

## **Economic Burden of Low Back Pain among Quarry Workers Attending Outpatient Physiotherapy Clinic at a Tertiary Health Institution in Ondo State, Nigeria**

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### **Abstract**

*Problem: The economic burden of health care in developing countries (like Nigeria) especially among the low social class and those involved in risky environment and occupations is worrisome and increase the out-of-pocket expenses of such individuals and expose them to poverty. A limited amount of data exists on the burden of low back pain (LBP) especially in developing countries.*

*Objective: This study was carried out to determine the economic burden of LBP of quarry workers who attend out-patient physiotherapy clinic of a tertiary health institution in Owo, Ondo State.*

*Methods: This study was carried out at Federal Medical Centre Owo in Ondo State, Nigeria. A descriptive cross sectional survey of forty quarry workers with LBP (28 males, 12 females) receiving physiotherapy at Federal Medical Centre, Owo, was carried out with purposive sampling method (non-probability sampling). Data on the economic burden of LBP and socio-demographic information of participants were collected using a self-developed questionnaire, reviewed by research experts. Data was analyzed using descriptive statistics of proportions, mean and standard deviations.*

*Outcome: It was discovered in this study that, the cost of Physiotherapy represents the highest cost (63%) among the direct costs, followed by the cost expended on Physician visit (23.56%) while the cost of diagnostic tests represents the least (3%). Among the indirect costs, the expenditure on paid help, 34000 naira (45.7%) is the highest, while that of meals outside home, 9738.46 naira (13.0%) is the lowest. On the overall, this study reveals that the direct cost of low back pain among quarry workers (60.6%) forms the bulk of expenses of the management of low back pain by quarry workers. It is recommended that, policy formulation on alleviating the economic burden of ailments associated with risky jobs should be considered in developing countries, the research work should be carried out using larger population, inclusion of other risky occupations in future researches and that other possible factors that can be responsible for the low back pain of such workers should be taken into consideration in future studies.*

### **Introduction**

Low back pain (LBP) is the most common musculoskeletal problem that brings patients to the hospital. It is usually accompanied by painful limitation of movement, often influenced by physical activities and postures and may also be associated with referred pain (Omokhodion and Sanya 2003). In the United States, LBP has reached epidemic proportions and represents a significant threat to the public health of its citizens.(Kovacs et al 1997). The recurrence of the condition is common. (Deyo 1996)

The lifetime prevalence is over 70% in industrialized countries, with peak prevalence between ages 35 and 55. In Nigeria, the prevalence of LBP among hospital workers was reported to be 46%, with the highest prevalence (69%) recorded amongst nursing staff, followed by secretaries/administrative staff (55%) and cleaners/aids (47%). Heavy physical work (45%), poor posture (20%) and prolonged standing or sitting (20%) were the most frequent activities associated with LBP amongst these workers (Van Tulder et al 2006)

Some studies have found the prevalence of LBP to be stable over several years. In Germany, the prevalence of LBP was found to be stable over a decade. The high number of patients with recurrent

pain makes it difficult to distinguish between prevalence of acute and chronic LBP. (Van Tulder 2006, Huppe et al 2007, Ihleback &Eriksen 2007)

**Justification of the study:** Low back pain is a common work-related ailment among quarry workers. Many studies have been carried out to unravel the prevalence and predisposing factor of LBP, but there is a dearth of documented studies toward the economic burden of LBP, especially among the quarry workers whose work is almost always associated with LBP. This is the motivation towards this study.

### **Statement of the problem**

In the developing nations like Nigeria, the popular payment system for health care deliveries on the part of the patients is out-of-pocket system. Only few citizens, predominantly the occupants of the formal sector are enrolled under Social Health Insurance (SHI) mostly in developing nations. Almost all of the quarry workers are not eligible to enjoy the benefits of SHI neither do they have the financial capacities to register under Private Health Insurance (PHI). This implies that, any health care facility enjoyed by this category of people will be personally paid for, through out-of-pocket payment system, which has the potential to add to the financial burden of quarry workers, most of who are paid meager wages/salaries. This can have gross negative effect on their wellbeing and welfare, and increase their level of poverty.

### **Research questions**

The following research questions were answered by this study;

1. What is the **direct cost** of managing the Low Back Pain among quarry workers attending outpatient Physiotherapy clinic at Federal Medical Centre, Owo.
2. What is the **indirect cost** of managing the Low Back Pain among quarry workers attending outpatient Physiotherapy clinic at Federal Medical Centre, Owo.
3. What is the **comparison between the direct and indirect cost** of managing LBP among quarry workers attending out-patient Physiotherapy clinic at Federal Medical Centre, Owo.

### **Significance of the study**

This study will serve as a search light into the burdens faced by the people involved in the hard labor jobs with respect to the treatment of the associated ailment. It will serve as a yardstick towards the proffering of possible interventions into how to assist the developing countries in reducing the economic burden of direct and indirect cost of managing occupational diseases and injuries.

### **Limitations of the study**

1. The researcher is a known person to most of the quarry workers who attends the Physiotherapy outpatient clinic (as the researcher is also a Physiotherapist), and this may lead to response bias
2. The study did not include other possible factors that may be responsible for the LBP of the participants of this study.

In order to reduce the effect of the (1) above, one research assistant was incorporated for the purpose of data collection through questionnaire.

### **Literature review**

#### **Introduction**

Low Back Pain (LBP) represents the leading musculoskeletal cause of disability and is the most frequently reported condition for which people receives outpatient physiotherapy (Jette et al, 1994). LBP has been referred to as a 20 century enigma which continues to cause disability and distress in a large proportion of the adult population (Waddel, 1998). LBP may not be a life threatening condition but it constitutes a major health problem in the world (Deyo and Phillips, 1996). It is usually

accompanied by the painful limitation of movement, often influenced by physical activities and posture, and may be associated with referred pain (Kovac et al, 2006).

Low back pain is neither a disease nor a diagnostic entity of any sort, it is usually defined as pain localized below the margin of the last ribs (costal margin) and above the inferior gluteal lines, with or without lower limb pain (Van Middelkoop et al,2010) It is one of the most common cause of musculoskeletal disorder related to work status and condition (Frank et al,1996) It occurs in similar proportions in all cultures, interferes with quality of life and work performance, and is the most common reason for medical consultations (Ehrlich,2003). It remains the leading cause of disability in persons younger than 45 years old [Lu,2003]. More than one-quarter of the working population is affected by LBP each year, (Lee et al,2001) with a lifetime prevalence of 60–80% (Hartvigsen et al,2000) and a large percentage of LBP claims for long durations -more than 90 workdays lost (Murphy and Volinn,1999) At some point in life, between 15% and 20% of adults have this syndrome (Ehrlich,2003;Frank et al,1996) in which most cases (90%) are nonspecific and occur in all age groups (Ehrlich,2003).

Low back pain is a complex condition with several factors contributing to its occurrence. Most knowledge on risk factors of LBP stems from cross sectional studies which cannot evaluate the temporal sequence between a risk factor and the occurrence of pain (Riihimäki,1991). Three different groups of potential risk factors have been identified in LBP :(a) individual factors such as body weight and age, (b) biomechanical factors such as heavy physical load, lifting, twisted postures, and vibration, and (c) psychosocial factors such as job control and job satisfaction (Keriri,2013).

Work related LBP which is a form of Mechanical - or nonspecific - LBP is the most commonly reported by the population (Daniele et al, 2012). The human body has a center of gravity, which keeps the balance between muscles and bones to maintain the integrity of structures and protect them against injury in any position - standing, sitting or laying down. In nonspecific LBP, imbalance typically occurs between the functional load - which is the effort required for work and activities of daily living, and ability - which is the potential for performing these activities (Daniele et al, 2012). Nonspecific LBP is characterized by the absence of structural change in which there is no disc space reduction, nerve root compression, bone or joint injuries, marked scoliosis or lordosis that may lead to back pain. Despite the lack of structural change in nonspecific LBP, it can limit daily activities and cause temporary or permanent inability to work, being one of the main causes of absence at work in the Western world (Krismer and Tulder, 2007).

The incidence of nonspecific LBP is higher in workers subjected to heavy physical exertion, such as weight lifting, repetitive movements, and frequent static postures ( Andrade et al,2005; Dagensis et al,2008). Lower back pain is a neuro-musculoskeletal disorder of the lumbar region caused by inflammation and/ or mechanical strain. It can originate from vertebral zygapophyseal joints, disc, muscles, ligaments and neural tissue due to trauma or repetitive strain, leading to degenerative changes of the lumbar spine (Maitland, 1986). Work-related low back pain, is any back pain originating in the context of work and considered clinically to have been probably caused, at least in part, or exacerbated by the claimant's job

(Ajeet,2013). Occupations involving heavy physical work are found to be a significant statistical risk factor in the development of lower back pain (Hartvigsen et al., 2001). Heavy physical work activities can lead to mechanical straining of the lumbar structures if done in an improper ergonomic manner. Mechanical straining of the lumbar structures causes inflammation, and this leads to lower back pain via the activation of the unmyelinated C nociceptors (Johnson, 1997).

Low back pain originating from physical work activities, is significant especially in situations where there is daily lifting of more than ten kilograms (Palmer et al., 2003); excessive hours spent on repetitive actions, (Guo, 2002) and extreme lumbar flexion when doing heavy lifting activities, (Hoogendoorn et al., 2000). These actions lead to accumulation of neuromuscular damage and inflammation of the lumbar spinal structures (Williams et al., 2000; Zedka et al., 1999).

Mining work such as quarrying task is often characterized by very difficult and challenging conditions involving manual material handling, heavy lifting, repetitive movements and tasks, forceful manual-exertion and exposure to whole body or segmental vibration (as a result of work tool handling) that are known to predispose people to work related musculoskeletal disorders (Steiner et al, 1999; Scharf et al, 2001).

Low Back Pain (LBP) being the most common musculoskeletal problem in the work place (Omokhodion and Sanya, 2003), is a major cause of work- related disability (Cunningham et al, 2008), which is associated with major costs in terms of health resource usage, worker disability and absenteeism (Maniadaki and Gray, 2000). LBP has been established as one of the most common reasons for sick leave in the western world (Reiso et al,2003). Furthermore 70-85% of adults in the general population is believed to experience at least one episode of low back pain at some time during their lives ( Andersson, 1999).

A study by, Lotters and Burdorf (2006) indicated that working class employees in an industry are prone to high incidence of short and long-term sick leave absence due to the high-risk of developing lower back pain. Devereaux (2004) indicated that lower back pain is the second leading cause of absence from work in the United States of America, and accounted for 25% of all work days lost. The lifetime prevalence for occupation related lower back pain, with each incident lasting for two to more weeks, is 13.8% in China and 60% to 90% in the Unites States of America (Devereaux, 2004). In South Africa, the annual occurrence of occupation related lower back pain has been found to be between 55.7% and 63.9%, among the employees of two South African steel manufacturing companies (Van Vuuren et al., 2003). Work related low back pain is also prevalent in Nigeria with Aliu and Saidu (2006) reporting 64% a prevalence rate for

work- related low back pain among stone quarry workers in northern Nigeria while Egwuonwu et al,(2013) reported 78.9% prevalence rate of work-related low back pain among drivers, mechanics, blasters, crushers and drillers working in a quarry industry in a South Eastern Nigeria.

A global survey indicated that occupation related lower back pain causes a loss of 818,000 disability-adjusted life years annually (Punnett et al., 2005). According to the American College of Occupational and Environmental Medicine (2003), 73% of the employees with lower back pain, which originated at work, were still absent from work a month after the original onset of the lower back pain symptoms. Absenteeism from work due to occupational induced lower back pain is an expensive health issue, (Murphy et al., 1999; Borenstein, 2000), due to the high compensational medical expenses and disability claims (Fransenet al., 2002; Van Tulder et al, 2000)). Thus, a study by Fransen et al., (2002) indicated that 23.9% of claimants were still receiving compensational payments for lower back pain three months after their initial assessment.

## **Epidemiology**

Low back pain (LBP) is neither a disease nor a diagnostic entity of any sort (Ehrlich, 2003). It is a common problem which affects the majority of adults at least once in a life time. It is irksome, of global concern, as common as headache affecting all age groups and races (May, 2001; Hazard, et al, 1996). It is a prevalent musculoskeletal condition, and a common cause of disability especially in its chronic/recurrent state. The majority of LBP episodes resolve spontaneously while a significant minority becomes recurrent and a small percentage remain persistent (Dunn and Croft, 2004).

Reviews of the literature describing LBP point prevalence in the developed world have produced variable estimates of prevalence rates (Loney and straford,1999). In the studies deemed by Looney and Stratford to be methodologically superior, the LBP point prevalence was estimated to be 6.8% in North America, 12% in Sweden, 13.7% in Denmark, 14% in the United Kingdom, 28.4% in Canada, and 33% in Belgium (Loney and straford,1999). Walker et al (2004), estimated the point prevalence of LBP at 25.5%, six-month period prevalence at 64.6% and lifetime prevalence at 79.2%. The retrospective one-year first incidence of LBP in the sample was 8.0%. These data suggest that LBP is

common in the Australian population, with four out of five adults experiencing LBP in their life and approximately one in 12 experiencing a new episode of LBP over a 12-month period.

It is estimated that episodes of low back pain, that are frequent or persistent have been reported in 15% of the United State of America population, with a lifetime prevalence of 65% to 80%, it is also stated that 28% of the United State of America industrial population will experience disabling low back pain at some time and 8% of the entire working population will be disabled in any given year, contributing to 40% of all lost work days (Lawrence et al, 1998).

In South Africa the annual occurrence of occupational related lower back pain has been found to be between 55.7% and 63.9%, among the employees of two South African steel manufacturing companies (Van Vuuren et al., 2003). Work related low back pain is also prevalent in Nigeria with Aliu and Saidu (2006) reporting 64% a prevalence rate for work related low back pain among stone quarry workers in northern Nigeria while Egwuonwu et al,(2013) reported 78.9% a prevalence rate of work related low back pain among drivers, mechanics, blasters, crushers and drillers working in a quarry industry in a South Eastern Nigeria.

### **The consequences of work-related lower back pain**

Work-related lower back pain among blue-collar workers leads to many consequences, which affect the employee as well as the employer (Hochanadel *et al.*, 1993, Elders and Burdorf, 2004). These consequences involve loss of productive life years, high medical claims, sick leave, and unemployment (Morken *et al.*, 2003, Punnett *et al.*, 2005, Lotter and Burdorf, 2006.). Morken *et al.* (2003) and Lotters and Burdorf (2006) looked at the prevalence and prognostic factors of sickness absence among industrial workers. They found that blue-collar workers have a high risk for both short- and long-term sickness absences due to musculoskeletal disorders, which included lower back pain (Lotters and Burdorf, 2006 and Morken *et al* 2003). Gluck and Oleinick's (1998) survey indicated that the claim rate for lower back pain peaks in men in the 24 to 34 year range. The highest rates are in manual labor occupations. These claim rates give one an insight into the manual workers' need to compensate for lost income due to sick leave, unemployment and/ or disability (Gluck and Oleinick, 1998)

Sick leave and unemployment are indicated in a survey of interviews and literature reviews by Pransky *et al.* (2002), who found that 60% of people who suffer with lower back pain lose one week of work per year. Only half of these employees return to their pre-injury job a year after injury and 20% are unemployed due to their injury (Pransky *et al.*, 2002). Using a logistical regression model the American College of Occupational and Environmental medicine predicted that 73% of employees, with occupational lower back pain, were unable to resume their work one month after initial assessment. To prevent back pain and its added cost, risk factors need to be identified and subsequently addressed to prevent the high cost, sick leave and unemployment. These risk factors also give one insight into which medical intervention is necessary for the effective management of work-related lower back pain at minimal medical cost (Harvigsen *et al.*, 2001 Devereaux, 2004

### **Predisposing factors for development of work-related low back pain**

#### **a. Heavy physical work**

Heavy physical work, heavy lifting, twisting and vibration are significant work-related risk factors (Devereaux, 2004). A cross-sectional and five year prospective study conducted by Harvigsen *et al.* (2001) indicated that blue-collar workers that are subjected to physical workload, over a five-year period, are prone to lower back pain. A relative lower proportion of workers who do sedentary work, experienced lower back pain, in contrast to a significant proportion of workers who do heavy physical work (Harvigsen *et al.*, 2001). Thus, a sedentary job has a statistically significant protective or neutral effect in relation to lower back pain. In contrast, a heavy physical job constitutes a statistically significant risk factor (Harvigsen *et al.*, 2001).

### **b. Repetitive activities**

Workers who spend time on both repeated strenuous physical activities and repeated bending, twisting or reaching on a typical job have higher prevalence of lower back pain than those who do not ( $p < 0.05$ ) (Guo, 2002). There is a significant ( $p < 0.05$ ) risk to develop lower back pain when the employee is exposed to twisting, bending, sitting, kneeling, squatting, carrying load and handling bulky material (van Vuuren *et al.*, 2005). Hoogendoorn *et al.* (2000) states that workers who lift a load of at least 25kg repetitively, (more than 15 times per working day), fall at risk of developing lower back pain.

### **c. Vibration and lifting**

Palmer *et al.* (2003) investigated whole body vibration and occupational lifting as potential risk factors for lower back pain. Significant associations were found at work between daily lifting of weights greater than 10kg (Palmer *et al.*, 2003). There is, however, little relevance to the exposure and amount of vibration, during driving of industrial vehicles. Fransen *et al.* (2002)'s study, in which borderline significance, ( $p < 0.05$ , OR: 1,6) was found for vibration during driving, confirms the above finding. Job requirement of lifting for three-quarters of the day or more, has been found to be a significant, independent determinant for chronicity of lower back pain,  $p < 0.05$ . (Fransen *et al.*, 2002). In addition, carrying a load, handling bulky material, kneeling and squatting when doing any lifting activity. Among South African industrial workers, are significant risk factors for lower back pain (van Vuuren *et al.*, 2005). Lifting thus seems to be a major risk factor for the development of lower back pain.

### **Economic burden of low back pain**

The economic burden of a disease is the sum of all costs associated with that condition which would not otherwise be incurred if that disease did not exist. (Dagenais S *et al* 2008)

However, given the many categories of costs that must be considered (direct, indirect and intangible), it could be challenging to fully estimate the economic burden of an illness as data is often not available. Intangible costs are rarely included when estimating the economic burden of any illness because of the general societal uneasiness about placing a monetary value on these aspects of a disease. LBP is a costly condition to the society in terms of work absenteeism, health care utilization, and disability benefits. Previous estimates of the total annual cost of LBP in the United States have ranged from \$20-\$50 billion. According to Katz (2006), the direct and indirect costs of low back pain, are estimated at \$60 billion annually in the United States.

A closer evaluation of the economic burden of LBP reveals that it is the commonest reason for activity limitations in individuals under the age of 45, the second most common complaint heard in physician's offices, (Lively 2002), the third leading cause for surgery, and the fifth most common cause for hospitalization (Deyo 1996). Hemmila found that about one-third of the direct costs (health care utilization) of LBP were spent on complementary therapies and that sick leaves accounted for 55% of the total cost. (Krishnaney *et al* 2007, Hemmilä 2002). LBP is the most expensive benign condition in industrialized countries and it is the number one cause of disability that affects people less than 45 years. For those older than 45 years, it is the third leading cause of disability. It results in significant restrictions on activities of daily living and participation, such as inability to work (Gatchel *et al* 1995). Furthermore, the economic and societal impact of LBP appears to be huge. Individuals with LBP incur millions of dollars in medical expenditure each year in the United States (Katz 2006)

This economic burden is of particular concern in developing countries where there are already limitations in health care delivery and funds are directed towards epidemics such as human immunodeficiency virus/Acquired Immune Deficiency syndrome. (Walker *et al* 2004)

## **Methodology**

### **Study area**

Federal Medical Centre, Owo is located in the Owo Local Government Area of Ondo State in Nigeria. The hospital provides health care services at the primary, secondary and tertiary levels to the people within its catchment areas which are Ondo, Kogi, Edo, Ekiti and Osun States and its surrounding States. It also receives patients from all states of the Federation because it is situated a stone's throw from the highway that links Abuja to Lagos. It is also an approved training centre by both the West African Postgraduate College and National Postgraduate College to train Resident Doctors in some specialist area of Medicine. It is a 250 bed tertiary health centre with average monthly attendance, by all groups, at the outpatient department put at 5,200 and the bed occupancy not less than 80% at every point in time.

### **Study population**

The target population in this study was the quarry workers who have developed a clinically confirmed mechanical low back pain. They are people who are known active workers of any of the surrounding quarries in the Owo community. Both male and female quarry workers with LBP, and are attending Physiotherapy outpatient clinic at Federal Medical Centre, Owo, participated in the study.

### **Sampling procedure**

The sampling procedure employed in the study is a purposive (non-probability) sampling method. The orthopedic clinic days, during which LBP cases are also treated, are Wednesdays and Fridays. Quarry workers who are LBP patients attending Physiotherapy outpatient clinic are recruited as they come to clinic for a period of four weeks (eight clinic days). The total number of patients recruited during this period was forty (40).

### **Study design and method of data collection**

This is a cross sectional descriptive survey study. Data on the economic burden of LBP and socio-demographic information of participants were collected using a self-developed questionnaire. The questionnaire used was reviewed by the research experts, and their inputs were incorporated in the final questionnaire used in the collection of data.

### **Data analysis**

Data analysis was done using the Statistical package for Social Science (SPSS) version 17. Data was analyzed using descriptive statistics of proportions, percentages mean and standard deviations.

### **Inclusion criteria**

The inclusion criteria for this study include

1. Male and female quarry workers
2. Quarry workers with mechanical low back pain, and are attending Physiotherapy outpatient clinic at Federal Medical Centre Owo.

### **Exclusion criteria**

The exclusion criteria were

1. All other patients with LBP, attending Physiotherapy outpatient clinic but are **not** quarry workers.
2. Quarry workers with LBP, managing other ailments apart from LBP at out-patient Physiotherapy clinic.

## Ethical considerations

### Consent

An approval to conduct the study was obtained from Health Research Ethics Committee of Federal Medical Centre, Owo. Participants in the study were informed in writing about the study. They were also guaranteed the confidentiality of whatever information given by them in the study tool. A statement of informed consent was clearly written on the questionnaire, which was signed by the respondent before filling the questionnaire.

### Beneficence

Findings will be communicated to the host management and state ministry of health. Advocacy efforts will be instituted at the policy formulation and stakeholders' level.

### Non-Maleficence to the participants

No harm of any kind was done to participants as a result of this study

### Presentation of results

A total of forty quarry workers with Low Back Pain receiving physiotherapy at the Federal Medical Centre, Owo, Ondo State, Nigeria, participated in this cross-sectional study. The majority (70%) of the participants were male. The age group of participants ranged from 20 to 50 years. A large percentage (62.5%) of the participants were between twenty and thirty years old (table 1). Respondents with primary education accounted for the highest (40%) number of respondents. The majority (75%) of the participants were married.

**Table 1.** Socio-Demographic Characteristics of Participants

CHARACTERISTICS	NUMBER (N)	PERCENTAGE (%)
<b>SEX</b>		
Male	28	70
Female	12	30
<b>AGE GROUP (YEARS)</b>		
20-30	25	62.5
31-40	10	25
41-50	5	12.5
<b>MARITAL STATUS</b>		
Married	30	75
Single	7	17.5
Widowed	2	5
Co-habiting	1	2.5
<b>LEVEL OF EDUCATION</b>		
University	2	5
Post-Secondary	8	20
Secondary	14	35
Primary	16	40

From the table 1 above, 28 (70%) of the participants were male, majority, 25 (62.5%) were between ages 20-30. Thirty (75%) were married while 16 (40%) had primary education.



**Table 2.** Direct cost of care of low back pain of quarry workers

VARIABLES	MEAN (Naira)	Standard Deviation-SD (Naira)	PERCENTAGE (%)
<b>Physician visit</b>			
Male (M)	29169.6	13254.25	
Female (F)	23408	13057.05	
			23.56
<b>Physiotherapy</b>			
M	75426	68875.2	
F	86344	62650.55	
			63
<b>Diagnostic tests</b>			
M	3782	1521.85	
F	2893.33	787.6	
			3
<b>Topical creams</b>			
M	7488	2661.5	
F	7160	2627.62	
			6.4
<b>Supportive devices</b>			
M	3500	0	
F	3750	353.55	
			3.12
<b>Medication</b>			
M	0	0	
F	2796.33	903.7	
			0.92
<b>TOTAL</b>	<b>114661.25</b>	<b>74230.53</b>	<b>100</b>

From the table 2 above, among the direct cost, the cost of Physiotherapy represents the highest cost (63%), followed by the cost expended on Physician visit (23.56%) while the cost of diagnostic tests represents the lowest (3%).

**Table 3.** Indirect cost of low back pain of quarry workers

VARIABLES	MEAN (Naira)	SD (Naira)	PERCENTAGE (%)
TRANSPORTATION	17772	13526.12	23.9
ACCOMPANYING PERSON	12938.18	9331.78	17.4
MEALS OUTSIDE HOME	9738.46	4850.69	13.0
PAID HELP	34000	19287.3	45.7
<b>TOTAL</b>	<b>74448.64</b>	<b>46995.89</b>	<b>100</b>

In the table 3 above, among the indirect cost, the expenditure on paid help, 34000 naira (45.7%) is the highest, while that of meals 9738.46 (13.0%) outside home is the lowest.

**Table 4.** Economic cost of low back pain among quarry workers

ECONOMIC COST	MEAN	SD	PERCENTAGE (%)
DIRECT	114661.25	74230.53	60.6
INDIRECT	74448.64	16837.13	39.4
TOTAL	189109.89	91067.66	100

Table 4 above, shows the cost distribution of LBP (direct cost, and indirect cost) of quarry workers. It reveals that the direct cost of low back pain among quarry workers (60.6%) forms the bulk of expenses of the management of low back pain by quarry workers.

## Discussion recommendation and conclusion

### Discussion

The economic burden of a disease is the summary of all costs associated with that condition. This means that the burden of a disease cannot be obtained if that condition does not occur in the first place. The categories of costs incurred on any condition include direct cost, indirect cost and intangible cost. However, in this study, the direct and indirect costs of care were summed up as the economic burden. This study revealed a huge average annual economic cost of care relative to the earning capacity of an average Nigerian. Due to the dearth of documented data on economic burden of low back pain in Nigeria, comparison is only possible with other parts of the world. The findings of Katz 2006, and William et al 2009, that indirect costs contribute 85% of the total costs of LBP does not support the findings of this study. In this study, indirect cost contributed 39.4%. This may be as a result of the fact that the majority of the participants bore all the expenses of the direct and indirect costs unlike what obtains in developed countries where healthcare is borne mainly by the government and insurance companies. No single participant of this study was covered by any health insurance institution.

The ratio of direct costs to indirect costs of care obtained from this study (3:2) is analogous to the previous studies' findings of Finnish (Dagenais S et al, 2008, Shekelle PG et al, 1998 and Katz 2006) reported in 2002, in which almost one third of the direct back pain costs in health care utilization was spent on complementary therapies and sick leaves which accounted for 55% of the total costs. According to this study, Physiotherapy visit (63%) was responsible for most of the direct cost incurred on low back pain by the quarry workers, followed by the physician visit (23.56%). This finding is similar to the findings in Lafuma et al (1998) where physical therapy contributed the most (41.6%) of the direct cost of care followed by physicians' fees (23.9%).

Indirect costs include lost earnings and productivity of both patients and the family members who take care of them. Some diseases like cancer and hemorrhagic stroke may result in premature death. In this case, the indirect cost (according to human capital approach) is the loss in potential future earnings. In this study, indirect cost of care included the cost of transportation to keep appointments, cost of transportation of the accompanied person, cost of meals outside the house, and the cost of paid help. The estimate of indirect cost obtained from this study could be limited by the fact that only a minority of the participants (quarry workers with LBP) expended cost on meals for accompanied persons, paid help and had meals outside the house. A closer evaluation of the economic burden of LBP reveals that it is the most common reason for activity limitation in individuals under the age of 45 (Lively, 2002). LBP is the most expensive benign condition in industrialized countries and it is the number one cause of disability that affects people less than 45 years and for those older than 45 years, it is the third leading cause of disability. It results in significant restriction on activities of daily living and on participation, such as inability to work (Gatchel 1995).

## Recommendations

Following the findings of this study, the following recommendations were given

1. Policy formulation on how to alleviate the economic burden of occupational ailments associated with risky jobs should be considered in Nigeria and possibly, in other developing countries.
2. It is pertinent for other interested researchers to carry out more studies in order to explore the economic implications of LBP on a larger population.
3. The tentacle of research in this direction should be extended to other risky occupations, apart from quarrying, that can be associated with Low Back Pain.
4. The other possible factors that can be responsible for the Low Back Pain of the workers should be taken into consideration in the sub-sequent researches.

## Conclusion

This study has revealed a considerable direct and indirect costs incurred by quarry workers with Low Back Pain in a tertiary health institution in Nigeria. The direct cost outweighs that of the indirect cost, and among the direct costs, the Physiotherapy visit was ranked the highest, while paid help ranked the highest among the indirect costs. The findings in this study confirm the popularity of out-of-pocket expenses on health care in developing countries like Nigeria. The continuation of this trend will continually subject the citizens of the developing nations to poverty associated with the direct and indirect cost of assessing the health care for various ailments. This ugly situation then calls for attention from all and sundry, if the actualization of Universal Health Coverage (UHC) will be a thing of reality in low income countries. The proper integration of Social Health Insurance (SHI) and Community Based Health Insurance (CBHI) into all categories of the citizens of low income countries will go a long way to help in achieving this much desired goal of UHC, and there will be relief of economic burden associated with health care, especially for this category of workers involved in environmentally/occupationally risky jobs.

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