with lead. Young children absorb higher percentages of ingested lead – about 40-50% compared to 10-15% in adults. In addition, eye cosmetics (*tiro*) which are commonly used for children in our environment have been associated with lead poisoning in a Nigerian child in Boston (CDC 2012). Lead exposure in children continues to be a topical public health problem in the United States and undue exposure in children was identified as a cut off point of blood lead of 10ug/dl. Lead affects children's brain development resulting in reduced intelligence quotient, behavioural changes such as reduced attention span, increased antisocial behaviour and reduced educational attainment. It also causes anaemia, hypertension, renal impairment, immuno-toxicity and toxicity to the reproductive organs. The neurological and behavioural effects of lead are believed to be irreversible (WHO 2016).

I carried out a survey on primary school children in Ibadan and took blood samples to the UK again for analysis.

We found blood lead levels ranging from 4 to 37  $\mu\text{g}/\text{dl}$ . About 75% had blood lead levels equal to or greater than 10  $\mu\text{g}/\text{dl}$  (Omokhodion et al. 2012). This is in sharp contrast to about 0.2% of school age children in the U.S. with blood lead equal to or greater than 10  $\mu\text{g}/\text{dl}$  (CDC 2005) and 0.8% of children in the UK with blood lead levels greater than 10  $\mu\text{g}/\text{dl}$  (O'Donohoe et al. 1998). Other workers in the north (Nriagu et al. 1997; Pfitzner et al. 2000) and southeast of Nigeria (Ugwuja et al. 2014) have reported that a significant proportion of children have blood levels of 10  $\mu\text{g}/\text{dl}$  and above, indicating that our environment is unsafe for children. Currently, the US Centre for Disease Control recommends 5 micrograms per deciliter as a reference level for which public health action should be taken for under five children (CDC 2016). However, a recent WHO report indicates that even blood lead concentrations as low as 5  $\mu\text{g}/\text{dl}$ , which was once thought to be a "safe level", may result in decreased intelligence in children, behavioural difficulties and learning problems (WHO 2016).

The perils of childhood lead poisoning were vividly demonstrated by the Zamfara lead poisoning disaster in 2010. The danger occurred while men (in the company of women and children) worked in small-scale mining of gold rich ore using processes which led to the contamination of the environment (water and soil) and the death of about 400 children (MSF 2012), (figs. 1 & 2). This tragedy is reported to be the worst outbreak of lead poisoning in modern history and demonstrates the fact that uncontrolled work activities can be a source of danger to workers, their families and other members of the community. We do not have to wait for another such disaster to set up the public health structures to address heavy metal pollution in our environment. There is a need for a government agency that will monitor exposures and body burden of these heavy metals in the general population over time so we can observe the trends and make the necessary adjustments in terms of policy and environmental control measures.





**Fig. 1:** In Zamfara, Nigeria a worker mines for gold.



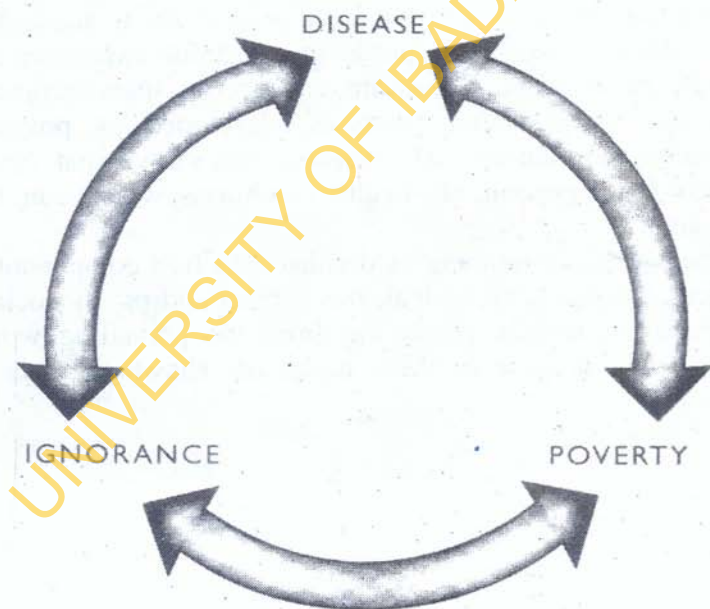
**Fig. 2:** Children work in the processing site in Bagega, Zamfara State.

### **The Informal Sector**

Much unregulated work activities take place in Nigeria especially in the informal sector. The plight of “the forgotten masses” of workers in this sector caught my attention soon



after my return from the UK. Employment statistics in Nigeria indicate that 10-15% of workers are engaged by government, another 5-10% are engaged by the private sector and between 70-80% are in the informal sector, majority engaged in trading. The Nigerian Demographic and Health Survey data indicates that about 20% of the Nigerian workforce are skilled manual workers. They comprise various occupational groups such as mechanics, printers, hairdressers, mill workers, barbers, tailors and the like. A significant majority of these workers are men. This segment of the working population caught my attention for various reasons: unregulated work activities, low educational attainment, poverty, exposures of unprotected workers to potentially harmful substances and work conditions, no provision of occupational health service, all indications of being caught in the vicious cycle of ignorance, poverty and disease.



**Fig. 3:** Cycle of ignorance, poverty and disease.

Adapted from Lucas & Gilles 2003

Some of these workers who are involved in unregulated trades like smelting of metal to produce pots and decorative ornaments are lauded by the media for their entrepreneurship. The pots are made from aluminum with the raw materials sourced from motor body scraps. The scraps are melted using the energy derived from the use of charcoal heated through a local furnace before they are moulded with sand to produce different sizes of pots. After heating the metal, the colour turns white producing a durable pot that can last between 40 to 50 years. Occupational health practitioners are concerned that no one pays attention to the long term consequences of the harmful exposures to metal fumes in this trade.

I have devoted much of my research efforts in occupational medicine to these groups of workers. From the spring board of the Department of Community Medicine, I launched out to the community, the marketplace to pursue my enquiry into the pitfalls and perils of these tradesmen. Much of these unregulated work take place in work sheds, roadsides and residential premises, producing harmful exposures in unprotected workers. Some are engaged in manufacturing processes in residential premises, developed as poverty alleviation programmes. My research has shown that these workers have preventable health conditions which can be mitigated.

The work environment is divided into five components; physical, chemical, biological, mechanical and psychosocial. Hazardous exposures emanating from the prevailing work environment in some of these trades are shown in table 2 below.

**Table 2: Hazardous Exposures in Artisan Trades**

Types of Hazards	Agents	Occupational Setting
Physical	Noise Vibration Excessive heat	Mill workers Tailors
Chemicals	Fumes e.g. vehicle exhaust Metal fumes Liquid chemicals Dusts, particulate matter	Mechanics Smelters, metal works Printers Carpenters, Pottery
Biological	Microorganisms Animals Plants	Farming
Mechanical	Sharp metals Exposed moving parts Lifting heavy objects	Mill workers Tailors Mechanics
Psychosocial	Irregular income Long hours of work	Most informal sector trades

Exposure to these workplace hazards lead to various work-related diseases among the artisan trades (fig. 4). I have conducted surveys among at least 9 of these trades and obtained reports of work-related illnesses (Omokhodion et al. 1996, 2005, 2009, 2013, 2016). The tables below, 3a and 3b show the common health problems reported by workers in artisan trades.



**Fig. 4: Workers in the informal sector.**

Long working hours, uncontrolled exposure to occupational hazards, poor and irregular pay characterize the work in this sector. Occupational asthma is associated with the hairdressing trade; respiratory problems from dust and textile fibres, neck and back pain are associated with tailoring or garment industry.



**Table 3a: Health Problems of Workers in Arusan Trades**

Mechanics	Welders	Printers	Mill workers	Butchers
Low back pain	Eye Inflammation	Low back pain	Low back pain	MSDs
MSDs	Minor injuries	MSDs	MSDs	Low back pain
Cuts and injuries	MSDs	Headaches	Tinnitus	Upper respiratory tract irritations
Hand dermatitis	Upper respiratory tract irritation	Upper respiratory tract irritation	Noise-induced hearing loss	Eye irritation
Gastro-Intestinal infections	Low back pain	Injuries	Cough	Knife injuries
Headaches	Hand dermatitis	Hand dermatitis	Rhinitis	Nail infection

MSDs- Musculoskeletal disorders

**Table 3b: Health Problems of Workers in Artisan Trades**

Tailors	Hairdressers	Barbers	Carpenters
MSDs	MSDs	MSDs	MSDs
Low back pain	Low back pain	Low back pain	Upper Respiratory tract irritation
Upper respiratory tract irritation	Eye irritation	Upper Respiratory tract irritation	Low back pain
Eye irritation	Nail infections	Headaches	Eye irritation
Minor injuries	Hand dermatitis	Dermatitis	Injuries

MSDs- Musculoskeletal disorders

### ***Low Back Pain and Musculoskeletal Disorders***

Low back pain is one of the most prevalent work-related diseases worldwide. In the occupational setting, it is associated with work which requires heavy physical exertion, bending, twisting and adoption of poor postures. The occurrence of low back pain and musculoskeletal disorders

abound in all these trades due to the manual nature of their work and awkward postures maintained at work such as shown in figure 5.



**Fig. 5:** Work postures predisposing to low back pain among mechanics.

### ***Low Back Pain in the Community***

I studied low back pain among workers in rural (Omokhodion, Umar and Ogunnowo 2000) and urban areas (Omokhodion and Sanya 2004) and in the general population in Igboora (Omokhodion 2002) and Ibadan (Omokhodion 2004). The results of my studies revealed that contrary to previous assertions in the literature that low back pain was a disease of industrialization, the prevalence recorded in all our studies were similar to those in high income countries. In the general population, a 12 month prevalence of 44% was recorded in Ibadan and 40% in Igboora. Farmers and artisans had the highest prevalence of low back pain in urban and rural areas. Data from the urban population is shown in table 4. This data indicates the high burden of this condition in the populace and the need for a panacea.



**Table 4: Low Back Pain in an Urban Community in Ibadan**

Occupation	N	n (%Low back pain)
Housewives	19	6 (32%)
Traders	189	64 (44%)
Artisans	111	52 (47%)
Farmers	27	23 (85%)
Office/formal sector workers	52	18 (35%)
Other	68	24 (35%)
No response	8	1 (13%)
Total	474	208 (44%)

### ***Noise-induced Hearing Loss***

**Exposure to noise over time can result in hearing loss** due to damage to the hair cells in the inner ear. Noise-induced hearing loss results from constant exposure to sound levels above 85 dBA Time Weighted Average (TWA). Worldwide, 16% of the disabling hearing loss in adults is attributed to occupational noise, ranging from 7% to 21% in the various sub-regions. This burden is heaviest among certain occupations. Workers in industries using heavy machines such as printing, textiles and agriculture are subject to excessive noise exposure at work. A heavier burden is borne by males compared to females. This is because males enter the work force at an earlier age than females, and remain there at higher participation rates than females throughout their lives in all regions of the world. Males are also represented at higher rates in economic sectors with high noise exposures: mining, manufacturing, utilities, and construction (Nelson et al. 2005).

Several studies on workers in textile industries and steel rolling mills in Nigeria have indicated a high prevalence of noise-induced hearing loss among workers in the formal industries (Elias et al. 2003; Odusanya et al. 2004; Ologe et al. 2006). Our study on mill workers in the informal sector, in



a large market in Ibadan showed that these workers are exposed to noise from machines ranging from 88-90dB in smaller machines used for grinding pepper and 101-105 dB in larger machines used for yam flour. One quarter of the study population reported difficulty with hearing (Omokhodion and Kolude 2005). Audiometric assessment of these workers showed that 33% of them had bilateral hearing loss compared to 18% among controls  $p < 0.05$  (Omokhodion, Adeosun and Fajola 2007). Other workers in the informal sector such as printers are exposed to noise from the printing press and from large generators used to power their machines. In formal industries, hearing protection is provided for workers exposed to these levels of noise but workers in the informal sector are left to their own discretion.

### ***Hand Dermatitis***

Occupational dermatitis could be allergic or irritant in nature. It usually affects the hands and is particularly prevalent among workers who handle chemicals such as mechanics, hairdressers and printers. Mechanics use organic solvents in car repair and they wash their hands with petrol to remove grease. Some hairdressers do not use gloves while applying chemicals to the hair. These work practices predispose workers to hand dermatitis.

### ***Accidents, Injuries and Use of Personal Protective Equipment***

Injuries in the form of cuts and bruises were commonly reported by all artisan groups. Our recent study (Balogun et al. 2016) showed high accident rates among artisans, mostly among carpenters, mechanics, welders, and tailors. These occurred with falling objects, moving objects and sharp instruments. Injuries were mainly to the hands due to manual handling of tools and other materials. Injuries were associated with working longer than 8 hours a day.

Several studies on workers in the informal sector have reported that whilst a large proportion of workers wear

overalls or work clothes, they lack other personal protective equipment (PPEs) such as masks, goggles and gloves. Many workers in the informal sector are not aware of the availability of these PPEs or cannot afford them. As such, they are at risk of inhalation of fumes and airborne particulate matter and exposure to chemicals resulting in respiratory irritation, eye inflammation, dermatitis and chronic poisoning with work chemicals.

### **Danger, Men at Work..... and the Children too**

In the course of my research within the community, I came across working children in markets, on the streets and in workshops. The explosion of the child labour phenomenon started in the early nineties in Nigeria and was associated with the introduction of the Structural Adjustment Programme. Child labour is defined as, 'All forms of economic exploitation, any work that is likely to be hazardous, or interfere with the child's physical, mental, spiritual, moral or social development'. UNICEF reports that there are about 15 million children below the age of 14 years working across Nigeria (UNICEF 2006). In some communities, this translates to up to half of the children in that age group. They work as street vendors, bus conductors, domestic servants and apprentices in various trades. In the early nineties, there were several publications on the social problems of these children (Oloko 1992).

### Box 1: Child work in Nigeria

#### Children's work activities in Nigeria

##### Public places such as streets and markets

- Hawking
- Food vending
- Begging
- Shoe shining
- Foot washing
- Car washing/watching
- Scavenging

##### Casual labourers in small-scale industries especially in the informal sector

- Farming
- Mechanics
- Bus conductors
- Vulcanizers
- Hairdressers, barbers
- Carpenters
- Tailors

##### Private households

- Domestic service
- Bonded labour

##### Others

- Military service
- Prostitution
- Quarries

Our studies on child labour were probably the first to report the health problems of working children in Nigeria (Omokhodion and Omokhodion 2002). The first study was conducted in a large market in Ibadan on 225 working children who were 8-17 years of age. These children reported symptoms of musculoskeletal disorders, upper respiratory



tract infections, wounds, visual problems and diarrhoea (table 5). Anthropometry showed that 36% were underweight and 43% were stunted using WHO weight for age and height for age standards. Fourteen percent had schistosomiasis diagnosed by *schistosoma haematobium* ova seen in their urine (table 5). Among children seen in the market in the morning hours, 45% were registered in schools. Health problems were more prevalent among those who were out of school. These children were working to make money required for their schooling and to make money for their parents. Others were making money to learn a trade. As much as 92% of parents knew that their children were on the streets. It was noteworthy that 14% of these children had lost one parent. I discerned that the child labour phenomenon had some ramifications from the school system as almost half of the children working on the streets were registered in school.

I therefore took my research enquiry into schools to compare the sociodemographic and health problems of working and non-working children in public schools (Omokhodion and Omokhodion 2004). That study showed that working after school hours was associated with low parental education and type of residence, which was a proxy measure of socioeconomic status. The prevalence of health problems in the 2 groups were similar except for the rates of malnutrition. About one third, 33% of working children were underweight and 34% were stunted compared with 20% and 26% in non-working children. The differences were still statistically significant when adjusted for socio-economic class and we suggested that malnutrition in working children may be related to unreplenished energy expenditure while walking the streets.

**Table 5: Health Problems of Child Workers in Ibadan (N=225)**

Health Problems	Frequency
Fever	47(21%)
Musculoskeletal diseases	43 (19%)
Upper respiratory tract infection	39(15%)
Schistosomiasis	31 (14%)
Wounds	29 (13%)
Skin diseases	26(12%)
Anaemia	9 (6%)
Visual problems	19 (4%)
Diarrhoea	7(3%)

It is generally believed that child labour is driven by poverty in families and this was what informed our enquiry into parent's perception of child labour (Omokhodion and Uchendu 2010). In this study, we found that 39% of parents felt that school age children should be allowed to work and 50% reported that their school age children were working. More women than men were in support of working children. Older parents were more likely to have working children than younger parents. Muslim parents were more likely to have working children than Christian parents. Parents from polygamous families and those engaged in skilled or partly-skilled occupations were more likely to have working children (table 6). Parents with working children had a higher number of children, mean 4.63 compared to those whose children were not working, mean 3.08. These differences were statistically significant  $p < 0.001$  and highlight the role of parental factors in child labour.



**Table 6: Parental Factors Associated with the Practice of Child Labour in Idikan, Ibadan (N=473)**

Parents' Variables	Categories	Prevalence of Child Labour	OR (95% CI)
Age	20-29	9%	1
	30-39	26%	3.6 (1.4-9.4)
	40-49	67%	20.0 (7.5-53.1)
	>50	86%	61.3 (15.1-248.4)
Family type	Monogamous	30%	1
	Polygamous	73%	6.7 (4.3-10.5)
Religion	Christian	30%	1
	Muslim	53%	2.7 (1.8-3.9)
Occupation	Professional	10%	1
	Skilled/Intermediate	23%	2.9 (0.9-9.6)
	Unskilled/Partly skilled	48%	8.9 (3.1-25.4)
	None	76%	7.1 (2.4-20.6)
Educational status	Arabic	63%	3.7 (1.2-12.1)
	Primary	54%	2.5 (1.2-5.5)
	Secondary	25%	0.7 (0.3-1.6)

Child labour is still prevalent in Nigeria. One of the pitfalls of this practice is that it interferes with the child's development. The perils are the dangers of street work; road traffic accidents, sexual abuse and associated sexually transmitted infections, locally endemic diseases such as schistosomiasis, diarrhoeal diseases, exposure to physical, chemical and biological hazards in the workplace, occupational accidents, substance abuse, long working hours and little or no protection from work hazards.

Our findings indicate that a multi-sectoral approach will be needed to curb the phenomenon of child labour. Poverty alleviation to reduce household poverty, family planning services to reduce family size, free education until junior secondary school level, female education, public enlightenment, especially targeted at mothers are some of the components of an intervention programme to address the



problem. The government needs to ensure that all children have access to compulsory education as a front-line response to child labour. Nigeria needs to commit to international standards to which she is a signatory, such as the International Labour Organization (ILO) Convention No. 182 which prohibits the worst forms of child labour including ...‘work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children’. ILO requires signatories to take necessary measures to eliminate the worst forms of child labour. In furtherance of this, legislation should be in place to prosecute and apply sanctions to employers who employ and exploit children.

### **Danger, Men at Work.... and the Women too**

Women have multiple roles: child bearing, child rearing and home making. Working women therefore have additional responsibilities which they need to juggle together on a daily basis. A woman's roles as home maker, wife and mother are non negotiable. Thus, her engagement outside the home creates a phenomenon of a ‘double day’—at the end of her day in paid employment, a woman starts another day in the evening when she returns home to fulfil her domestic obligations (Committee to Study Female Morbidity and Mortality in Sub-Saharan Africa 1996). After spending eight hours at work, she may spend another four or more hours working at home and hence gets little time to engage in other activities such as self care. This increases the physical and psychological demands on women and the potential for work life imbalance or work life conflict. The focus on women at work is increasingly important as the proportion of women in the workforce is increasing all over the world. An additional trend is that with increasing educational attainment, more women are moving into traditionally male occupations which have high job demands. This has raised concerns about the effect of work on their health. Occupational exposures may also affect their accompanying or unborn children. In several parts of Africa, women put their children on their backs while they carry bags of cement on construction sites or work on farms with attendant pesticide exposures (fig. 6).



**Fig. 6:** Women at work while carrying children on their backs.

Several workplace agents have been identified as reproductive hazards in women. These include physical agents such as ionizing radiation, chemicals such as lead and methyl mercury and work activities prevalent in many occupations (table 7).



**Table 7: Reproductive Hazards of Women in the Workplace**

Agent	Effects	Potentially Exposed Workers
<b>CHEMICAL</b>		
Cancer treatment drugs e.g methotrexate.	Infertility Spontaneous abortions Birth defects Low birth weight	Health care workers Pharmacists
Lead	Infertility Spontaneous abortions Low birth weight Developmental disorders	Battery manufacture and repair Welders
Toluene	Microcephaly Developmental disorders	Petroleum workers
<b>PHYSICAL</b>		
Ionizing radiation	Infertility Spontaneous abortions Microcephaly Childhood cancers	Health care workers
Heat	Neural tube defect	Boiler room workers Bakery workers
<b>BIOLOGICAL</b>		
Cytomegalovirus	Birth defects Low birth weight Developmental disorders	Health care workers
Human Immuno-deficiency Virus	Low birth weight Childhood cancer	Health care workers
Rubella	Birth defects Low birth weight	Health care workers Child care
Toxoplasmosis	Spontaneous abortions Birth defects Developmental disorders	Animal care workers
Varicella zoster (chicken pox)	Birth defects Low birth weight	Health care workers Child care
<b>WORK ACTIVITIES</b>		
Heavy physical exertion	Spontaneous abortions Preterm births Low birth weight Still births	Several occupations
Prolonged standing	Spontaneous abortions Preterm births Low birth weight Still births	Several occupations



## Work and Pregnancy Outcome

The effect of work on pregnancy outcome has been studied in several countries in Europe and the developed world. Several studies have indicated that work factors such as shift work, prolonged standing and heavy physical work are associated with low birth weight (Aitken 1990; Neidhammer et al. 2009) and preterm births (Henricksen et al. 1995; Saurel-Cubizolles et al. 2004). Very little data is available from African countries. Our research on work and pregnancy outcome (Omokhodion et al. 2010) was one of the first set of data on occupational exposures and pregnancy outcome in Nigeria.

We studied 1504 women in lying-in wards and obtained a history of occupational exposures and work activities in pregnancy from mothers and collected data on pregnancy outcome from case notes. We found that professionals (such as lawyers, engineers and bankers) and caterers had the lowest rates of low birth weight and preterm births, while health care workers had the highest rates of low birth weight and hairdressers and tailors had the highest rates of preterm births (table 8).

**Table 8: Work and Pregnancy Outcome Study: LBW and Preterm Births by Occupational Grouping**

Occupation	N	% LBW	% Preterm Birth
Professionals	25	0	8.0
Teaching	140	6.4	8.5
Trading	543	7.0	9.5
Administrative/ Clerical	71	9.9	8.3
Computing	11	18.2	9.1
Hairdressing	33	9.1	9.1
Tailoring	100	10.0	14.3
Catering	14	0	7.1
Health care	23	17.4	21.7
Other	25	16.0	20.0
Unknown	8	12.5	12.5
Total	993	7.9	10.2

Among tailors, our study found that foot pedals used in manual sewing machines were the source of exposure to vibration. A study from Quebec (Croteau et al. 2007) reported that whole body vibration is associated with preterm births and we postulated that this may also explain the high rates of preterm births in this occupational group. Very few studies have looked at the effect of domestic work on pregnancy outcome. A study in the Phillipines associated household chores with low birth weight (Barnes et al. 1991). Our study found that carrying heavy objects/heavy physical work at home was associated with low birth weight (Omokhodion et al. 2010). We are currently looking at health care workers to identify the sources of exposures or work activities that are associated with adverse pregnancy outcomes.

Our data was further analysed to identify possible occupational or environmental determinants of low Apgar score at 1 minute and 5 minutes among infants born to these mothers. Our findings suggest that physical exertion at work and cooking with kerosene at home were associated with low Apgar scores, <7 at 1 minute in multiple logistic regression. These findings suggest that in addition to known obstetric and maternal factors, the work and home environment may make significant contributions to pregnancy outcome.

Women are vulnerable to other reproductive health problems. Our study on 1700 hairdressers in Ibadan showed that they had major reproductive health needs as about 72% of single hairdressers were sexually active (Omokhodion, Balogun, Olaolorun and Klemetti 2015). About a quarter of the sexually active singles had ever had abortions and less than two thirds were using contraceptives, table 9. About 10% of hairdressers studied reported symptoms of sexually transmitted infections indicating the need for reproductive health interventions in this female occupational group.



**Table 9: Sexual and Reproductive Health Characteristics of Hairdressers (N=1,452)**

Sexual and Reproductive Health Characteristics	Sexually Active Singles n= 612 n (%)	Married n=840 n (%)	Total n (%)	P value
Ever used contraceptive method	471 (77.0)	660 (79.3)	1135 (78.3)	0.31
Current Contraceptive use	366 (59.6)	461 (55.4)	827 (48.6)	0.067
Ever been pregnant**	212 (34.6)	808 (96.5)	1020 (70.8)	0.000
Ever had unwanted pregnancy *	160 (26.1)	269 (32.2)	429 (29.8)	0.019
Ever had abortion**	148 (23.9)	330 (39.4)	476 (32.8)	0.000

\*p < 0.05 \*\*p < 0.001

In summary, the health of women working at home or in paid employment deserves attention as physical and mental health problems may take their toll while they continue to care for the family. The protection of the unborn child should be a major concern in the health and safety of women at work.

Mr. Vice-Chancellor, Sir, I have described the pitfalls and perils of men, women and children at work, the summary of which is that gainful employment whether in the public, private or informal sector can be a danger to health. I have narrated my venture into the world of work, particularly as it affects the teeming masses of workers in this country. Whilst undergoing that enquiry, I was also mindful of my workplace, our citadel of learning. I have studied the hazards faced by students, of working and living in our campuses (Omokhodion and Gureje 2003; Omokhodion 2003) and the health problems accruing (Alagh and Omokhodion 2005). I have reported the low levels of health and safety in clinical laboratories in Ibadan, including the ones within the College of Medicine and the University College Hospital (Omokhodion 1998). The recent epidemic of Ebola Virus Disease was a wake up call for the need to protect workers in the Healthcare sector. I have also observed the lack of observance of safety regulations in our premises, at



construction sites and business premises within our precincts and how this institution is ill prepared for emergencies such as fire incidents.

**Mr. Vice-Chancellor, Sir, I wish to submit that the panacea for the pitfalls and perils in the workplace is primary prevention.** The goal of occupational health is the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations and the prevention of work related ill health (ILO 1950). In furtherance of this assertion, I have put in place some intervention programmes to help break the vicious cycle of ignorance, poverty and disease.

Following several studies among workers in the informal sector, I have set up intervention programmes for the various artisan groups based on the findings in our surveys. I have done this with the assistance of my younger colleagues in the department, notably Dr. Mary Oluwayemisi Balogun, Consultant Occupational Physician in our Occupational Health Unit who has shown exceptional leadership and coordinating skills that have been useful in the implementation of our intervention programmes. I have also been assisted by several resident doctors who have done their rotations in the Occupational Health Unit. I wish to acknowledge them all for their personal contributions to the programme, including the use of their vehicles to get to the various locations in the community and providing drinks for participants at the seminars. We have developed seminar topics which cover occupational health, reproductive health and general health topics tailored to the needs of each artisan group. The packages can be patented and are ready for delivery to artisan groups across the state or across the country as resources permit.

To address some of the perils that women face, I have set up a Women's Health Research Group—a multidisciplinary group to focus on the health needs of women through the life course, that is from the girl child through to adolescence, adulthood, midlife, post-menopausal and elderly phases of life. This group is distinct from other women's groups in that

its focus is on health issues. The group will also be a voice for various women's health issues and produce data that will support advocacy to improve women's health. It will work closely with other women's associations concerned with the health of women to push for evidence-based interventions and policy changes that affect women's health. This group was established in March this year and we have begun working on projects to address work life balance and mental health status of women.

### **Recommendations**

My contributions in Occupational Health is only a drop of water in the big ocean of the occupational health needs in Nigeria. In my recommendations for the panacea to the dangers in workplaces, I wish to start with our great University.

- Mr. Vice-Chancellor, Sir, our institution which is recognized as the first and the best in Nigeria should take the lead to focus on the health and safety of workers and set up a mechanism for institutionalizing health and safety in the culture of our operations as in other world class institutions. I wish to commend the administration of Professor O. Akinyinka, Provost College of Medicine, 2010-2014 for taking the first step in the right direction by requesting that we draft a health and safety policy for the College after several reports of unsafe conditions and injuries among staff passing through a construction site in the College premises. This document was drafted by 3 other colleagues and myself: Professor Simbo Amanor Boadu, of the Department of Anaesthesia, Dr. Fred Osiname of the Department of Health Promotion and Education and Dr. Oladapo Okareh of the Department of Environmental Health Sciences and approved by the Academic Board of the College during the tenure of the current Provost, Professor Salako. I also wish to commend Professor Salako for passing the document to the legal department before the end of his tenure.



Mr. Vice-Chancellor Sir, I would like to use this medium to commend this document to our great University and recommend that we adopt this policy to protect the health, safety and welfare of students, staff, contractors and visitors. Some of the highlights of our policy include the need to institute measures for fire safety in our premises. The Policy also emphasizes the need to address the issue of excessive work hours and the need to make annual leave compulsory for all workers such that the personnel department would write to staff by mid-year to remind them if they have not taken a leave that year. The policy also recommends regular medical checkups for staff more than 50 years of age. Such a policy will go a long way to reduce the prevalence of accidents and work-related ill health among the staff in our University. The implementation of this policy will require the establishment of a health and safety office manned by qualified health and safety personnel working with health and safety representatives of each faculty. Expertise in this area resides within the four walls of our institutions and we should take the lead in projecting the immense value of the investment in the health and safety of workers to achieve a vibrant academic enterprise.

- My other recommendation for our great University is that we develop our Central Laboratory to a world class standard that befits Ibadan. We need state of the art equipment for analysis of toxins in humans, animals and the environment. The expertise for this analyses reside within our institution—in our Departments of Community Medicine, Chemistry, Biochemistry, Chemical Pathology, Environmental Health Sciences and Veterinary Pathology to mention a few. Our University should demonstrate its proficiency in analytical toxicology by participating in external quality assurance schemes such that if reports come from Ibadan, they will be internationally accepted as



authentic and may even be used to supplement national toxicology data.

- The government of Nigeria needs to focus on the health of its working population. This is an investment in the nation's economy because a healthy workforce is a productive work-force. It is not enough to give handouts to workers as hazard allowance. Employers have the responsibility to ensure that workplaces are as safe as is reasonably practicable to safeguard the health of workers.

The health and safety of the teeming masses of workers in the informal sector is a major concern. No health services are available to them and they are left to their own devices to protect themselves from hazardous exposures. The majority suffer from health conditions that are largely preventable with the breaking of the poverty, ignorance and disease cycle. Workers in the informal sector are organized in unions with regular meetings in designated locations. My experience has shown that the unions and their executive members could be a portal to deliver health and safety services to them at low cost. Personal Protective Equipment can also be introduced at low cost. These services should be delivered through the primary health care system and can be achieved by orientating primary health care workers to deliver basic preventive and curative health services at mechanic villages, and other locations to tailors, carpenters, printers etc. This after all is part of the goals of primary health care—'to take health services to places where people live and **work**'.

- It is my considered opinion that Nigeria needs a federal agency dedicated to serve the health and safety needs of workers across the country and prevent unnecessary occupational ill health and loss of man hours. The Society of Occupational and Environmental Physicians of Nigeria has called for the establishment of this government agency at several fora. This agency should

be multidisciplinary to comprise experts in occupational medicine, occupational hygiene, toxicology, safety and other disciplines related to the health, safety and welfare of workers. Agencies like this exist in the U.K – the Health and Safety Executive (HSE) and in the US, the National Institute of Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA).

This agency will be charged with monitoring the exposure of workers and collating exposure data for workers and the general population especially for high risk groups such as pregnant women and children. The monitoring of the population exposure to heavy metals such as lead, arsenic and cadmium should come under the purview of this agency in order to produce national data of population exposure as is available in other countries. The Ministries of Health, Labour and the Environment will work closely with this agency so that data collated can inform policy and preventive action to reduce hazardous exposures in the populace.

- The National Policy on Occupational Safety and Health should include protection of women at work and policies to make women's work less hazardous and support women's participation in the labour force. This Policy should also address the protection of the unborn child and the protection of children from participating in hazardous work as stipulated by ILO convention 182.
- To all workers present, I have used this lecture to draw attention to the dangers in workplaces and the responsibility that workers have to avoid the pitfalls and the perils in their occupations and take steps to ensure that their workplaces are healthy and safe. It is not enough for workers' unions to fight for wage increase and improved work conditions. Safety must be high on the agenda of unions and they should be the advocates for protecting the health and safety of their members.



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## **BIODATA OF PROFESSOR FOLASHADE OLUFUNKE OMOKHODION**

Professor Folashade Omokhodion was born in Lagos to Chief Gilbert Benjamin Akinyemi and Mrs. Agnes Tinuade Akinyede of the AKINYEDE family of Ode-Ekiti. Her primary school education was at St. Mary's Private School, Broad Street, Lagos, 1961–1967. She attended Queen's College Yaba, Lagos, 1968–1974 where she obtained the West African School Certificate in 1972 and the Higher School Certificate in 1974. She was admitted into the College of Medicine of the University of Ibadan in 1974 and graduated MBBS in 1979. She had her postgraduate training in Occupational Medicine at the London School of Hygiene and Tropical Medicine where she obtained the Masters in 1982 and PhD 1990 in that specialty. She obtained the Fellowship of the West African College of Physicians in Community Health in 1992 and the Membership of the Faculty of Occupational Medicine of the Royal College of Physicians of London in 1996. She was awarded the Fellowship of the Faculty of Occupational Medicine in 2011 and the Fellowship of the Faculty of Public Health of the Royal Colleges of Physicians of the United Kingdom in 2012. She is an honorary Consultant Community and Occupational Physician to the University College Hospital, Ibadan.

Professor Omokhodion started her academic career at the College of Medicine University of Ibadan as Lecturer 1 in 1990, was promoted to Senior Lecturer in 1994 and Professor in 2006. She has served the University in various administrative positions as:

- Subdean Postgraduate for the Faculty of Clinical Sciences and Dentistry from 1992 to 1994 and 1996–2000,
- Acting Director, Ibarapa Programme 2000–2003,
- Acting Head of Department of Community Medicine 2003–2006
- Head of Department of Preventive Medicine and Primary Care 2010–2014

She has served as external examiner for several Nigerian universities and the University of Sierra Leone. Outside the University, she has served as consultant with international agencies in community health. She was country coordinator for the Dreyfus Health Foundation programme in Nigeria from 1995-2005, organizing workshops to develop research projects for the Problem Solving for Better Health Program and supervising over 50 community based intervention projects in rural and urban areas across the country. She served as a short-term consultant for the World Bank in 2003 collating data across the country on challenges of the control of communicable diseases in Nigeria. She was a Visiting Lecturer to the Department of Public Health of the University of Kuopio, Finland in 2005 and a Visiting Professor to the Occupational Medicine programme at the Department of Medicine, University of Alberta, Edmonton, Canada in 2009. She served as research advisor to Shell Petroleum Development Corporation in 2011.

She is currently the Academic Coordinator, Doctors as Educators programme—a collaborative Medical Education programme of the Royal College of Physicians and the West African College of Physicians, 2011–date. She is a Member of the Global Health Network on Disease Control Priorities based at the University of Washington.

She is a member of several professional bodies:

- Nigerian Medical Association
- Society of Occupational and Environmental Health Physicians of Nigeria
- Association of Public Health Physicians of Nigeria
- Society of Occupational Medicine (U.K.)
- Hearing International, Nigeria

She is currently the Editor-in-Chief of the Occupational and Environmental Health Journal, a journal of the Society of Occupational and Environmental Health Physicians of Nigeria.



Professor Omokhodion has supervised over 35 postgraduate dissertations and theses for MPH, PhD and the fellowship programme in Community Health. She has conducted studies in Occupational Medicine and Community Medicine and has over 65 publications in international journals. Her work in Occupational health has covered the areas of occupational toxicology, occupational hazards and health problems of workers in small-scale industries, noise exposure and noise-induced hearing loss, child labour, and women at work. Her research in community medicine has focused on women's health, students' health, tobacco smoking among young people, environmental pollution and childhood diseases. She has presented her work at several international conferences across the world.

Professor Omokhodion is the Patron of the Christian Medical and Dental Association-Students' section, at the University of Ibadan. She works as a Christian counsellor. She is married to Samuel Omokhodion, a Professor of Paediatrics and a Paediatric Cardiologist and they have three grown children.

## NATIONAL ANTHEM

Arise, O compatriots  
Nigeria's call obey  
To serve our fatherland  
With love and strength and faith  
The labour of our heroes' past  
Shall never be in vain  
To serve with heart and might  
One nation bound in freedom  
Peace and unity

O God of creation  
Direct our noble cause  
Guide thou our leaders right  
Help our youths the truth to know  
In love and honesty to grow  
And living just and true  
Great lofty heights attain  
To build a nation where peace  
And justice shall reign

## UNIVERSITY OF IBADAN ANTHEM

Unibadan, Fountainhead  
Of true learning, deep and sound  
Soothing spring for all who thirst  
Bounds of knowledge to advance  
Pledge to serve our cherished goals!  
Self-reliance, unity  
That our nation may with pride  
Help to build a world that is truly free

Unibadan, first and best  
Raise true minds for a noble cause  
Social justice, equal chance  
Greatness won with honest toil  
Guide our people this to know  
Wisdom's best to service turned  
Help enshrine the right to learn  
For a mind that knows is a mind that's free



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