



# Levels of disability as correlates of economic burden in patients with chronic low back pain: outpatient physiotherapy attendance in perspective

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## Abstract

**Background:** Chronic low back pain (CLBP) is usually accompanied by various levels of disability and cost variables. The management of CLBP is often bereft of cost evaluation regarding physiotherapy outpatient attendance.

**Objective:** This study aimed to estimate the cost borne by patients with CLBP during outpatient physiotherapy attendance

**Methods:** Fifty-six patients with CLBP were purposively sampled in the cross-sectional survey at three hospitals in the Greater Accra Region of Ghana. The levels of disability were classified with Oswestry Low Back Pain Disability Index whilst the costs borne by the patients were estimated with the economic burden of the low back pain questionnaire. Data were summarized descriptively with frequency, mean, range and standard deviations. A crude linear relationship between the costs and levels of disability was determined with Spearman's correlation coefficient at a  $p < 0.05$  level of significance.

**Results:** The age range of the participants was 26 – 60 years (mean =  $47.1 \pm 10.1$  years), and they comprised 32 females and 24 males. Twenty-five (44.6%) of the participants reported a moderate level of disability compared to 14 (25%) of them with severe disability. The monthly direct and indirect costs were GH¢ 1139.1  $\pm$  860.0 and GH¢ 317.4  $\pm$  318.8 respectively. The economic burden of care amounted to GH¢ 1405.5  $\pm$  907.7. There was a significant and direct correlation ( $r_s = 0.286$ ;  $p = 0.032$ ) between the levels of disability and the overall monthly expenditures on the economic burden of care during physiotherapy attendance.

**Conclusion:** Our findings indicate that the economic burden experienced by patients with CLBP could be influenced by their levels of disability. These findings underscore ideas for formulating initiatives toward improving the cost of illness alleviation.

**Keywords:** Chronic low back pain, economic burden, disability, physiotherapy attendance, cost of illness

## INTRODUCTION

Low, back pain is a common health problem associated with varying levels of disability among the working populace, children, and elderly individuals [1]. The natural history of low back pain is variable, and it may last a few days to weeks with intensive (acute) pain or persist for months or years with less intensive (chronic) pain [2]. The effects of the latter on the patients vary substantially with regards to their daily activities including occupation as well as community and family social

participatory roles. Most low back pains are characterized by ubiquitous aetiology which aptly defines them as non-specific chronic low back pain (CLBP) and accounts for about 90% of all types [3]. Chronic low back pain is the leading cause of years lived with disability in both developed and developing countries and ranked sixth in terms of overall disease burden based on the disability-adjusted life-years [4]. The Global Burden of Disease study revealed that CLBP is part of the top ten health challenges, with the number of disability-adjusted life years higher than that of the Human Immunodeficiency Virus, road injuries, tuberculosis, chronic lung cancer, chronic obstructive pulmonary disease and preterm birth complications [5]. The debilitating sequela of CLBP remains the most frequent

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reason for physician consultation and serves as the harbinger of absenteeism, productivity losses and activity limitation at workplaces [6]. The point prevalence of CLBP in Africa ranges from 16 – 59% which is higher than the 12 – 33% reported range in the developed countries [7]. More importantly, the global prevalence of disability has been reported to be highest in sub-Saharan Africa with most disabilities attributed to musculoskeletal disorders including CLBP [8]. Lack of priority for prevention and ineffective management of most musculoskeletal disorders including low back pain have paved the way for avoidable disability, and undue economic burden on individuals, families, and society at large.

There is an enormous economic impact of CLBP on society through direct health care expenditure orchestrated by the management of its sequelae, and indirectly through lost production and household productivities [8]. Low back pain is regarded as a major contributor to health care costs, whilst indirect cost is reported to be much higher than direct cost [4]. One pragmatic way of modifying the unbearable economic burden of CLBP is by providing evidence of what the burden portends in different environments. Recognising the economic impact of low back pain is key to the attainment of all the strategic agendas for prioritising prevention, management, and research. Evaluation of the economic burden of health care could provide useful tips for efficient resource allocation, particularly in the healthcare delivery system of low- and middle-income countries. Despite the frantic efforts on this topic, however, there is insufficient information regarding the cost appraisal of physiotherapy attendance in the Ghanaian healthcare system. The previous finding in a comparative study estimated direct costs borne by patients with CLBP [9]. The study was limited by the inclusion of only the direct cost as a component of the economic burden. Valid cost estimation should be reflective of all the essential components of the cost of illness including various healthcare services, based on specific geographical location. The present study thus estimated both the direct and indirect health costs.

Physiotherapy is well patronized in the management of patients with CLBP and is associated with a high need for patient engagement as well as high rates of self-referral and out-of-pocket payments. The generation of baseline data on the economic burden imposed on individuals and families could pre-set ideas for initiatives or policy measures aimed at cost alleviation. Various studies have reported the causal relationships between levels of disability among patients with CLBP and the healthcare costs borne. For instance, Herman et al., 2019, found that patient preferences and costs had little impact on the rated appropriateness of spinal mobilization and manipulation in patients with CLBP [10]. The authors opined that the preferences of the individual patient as well as the large cost differentials were the most appropriate factors. In another longitudinal study, pain and disability experienced by patients with CLBP were found to be related to societal and healthcare costs as well as their health-related quality of life [11]. In another study, functional disability, poor physical health, and patients at

risk of becoming high-cost users are the predictors of societal costs [12]. The authors defined predictive factors for societal costs as patients in the top 10% of cost outcomes as well as pain severity, disability to healthcare, and societal costs [12]. Population-specific estimation is justifiable due to the potential and peculiar intervening factors including the adopted treatment guidelines, practice settings, human resources, and varying socio-economic status to validate the costs [13]. The present study, therefore, intends to estimate the economic burden imposed by CLBP, taking into consideration the direct and indirect costs among patients seeking physiotherapy services at three healthcare facilities. In this study, we streamlined the definition of economic burden to the sum of the direct and indirect costs of managing CLBP [14].

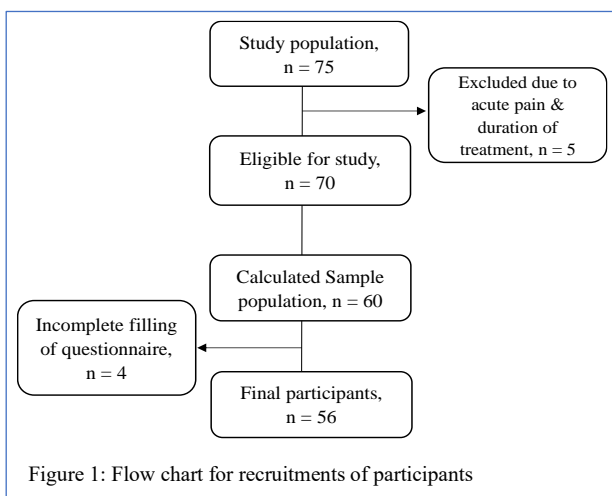
## MATERIALS AND METHODS

### Study sites

The cross-sectional survey was carried out at the physiotherapy out-patient units of three hospitals located within the Greater Accra Region of Ghana. The hospitals were selected across the district, regional, and tertiary levels of healthcare facilities in Ghana.

### Study design and sampling size

The purposive sampling technique was adopted in the recruitment of patients for the study. We resorted to non-probability sampling because of the difficulty arising from generating a sampling frame. Nonetheless, the sample was drawn from a discrete population of patients with CLBP. Participants were drawn among patients referred for physiotherapy on account of CLBP at each selected hospital. Patients were considered for inclusion if they presented with CLBP, had received physiotherapy for a minimum period of four weeks, and were within the working-age bracket of 26 - 60 years. Other patients with acute low back pain, severe pathology and structural deformities in the spine were excluded from the study. The sample population was estimated with Slovin's formula,  $n = N / (1 + N * e^2)$  where N refers to the total population and e is the error tolerance [1]. Seventy patients were eligible



for participation at the start of this study. Thus, with a pegged margin of error of 5%, a total of 60 participants were expected to take part in the study (Figure 1).

**Materials for data collection**

The level of functional disability associated with the CLBP was evaluated with Oswestry Low Back Pain Disability Index. The tool measures the ability of patients to cope with their low back pain while performing activities of daily living [12]. It comprises ten sections and each section has six items. A score of 0 is awarded if patients select the first item and 5 if the last item is selected, with the maximum attainable score of 50. The level of disability is determined by calculating the percentage of the score obtained from the total. The levels are classified as mild disability (0 – 20%), moderate disability (21 – 40%), severe disability (41 – 60%), crippled (61 – 80%), and bed-bound (81 – 100%). The cost appraisal was performed with an adapted questionnaire from the previous study by Odole et al. in 2011 [14].

The Economic Burden of Low Back Pain Questionnaire consists of three sections with 43 items for assessing the economic burden of managing low back pain. Section A seeks information on biodata while sections B and C extract information on the direct and indirect costs of CLBP, respectively. The economic burden was calculated as the total sum of direct and indirect costs. The content validity of the questionnaire used in this current study had previously been adjudged adequate by experts in cost evaluation of questionnaires through peer review [14]. The assessment of the validity was carried out using a Delphi study approach which involved two academics and two clinicians (Physiotherapists) with vast experience in research and management of CLBP, respectively. They were able to meet the set agreement level of 80% following their evaluation. Items relating to the duration of visits to the physicians and the frequency of visits as well as the costs of diagnostic testing (laboratory and imaging techniques) were suggested for deletion from the items in sections A and B of the questionnaire. The unanimous decision was based on the occurrence of the two events at the beginning of the patients’ consultations with the physicians. Thereafter, a test-retest reliability test was performed on four patients at an interval of 2 weeks on sections B and C, and those involved were excluded from the main study. A correlation coefficient of  $r = 0.79$  was obtained. Both questionnaires took approximately 30 minutes to complete, and their modes of administration were researcher- and self-administered.

**Procedure for data collection**

Approval for this study was obtained from the Ethics and Protocol Review Committee of the School of Biomedical and Allied Health Sciences, College of Health Sciences, University of Ghana (Reference Number: SBAHS/10412320/AA/R2/015-2016). Heads of Physiotherapy Departments at the selected hospitals were approached to seek and obtain their permission before the commencement of the research. The patients consented to

participate in the study through either their signatures or thumb printing on the consent form following a vivid explanation of the intent of the study. Copies of the Oswestry Low Back Pain Disability Index and Economic Burden of Low Back Pain Questionnaire were administered at the physiotherapy out-patient units of the three hospitals by research assistants who had been well briefed. Completed copies of the questionnaires were obtained from most of the participants on the same day. Other participants who could not recall the costs of some items such as supportive devices and topical gels were particularly allowed time to reflect on the costs for completion of their next appointments. All cost categories were measured with a 3-month recall period. Participants’ phone contacts were requested, and appointments were scheduled to meet the participants on their next visits.

**Statistical analysis**

Data were analysed with the Statistical Package for Social Sciences (SPSS) version 25 (SPSS Inc., Chicago, IL). The analysis involved descriptive statistics such as mean, standard deviation and frequency to summarize the data. Crude linear correlations between the levels of disability orchestrated by CLBP and the overall costs of managing CLBP were analysed with Spearman’s correlation coefficient. The level of significance was accepted at  $p < 0.05$ .

**RESULTS**

**Socio-demographic profiles of patients**

Fifty-six out of the estimated 60 patients completed both questionnaires accounting for a 93.33% ( $n = 56/60$ ) response rate. Thirty-two (57.14%,  $n = 32/56$ ) of them were

Table 1: Socio-demographic and socio-economic profiles of the participants

Variables	Frequency	Percentage
<b>Sex</b>		
Male	24	42.85
Female	32	57.14
<b>Marital status</b>		
Married	46	82.14
Single	10	17.85
<b>Occupation</b>		
Employed	24	42.85
Self-employed	32	57.14
Employed/Self-employed	3	5.35%
<b>Monthly income (GH¢)</b>		
100 – 500	3	5.35
600 –1000	5	8.92
1100 – 1500	8	14.28
1600 – 2000	2	3.57
> 2000	6	10.71
Undisclosed	32	57.14

\* GH¢: Ghana cedis

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females, and the age range of the patients was 26 – 60 years (mean age = 47.1 ± 10.1 years). Twenty-one (37.50%, n= 21/56) of the patients had a university education (Supplementary data 1), and 82.14% (n = 46/56) were

married. Of the total participants, 42.85% (n = 24/56) were employed, while 57.14% (n = 32/56) were self-employed. Three participants (5.35%) also assumed both employed and self-employed status. The mean onset of the duration of their low back pain was 2.43 ± 1.92 years. A total of 32 (57.14%) patients did not disclose their monthly income, whereas 14.28% (n = 8/56) earned between GH¢ 1,100.0 and GH¢ 1,500.0 monthly. Only 6 (10.71%) participants earn a monthly salary above GH¢ 2,000.0 (Table 1). Concerning their levels of disability, moderate disability was reported by 44.64% (n = 25/56) of patients, compared to 25.0% (n = 14/56) with severe disability (Figure 2).

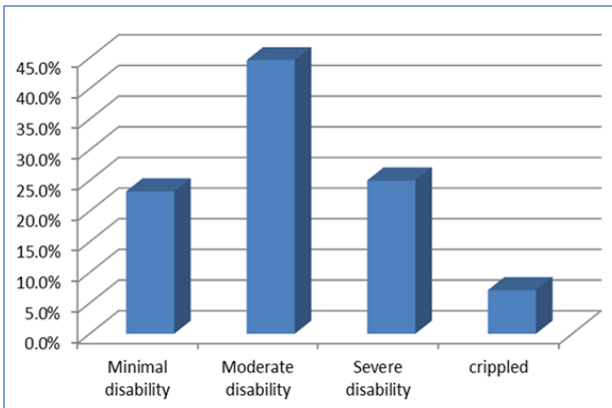


Figure 2: Bar chart depicting the four levels of disability experienced by the participants following the affliction with non-specific chronic low back pain as reported in Oswestry questionnaire

Table 2: Direct and Indirect monthly costs of care for low back pain

Items/events	Num	Percent	Amount (GH¢)
<b>Direct cost</b>			
Physician visits	35	62.50	258.73 ± 179.50
Physiotherapy visits	39	69.64	480.41 ± 196.41
Diagnostic test	50	89.28	302.20 ± 274.62
Topical cream	47	83.92	21.34 ± 11.10
Supportive devices	31	55.37	103.91 ± 254.52
Medication	38	67.85	342.14 ± 573.92
<b>Total direct cost</b>			<b>1139.10 ± 860.01</b>
<b>Indirect cost</b>			
Public transportation	42	75.00	208.45 ± 169.41
Companionship to clinic	7	12.50	283.71 ± 210.40
Meals taken at hospital	8	14.20	136.00 ± 137.13
Seeking assistance	14	25.00	220.71 ± 120.92
<b>Total indirect cost</b>			<b>317.41 ± 318.82</b>
<b>Economic burden</b>			<b>1408.48 ± 907.73</b>

\* Num, number; GH¢, Ghana cedis

Table 3: Correlation Matrix depicting the relationship of the levels of disability with the economic burden of chronic low back pain

	Levels of disability	
	r <sub>s</sub>	p value
Direct cost (n = 56)	0.192	0.157
Indirect cost (n = 47)	0.197	0.184
Economic burden (n = 47)	0.286	0.032*

\* Correlation is significant at the 0.05 level (2-tailed); r<sub>s</sub>, spearman's correlation

### Economic burden of CLBP

The mean amount expended monthly on the care of CLBP was GH¢ 1408.48 ± 907.73 which was the sum of the direct (GH¢ 1139.10 ± 860.01) and indirect (GH¢ 317.41 ± 318.82) costs. The highest monthly direct cost (GH¢ 480.41 ± 196.41) was attributed to physiotherapy, closely followed by the cost of medications (GH¢ 342.14 ± 573.92). The cost of physiotherapy was borne directly by 39 of the patients (69.64%), whilst only 12 (21.14%) benefited from the Health Insurance Scheme (Supplementary data 2). Companionship to the clinic was the highest indirect cost (GH¢ 283.71 ± 210.40) borne monthly by the patients followed by seeking assistance (GH¢ 220.71 ± 120.92) in the performance of their daily activities. The mean monthly indirect cost for managing CLBP was GH¢ 317.41 ± 318.82, of which companionship of the patients to the hospital was the highest, amounting to GH¢ 283.71 ± 210.40, followed by the cost of public transportations to the respective hospitals (GH¢ 208.45 ± 169.41). Fourteen (25.00%) of the patients reported that they expended GH¢ 220.71 ± 120.91 monthly to secure assistance in respect of their condition at home, and the cost of meals during hospital visits was GH¢ 136.00 ± 137.13 (Table 2). The mean loss of working hours per hospital visit was 3.43 ± 1.72 hours, and 30.35% (n = 17/56) of the respondents took sick leave with a mean of 32.40 ± 32.81 days per annum.

### Correlations between the costs and levels of disability

The cost evaluation was further analysed with the level of disability presented by the participants using Spearman's correlation coefficient. There was a weak direct but significant correlation between the levels of disability of the patients and the overall economic burden [r<sub>s(56)</sub> = 0.286; p = 0.032]. However, the levels of disability were directly and insignificantly correlated with the direct cost (r<sub>s(56)</sub> = 0.192; p = 0.157), and indirect cost (r<sub>s(56)</sub> = 0.197; p = 0.184) among the patients (Table 3).

## DISCUSSION

The study was conceptualized to appraise the point prevalence of the levels of disability precipitated by CLBP and the economic burden borne by patients who received outpatient physiotherapy services at three healthcare facilities in Greater Accra, Ghana. Our main findings indicate that the levels of disability reported by the patients range from mild to crippling. Also, the direct cost per

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month for the patients was much higher than the indirect cost with a ratio of 3.6:1.0, and the total expenditure (economic burden) was positively and significantly correlated with the levels of disability. Of the 56 patients recruited, the majority were females. Although findings regarding the sex distribution about the prevalence of CLBP are still equivocal, women with CLBP are more likely to take time off work their work to seek healthcare for CLBP compared to their male counterparts. Again, women have a longer life expectancy than men, hence they experience more age-associated functional disabilities compared to men [15]. The majority (66.07%,  $n = 37/56$ ) of the participants were also educated, which is presumably reflective of the monthly income of > GH¢ 1,000.00 reported in over two-thirds of the sample population. An appreciable proportion (37.50%,  $n = 21/56$ ) of the patients had university education as against 1.78% ( $n = 1/56$ ) each of those who either had no formal education or were unable to complete secondary education. The literacy status of the respondents could be ascribed to the selection of urban settings as the study site. Accra is a cosmopolitan city that plays host largely to the middle-class inhabitants. In addition, 44.64% ( $n = 25/56$ ) of the patients presented with moderate disability compared to those with severe disability (25.00%,  $n = 14/56$ ). The reported level of disability might have been influenced by the moderately high literacy status of the patients. This finding is consistent with the existing fact in the literature. Studies have suggested that less educated persons have higher odds of incidents of functional disabilities compared to highly educated counterparts [16,17]. The same assumption may hold as well in the present case. Self-employment (private jobs) constitutes a higher proportion of the participants which is similar to the findings of Odole et al., 2011, in which most of their respondents similarly engaged in trading [14]. Indeed, the economy of the low- and middle-income countries such as Ghana depends largely on small-scale enterprises as a source of livelihood. This finding may not, therefore, be far-fetched from the existing norm.

Considering the moderate monthly income of the respondents with CLBP, the economic burden borne by the patients could be described as overwhelming. Only six of the 56 patients (10.71%) earned a monthly salary greater than GH¢ 2,000.00. This has serious implications for adherence to physiotherapy attendance with the likelihood of increasing missed appointments on account of financial challenge, with concomitant persistence of CLBP. The challenge is compounded by the fact that 69.64% ( $n = 69.64$ ) of the patients bore the cost directly. Also, the direct healthcare cost in our finding was greater than the indirect cost. This is at variance with the previous studies in which indirect cost was reportedly greater than the direct cost [4,18,19]. The intuitive inference is drawn from this disparity between the previous and present findings partly emanates from modes of accessibility of physiotherapy services among the patients. Whilst self-referral and out-of-pocket modes of payment remain the adopted method for physiotherapy service in Ghana, direct physiotherapy

practice as well as comprehensive health insurance schemes are the method of choice in industrialized countries. Even though the health insurance scheme is being practised in Ghana, it is yet to fully incorporate other forms of healthcare including physiotherapy. In this study, only 21.42% ( $n = 12/56$ ) of the patients benefitted from the National Health Insurance Scheme even though the cost did not cover some items such as supportive devices, topical analgesic creams, portable electrotherapy, and mechanical devices. The extra but essential rehabilitation needs, add to the direct cost which was largely borne by the patients. Indeed, physiotherapy utilization is negatively associated with not having health insurance [20].

Furthermore, sick leaves and loss of working hours per day were used to estimate productivity losses. About 30.35% (17/56) of the patients took sick leaves on the account of their CLBP with an average of  $32.40 \pm 32.81$  days off work. The lost working hours per hospital visit averaged  $3.43 \pm 1.72$  hours. Productivity losses were not only due to hours lost from one's workstation, but hours also lost at work (presenteeism) due to the pain. This finding follows the same trend as the previous studies regarding the lost working hours and productivity [22]. The productivity cost elsewhere was largely attributed to reduced performance and not absenteeism per se. Generally, the management of CLBP is largely based on conservative (non-operative) management strategies which have implications for costs. In a retrospective study on 2,77,941 patients with the herniated lumbar disc in the United States of America, a cost analysis indicated that patients who failed non-operative treatments were billed for nearly twice as much compared to patients who were successfully treated (failed cohort: \$1718 per patient; successful cohort: \$906 per patient) [24]. Several methods have been advocated to ensure cost-effective and cost-efficient conservative management of patients with CLBP. These include early patient management at the primary care level to reduce the costs of care and waiting times for patients as well as the adoption of organized clinical pathways of care such as the use of clinical practice guidelines [25]. We are mindful of some methodological limitations in this study. The overall costs borne by the patients for managing their low back pain are bound to differ from facility to facility occasioned to many factors including distance, charging system and the treatment protocols in each facility. Most physiotherapy protocols are yet to be streamlined into clinical guidelines which allow room for variations in the management accompanied by different charging systems. Again, the information gathered from respondents could be affected by recall bias which may have affected information on the cost of medications and supportive devices. The data gathering process was also based on point contact with the participants, perhaps a longitudinal design would yield a different outcome.

### Conclusion

It was found in this study that the high overall monthly expenditure among the participants in this study could be ascribed to the levels of disability occasioned by CLBP.

The overall costs borne by the patients appear burdensome considering their relatively low socio-economic status, coupled with the out-of-pocket payment format. These findings thus suggest the need for further refinement of measures through cost alleviation to improve patients' accessibility to rehabilitation services.

## DECLARATIONS

### Ethical considerations

Approval for this study was obtained from the Ethics and Protocol Review Committee of the School of Biomedical and Allied Health Sciences, College of Health Sciences, University of Ghana (Reference Number: SBAHS/10412320/AA/R2/015-2016). The patients consented to participate in the study through either their signatures or thumb printing on the consent form.

### Consent to publish

All authors agreed to the content of the final paper.

### Funding

None

### Competing Interests

No potential conflict of interest was reported by the authors.

### Author contributions

DKA conceptualized the study, and collected, entered, and cleaned the data. AIB made the initial and final drafts of the manuscript, transformed it into an intellectual document, and interpreted the data. ACO developed the tool for cost evaluation, revised the manuscript critically for important intellectual content, and participated in the editing. PON edited and improved the readability of the manuscript. DKA, AIB, ACO, PON agreed to be unconditionally accountable for any issue(s) raised regarding the accuracy or integrity of any part of the manuscript.

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### Availability of data

Data is available upon request to the corresponding author.

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