

## Estimation of Economic Cost of Low Back Pain Management in Kano, Nigeria

Bashir Bello<sup>1\*</sup>, Tasiu Isah Muhammad<sup>2</sup>

<sup>1</sup> Senior Lecturer, Physiotherapy Department, Faculty of allied Health Sciences, Bayero University Kano, Nigeria.

<sup>2</sup> Physiotherapist, Murtala Muhammad Specialist Hospital, Kano, Nigeria.

### ARTICLE INFO

#### Article history:

Received: February 15, 2017

Accepted: March 03, 2017

Available online March 17, 2017

#### Keywords:

Low back pain

Economic cost

Direct cost

Indirect cost

© 2017 Bello and Muhammad. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

The cost of treatment for patients with low back pain (LBP) has a noteworthy monetary effect around the world. In Nigeria documents indicating the cost of treatment of LBP are few or not in existence. The purpose of this study is to estimate the cost of low back pain management in Kano state. A total of 79 respondents (55 males, 24 females) aged between 30 to 70 years receiving physiotherapy in secondary and tertiary hospitals consented to participate in the study. Data on economic cost of low back pain and socio demographic information were collected using a standardized economic cost questionnaire. Respondents functional disability level were assessed using Rolland Morris Disability Questionnaire. Results were analyzed descriptively using statistics of proportions, means and standard deviation, inferential statistics of chi square. The overall estimated cost of annual low back pain management was averaged at 94389.57 naira  $\pm$  67270 with direct cost accounting for 84.80% (80045.57  $\pm$  54287.02 naira) and indirect cost accounting for 15.20% (14344  $\pm$  12983.47 naira). There was no association between the cost of management of low back pain and gender ( $p=0.39$ ). However, there was an association between the cost of low back pain management and functional disability score among respondents ( $p=0.004$ ). This study concluded that management of low back pain constitutes a substantial cost burden which is largely attributed to direct cost and radiological investigation contributed greatly to the cost.

\* Corresponding Author; E. Mail: [nurubash@yahoo.com](mailto:nurubash@yahoo.com)

Cite this article as: Bello, B., Muhammad, T.I., 2017. Estimation of Economic Cost of Low Back Pain Management in Kano, Nigeria. *Advances In Life Science And Medicine* 03 (01), 01-08.

### 1. Introduction

Anderson (2000), explained that LBP is the most common musculoskeletal problem that brings patients to the hospital. The author further stated that in the United States, LBP has reached epidemic proportions and represents a significant threat to the public health of its citizens. Omokhodion, Umar and Ogunnowo (2000) reported that the prevalence of LBP among hospital workers in Nigeria was 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.

Shekelle (2009) affirmed that to ensure a health system is adequately aligned to a population's true health challenges, policy-makers must be able to compare the effects of different diseases that kill people prematurely and cause ill health and a way to assess this, is by estimating the economic cost of a disease. Estimating the cost of a low back pain

management will provide information regarding the burden of the condition and in turn provide data for the government and policy makers in redirecting attention and fund towards prevention and management of the disorder.

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 (Shekelle, 2009). 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 (Whitehurst, et al., 2011). Intangible costs are rarely included when estimating the economic burden of an illness because of the general societal uneasiness about placing a monetary value on these aspects of a disease.

In Nigeria, with increasing focus on endemic diseases such as HIV, Ebola virus, polio cases, and of recent Lassa fever, the impact of low back pain is often overlooked particularly from an economic perspective. This may explain why only 2 research studies (economic cost) have been published in this field with high prevalence rate of about 80% in adult Nigerian population. These 2 studies (Odole et al., 2011 & Birabi et al 2013) were all carried out in the western part of the country. The northern part of Nigeria with the differences in cultural, religious and socioeconomic status, there is a likelihood of difference in the cost of low back pain management. Hence pulling such data together will give an average cost of low back pain management in Nigeria.

## 2. The Cost of an Illness Study

Cost of illness analysis attempts to indicate the impact of a particular disease on society by estimating the overall amount spent on managing the illness in economic terms (Maniadakis and Gray, 2000). According to Maniadakis and Gray (2000), three methodological issues have to be resolved when conducting a cost of illness study; firstly, the analysis should be based either on the incidence or the prevalence of the disease; secondly, it should be conducted either following a 'top down' or 'bottom-up' approach; and thirdly it should include direct costs, employment-related costs or intangible costs, which in turn can be estimated in different ways. The present evaluation is prevalence based, and estimates the annual cost of the condition in the northern region of Nigeria. To achieve this, we combine epidemiological, service utilization and unit cost data coming from respondents, to estimate the direct and

indirect costs of diagnosing and treating low back pain within a secondary and tertiary health care center.

## 3. Economic Burden of Low Back Pain

Low back pain is the leading cause of activity limitation and work absenteeism throughout the world, and it causes an enormous burden on individuals, families, industries and government (Watson, Pappagerougou and Jon, 2000). In United Kingdom, low back pain was identified as the most common cause of disability in young adults, with more than 100 million work days lost per year (Pappergou et al., 1996). LBP management is costly, with total costs estimated to be between \$100 and \$200 billion annually in the US, two-thirds of which are due to decreased wages and productivity (Katz, 2006). In Nigeria, few studies are published on the economic burden of low back pain, one study at Ibadan reveals that the estimated annual economic cost was averaged at 139,156.25±77,091.16 naira with direct costs (114,661.25±74,230.53 naira) accounting for 82.4%. About 60.10% of the direct costs was attributed to physiotherapy (68,875.20±53,988.52 naira) followed by the cost of physician's visit (27009.00±13314.95 naira) (Odole et al., 2011). The cost of medications was the least (2796.33±903.70 naira). The estimated average annual indirect cost was estimated to be 24,495.00±16,837.13 naira. This study concluded that the direct cost of care accounted for majority of the money spent by patients with low back pain visiting physiotherapy. Also the other study still from southern part of Nigeria, revealed that an average of N196,200 and N781,500 in a government and private owned hospitals respectively, was used to access care between 2 and 52 weeks of post diagnosis low back pain case in Nigeria (Birabi, et al., 2013). The study concluded that managing low back pain constitutes a substantial direct cost burden and there is a consequence of disability adjusted life year and attendant reduced quality of life as a result of unaffordable cost of care amongst sufferers. Both studies due to regional and socio-economical differences with northern part of Nigeria, still poses inadequacies and shortcomings in estimating the average cost of management of LBP in Nigeria.

## 4. Methodology

The research design for the study was a descriptive cross sectional study of economic cost of LBP among patients managed in secondary and tertiary hospitals in Kano state. The population were participants diagnosed and managed for LBP in secondary and

tertiary hospitals in Kano state for at least one-year duration. Participants were included in the study if; the pain was low in the back, allow them to carry out activities for daily living even under difficulties and if they consent to participate. Participants were excluded if the pain was due to a Trauma, infection of the spine, Malignancy or bed ridden due to severity of the pain. Participants were also excluded if they had gone through any back surgery.

A purposive sampling of seventy-nine individuals diagnosed and managed for low back pain in secondary and tertiary hospitals of Kano state were recruited for the study. Ethical approval was sought and granted by the Research and Ethics committee of Aminu Kano Teaching Hospital, Kano before the commencement of the study. Consented participants were then given two questionnaires to fill; Economic burden of LBP questionnaire and Roland-Morris Disability Questionnaire (RMDQ). The Economic burden of LBP questionnaire adopted from Odole et al (2013) was shown to have high validity and reliability coefficients. The questionnaire is made up of 3 sections; A, B and C. A total of 43 items are to be answered by the participants. Section A of this questionnaire inquires about sociodemographic factors, section B measures direct cost and section C Measures Indirect cost. The Roland-Morris Disability Questionnaire was used to assess how LBP affected the participants' ability to manage in everyday life in terms of physical disability. It is composed of 24 items and has proven evidence of psychometric properties of construct validity ( $r=0.89$ ), and test-retest reliability ( $r=0.80$ ) (Deyo,1996). It is scored by simply summing up the 24 items circled on the questionnaire by the participant. It has a minimum score of 0 and a maximum score of 24. A score of 0-11 is regarded as mild disability, 12-18 as moderate disability and 19-24 as maximum disability.

Descriptive statistics of mean, standard deviation and percentages was used to summarize the data obtained. A chi square test was used to test the association between economic cost of care and the physical disability level of the patients with LBP as well as the association between gender and economic cost of LBP management. Analysis was done using the statistical package for social science (SPSS) version 15.0. Level of significance was set at  $<0.05$ .

### 5. Study Limitation

The sample size of this study is considered a limitation of this study, a larger sample size like 300 respondents or more may add to generalizability of the findings.

The study considered patients visiting secondary and tertiary health institutions of the state and no private hospital settings were involved, this is considered a limitation because cost of care of LBP by patients who visit private clinics was not sought and these cost are expected to be higher relative to the cost of LBP obtained in this study.

### 6. Results

A total of 79 individuals with low back pain receiving treatment in secondary and tertiary health institutions in Kano state participated in this cross sectional study. The result is highlighted in the following themes:

- 6.1 Sociodemographic profile of participants
- 6.2 The direct cost for LBP management
- 6.3 The indirect cost for LBP management
- 6.4 Overall direct and indirect cost of care for male and female respondents with LBP
- 6.5 Association between economic cost of LBP management and gender among respondents
- 6.6 Association between economic cost and level of disability score of respondents.

#### 6.1 Socio-demographic Characteristics

The majority (69.6%) of the participants were male while (30.4%) were females. The age group of the participants ranged from 31-70 years. The commonest age range is 51-60 years (31.6%) followed by 41-50 years (25.3%) indicating low back pain is more prevalent among middle aged individuals. Majority of the participants were farmers (44%) while traders and teachers have equal representation in the sample (13%). Farming especially peasant farming has a nature of repetitive bending while working, this is likely to make them prone to low back pain than teachers and traders. Married people have higher representation in the data (57%) while widows and divorced participants both have equal representation of (15%). Respondents with post-secondary school educational achievement are highest (38.2%) while religious scholars and primary school certificate have equal representation (11%). About 73. % of respondent reported to have had previous episode of low back pain about 1 to 4 times previously and only 2.5 % of the respondents had low back pain greater than 10 times previously, indicating that low back pain pathology has a characteristic of recurrence over time.

#### 6.2 The Direct Cost of Low Back Pain Management

Cost of medical diagnosis accounts for the largest

**Table 1:** Socio-Demographic Characteristic of Respondents

Characteristics	No	%
Gender		
Male	55	69.6
Female	24	30.4
Age groups(yrs)		
31-40	15	20.0
41-50	20	25.3
51-60	25	31.6
61-70	19	24.1
Marital Status		
Single	10	13
Married	45	57
Divorce	12	15
Widow	12	15
Occupation		
farmer	35	44
Banker	5	6
Trader	10	13
Teaching	10	13
Business	19	24

**Table 2:** Showing The Direct Cost of Low Back Pain Management

Variable	(mean cost) naira	Sd	%
Physician visit	12,440.5	7,023.9	14.1
PT visit	16,101.2	4,354.8	18.3
Medication	5,802.5	3,269.1	6.6
Topical medication	3,235.4	2,94.8	3.7
Supportive device	17,052.6	11,607.2	19.4
Investigations	33,452.0	5,0930.4	37.9
Total direct cost	80,045.6	54,287.0	100

37.94 % (33452.04±50930.4 naira) followed by cost of supportive devices 19.3% (17052.60± 11607.24 naira). Physiotherapy visit accounts for 18.3 % (16101.24 ± 4354.76 naira) while the cost of physician visit accounts for 14.1% (12440.5 ± 7023.83 naira). See table 2.

### 6.3 The Indirect Cost of Low Back Pain Management

The cost of transportation 76.7% (16,080±11,296.80 naira) accounts for the largest indirect cost in costs associated with indirect care of low back pain followed by cost associated with patients who come to the hospital accompanied 8.1% (1692.30±5015.16 naira). The loss of income associated with respondent receiving care accounts for 6.9% (1443.04 ±5281.08 naira). See table 3.

### 6.4 The Overall Economic Cost of Male and Female Respondents

The table 4 below shows the economic cost of male and female respondents in terms of overall direct and indirect cost. The overall direct cost associated with male respondents was averaged at ₦84818.18±63429.89 while the overall indirect cost associated with male respondents was averaged at ₦14181.82 ±12495.8. The overall direct cost associated with female respondents was averaged at ₦69108.33±19210.04 naira while the overall indirect cost associated with female respondents was averaged at ₦14716.67±14312.98 naira. See table 4.

### 6.5 Association Between Economic Cost and Gender Among Respondents

There was no association in the cost incurred by male participants when compared to that of female participants in the management of low back pain. ( $p=0.4$ ). See table 5.

### 6.6 Association Between Economic Burden and Level of Disability Score.

There was an association between respondent's disability score level and economic burden of low back pain management. Chi square value is 156 and p-value is 0.004 and level of significance was set at  $p<0.05$ .

## 7. Discussion

The economic cost of low back pain management annually was averaged at 94389.57±67270 naira with direct cost accounting for 84.80% (80045.57±54287.02 naira) and indirect cost accounting for 15.20 % (14344 ± 12983.47 naira).

Among the direct cost, medical investigation accounts for the largest cost in direct cost, while cost of transportation accounts for the largest cost in indirect care for low back pain.

The economic cost of low back pain management is high considering the minimum wage in Nigeria (N18,000 as at year 2016), this means that patients who suffer from low back pain might have about half of their annual salary consumed by cost of management of the condition, this could have a great implication on physical and socio-economic well-being of affected patients. Therefore, on the part of practitioners, medical investigations should be limited to patients who shows sign of serious pathology, this is in line with the European guideline for diagnosis of low back pain pathology (Koes et al., 2010). In addition, practitioners should consider referring patients to hospitals closer to patient's residence so as to reduce the cost of transportation on patients with low back pain condition. On the part of the Government and policy makers, non-communicable diseases such as low back pain should be given adequate concern in budgetary allocation or subsidies as well as awareness of disease prevention and prompt responses similar to communicable diseases because the annual cost of management of this condition is high and if left unchecked could impede the Government plan on poverty alleviation. This is in line with the WHO agreement on 2011 in which 190 countries agreed on global mechanisms to reduce the avoidable non-communicable burden and a Global action plan for prevention and control of non-communicable disease 2013- 2020 (WHO,2013). Odole et al., (2011) showed that direct cost accounts for 82.4% of economic cost of low back pain management. Although, in some countries were most of the direct cost is incurred by its government or health insurance companies, indirect cost appears to contribute more than direct cost in the management of low back pain (Williams et al., 2008). This is another indication that the government of Nigeria give little or no budgetary allocation to the management of LBP. In this study, the economic cost of low back pain management annually was averaged at 94,389.57±67,270 naira. However, in the studies of Odole, (2011) and Birabi, (2012) this cost is comparatively higher (139,156.25±77,091.16 naira and 196,000 naira) respectively. This finding is reasonable due to the fact that the cost of goods and services in southern part of Nigeria is usually higher than the northern part a place where the Nigeria Economic Report (NER, 2014) have classified as

**Table 3:** Showing The Indirect Cost of Low Back Pain Management

Variable	Cost (mean cost)naira	Sd	%
Transportation	16,080	11,292	76.7
Accompanied person(s)	1692.3	5015.1	8.1
Paid helps	1063.3	4270.7	5.0
Meals outside home	698.7	1692.7	3.3
Loss of income	1443.0	5281.1	6.9
Total cost of Indirect care	14,344	12,983.5	100

**Table 4:** The Overall Economic Cost of Male and Female Respondents

GENDER		DC	IC
MALE	MEAN	84818.18	14181.8
	N	55	55
	STD	63429.89	12495.87
FEMALE	MEAN	69108.33	14716.67
	N	24	24
	STD	19210.04	14312.98
TOTAL	MEAN	80045.57	14344.30
	N	79	79
	STD	54287.02	12983.48

Key:DC:Direct Cost, IC:Indirect Cost

**Table 5:** Association Between Gender and Economic Burden in The Management of Low Back Pain Among Respondents.

Cost variable	Male	Female	P value
Direct cost	84,818± 63430	69108±19210	0.6
Indirect cost	14,181±12496	14,717±14313	0.2
Total	99,000±75926	83825±33523	0.4

having low socio-economic status.

The amount spent by respondents for medical investigation accounts for the largest cost (37%) in direct care cost of low back pain management in this study. This finding must have resulted from practitioners (Physiotherapists and GPs) in the environment not strictly adhering to the guidelines of low back pain diagnosis in which clinicians are not recommended to request for diagnostic investigations such as MRI and routine x rays only when serious spine pathology (such as disc herniation, tumor, or spinal fracture) is suspected. It is therefore, expected that if practitioners narrowed down these investigations to patients of low back pain who showed evidence of a serious spinal pathology then the cost of investigation would be reduced. The cost of Physiotherapy services is less in this part of the country as most LBP individuals who visit the state owned hospitals like Murtala Muhammad specialist hospital have been giving 50 % subsidy by the state government to help reduce the cost of management. This finding is in contrast to the work of (Odole et al., 2011) where Physiotherapy contributed about 60% of the direct cost of care. This may be explained by high cost of services in the south relative to the north where no subsidy or incentives are received by the patients. It is also possible that clinicians over the south are adhering to the guideline for medical investigation compared to the clinicians in the north, hence cost of medical investigations was found to be less. In the study of Becker, Held and Redelli (2009), it was shown that the cost of physiotherapy and the cost of medical investigations in patient managed for LBP was similar. This shows that if direct cost for low back pain management is to be minimized, Physiotherapy and Medical investigation cost should be targeted.

The cost of transportation is the highest contributor to indirect care cost of LBP management (77%) in this study. This is because patients are often given several sessions / appointments for Physician and Physiotherapy visit. This cost is further increased if patients reside in places far away from the hospital settings and when they have to come accompanied by a relative to the hospital. It is therefore suggested that patients with low back pain should be given adequate home programs to reduce the frequent visits as well as referral to hospitals closer to their residence. This finding is in line with the study of Odole et al., (2011) in which cost of transportation accounts for 60% of indirect care cost.

This study showed that there was no association between gender and the economic cost of low back

pain management ( $p>0.05$ ). This finding could be linked to a known fact that the etiology, pathology or risk factors of LBP has no any gender preponderance among individuals with the disorder (Wolff and Pflieger, 2003). It is therefore expected that both male and female sufferers of LBP should spend equal amount in the management of LBP. This finding is in line with previous studies that demonstrated no association between gender and the economic burden of low back pain management (Becker et al., 2010; Odole et al., 2011; Birabi et al., 2012).

This present study indicated a significant association between disability level and the cost of management of LBP ( $p<0.05$ ). This implies that the higher the disability level from LBP the higher the cost of management due to their likelihood of either increased sessions of treatment or need for special investigations such as MRI. This finding is in line with previous findings of (Becker et al., 2010; Odole et al., 2011) in which there was an association between cost of low back pain and disability level of respondents.

## 9. Recommendations

### 9.1. Recommendations for Health Care Providers

1. Medical practitioners should endeavor to minimize the request of medical investigations until when serious low back pain pathology is suspected.
2. Home program and back care should be taught by Physiotherapist to all low back pain patients so as to minimize frequent hospital visits by patients and thus a reduction in the economic cost of low back pain management.

### 9.2. Recommendation for Policy Makers

1. Policy makers and the Government should consider the paradigm shift from management or treatment to prevention of non-communicable diseases.
2. Attention should be given to conditions with such a high lifetime prevalence's such as low back pain so as to prevent a high number of the society from disability in the near future as well as reduction of productivity of the populace.
3. Health insurance companies should cover physiotherapeutic services so as to further enhance care delivery and reduce the overall burden of direct care cost of low back pain management.

## Conclusion

Following analysis of findings from this study, it was

concluded that the economic burden of low back pain management is high relative to the minimum wage of most Nigerians, and frequent request of diagnostic imaging back supports that have not been recommended by many guidelines are responsible for this high cost of management.

### Conflict of interest

The authors declare no any conflict of interest and there was no any external funding received for the study.

### References

- Andersson, G., 2000. The Epidemiological features of low back pain. *The Adult Spine, Lancet* 37, 93-141.
- Becker, A., Held, H., Redelli, M., 2010. Low back pain in primary care, Loss of care and prediction of future health care utilization. *Spine* 35, 1714-1720.
- Birabi, N.B., Oke, K., Dienye, P.O., Okafor, U.A.C., 2013. Cost Burden of low back pain among adults in southern Nigeria. *International Journal of Medical and Applied Sciences* 3, 24-29.
- Dagenais, S., Caro, J., Haldeman, S., 2007. A Systematic review of low back pain cost of illness studies in the United States and internationally. *American Journal of Medical Science* 8, 8-20.
- JAMA., 1999. Centers for disease control and prevention: Prevalence of disabilities and associated health conditions among adults United States, 285,1571-1572.
- Katz, J.N. 2006. Lumbar disc disorders and low-back pain: socioeconomic factors and consequences. *American Journal of Bone & Joint Surgery*, 88(suppl 2):21-24.
- Koes, B.W., van Tulder, M., Lin, C.W.C. et al. 2010. An updated overview of clinical guidelines for the management of non-specific low back pain in primary care *European spine journal*, 19: 2075.
- Maniadakis, N., and Gray, A., 2000. The economic burden of back pain in the UK. *Pain*, 84(1):95-103.
- NER, 2014. Nigeria economic report: Document of the World Bank. Retrieved from <http://documents.worldbank.org/curated/en/> on 23<sup>rd</sup> May, 2016.
- Odole, C.A., Babatunde, A.A., Olatunji, B.O., 2011. Economic burden of low back pain on patients seen at the outpatient clinics of secondary and tertiary health institutions in Ibadan. *Journal of The Nigeria Society of Physiotherapy* 18 & 19, 43-48.
- Omokhodion, F.O., Umar, U.S., Ogunnowo, B.E., 2000. Low back pain in Nigerian university. *Journal of Occupational Medicine* 53, 287-289.
- Shekelle, P.G., 2009. Cost of health estimation. *Annals of European Economics* 12, 9-17.
- Stewart, W.F., Ricci, J.A., Chee, E., Leotta, C., Foley, K., Hochberg, M.C., 2006. Back pain exacerbations and lost productive time costs in United States workers. *Journal of Spine* 31, 3052-3060.
- Van tudler, M.W., Koes, B.W., Boutler, L.M., 1997. Conservative treatment of acute and chronic low back pain. A systematic review of randomized control trials of the most common interventions. *Journal of Spine* 22, 2128-56.
- Watson, K.D., Papageorgiou, A.C., Jones, G.T., 2002. Low back pain in school children, Occurance and characteristics. *Journal of Pain* 97, 87-92.
- Wenning, I., Schmid, T., Kohlman, S., and Skewith, R., 2008. The burden of NCDs internationally. *American Journal of Public Health* 16, 40-46.
- Whitehurst, T., Bryan, M., Lewis, J., Hill, R., and Hay, S., 2011. Cost of Non-communicable disease in Germany and Internationally. *European Journal of Public Health* 12, 20-24.
- Williams, J.H., Money, J.K., and Kristina, S.B., 2009. Implications for physical activity in the population with low back pain. *American Journal of Lifestyle and Medicine* 3, 63-70.
- WHO, 2013. Global action plan for the prevention and control of non-communicable diseases 2013-2020. Retrieved from <http://www.who.int/en/> September, 2014.
- Woolf, A.D., and Pfleger, B., 2003. Burden of major musculoskeletal conditions. *Bulletin of the World Health Organization* 81, 646-56.