

ASSESSMENT OF THE COST OF ILLNESS AMONG PATIENTS WITH DIABETIC FOOT ULCER (DFU) IN GENERAL HOSPITAL MINNA, NIGER STATE, NIGERIA

Aisha Umar Alfa, & Ahmad Muhammad Tsauni

*Department of Economics,
Bayero University, Kano, Nigeria*

Email: tarsabibi@yahoo.com, ahmadutsauni@gmail.com

ABSTRACT

The paper examined the cost of illness among patients with Diabetic foot ulcer in General Hospital Minna and was a cross-sectional study involving 40 participants drawn from medical wards and diabetes clinic of General Hospital Minna. Questionnaire was used to collect data that was used to estimate direct medical, direct non-medical and indirect costs of DFU. The mean age for participants was 51.3 ± 9.1 years. The mean age for Males was $49.6.3 \pm 8.4$ years while that of females was 58.9 ± 8.7 years. Exactly 30% of participants had tertiary education while 17.5% had Secondary education and 45% do not have formal education and 7.5% had Quranic education. The average monthly income of participants was 25,187.5 Nigerian Naira however, 57.5% of participants had monthly income of 0 - 20000 Nigerian Naira. The total cost of diabetic foot ulcer is 4,526,300 Naira (\$9839.8) per annum for the 40 participants. The total direct cost was estimated to be 4,162,400 Naira (\$9,048.7). The total indirect cost was 363900 Naira (\$791.1). From the findings it may be concluded that the treatment of diabetic foot ulcer in General Hospital Minna is relatively cheap, however still out of reach of average Nigerian. There is the need for the authorities of General Hospital Minna to strengthen the Nutrition department to meet the dietary requirements of diabetes patients and also the Social welfare

department should be well funded to take care of the destitute and paupers who are diabetic but cannot afford the treatment to prevent complications.

Keywords: Cost of Illness; Diabetic Foot Ulcer; Medical Cost, Niger State

INTRODUCTION

The term Diabetes mellitus describes a metabolic disorder of multiple etiology characterized by chronic hyperglycaemia with disturbance of carbohydrate, fat and protein metabolism resulting from the defects in insulin secretion, insulin action or both. The effects of diabetes mellitus include long damage, dysfunction and failure of various organs. Amongst many complications of diabetes mellitus is diabetic foot ulcer. Diabetic foot ulcer is one of the major long time complications of poorly managed diabetes. It results from damage to the peripheral nerves and blood vessels that supply the feet by the high blood glucose level in the body. In the USA, it is estimated that 15% of all diabetic patients are affected by foot

ulcer in their lives. In Great Britain, 4.4% to 9% of diabetic patients suffer from foot ulcer. In Nigeria, about 10% of patients with diabetes suffer from foot ulceration, among newly diagnosed diabetics, about a quarter present with foot ulcer. In 2005, people with diabetes related foot ulcer made up 12% of total hospital admissions.

Foot ulceration is a cause of terrible suffering for those with the condition and their loved ones, the costs are highly prohibitive in terms of economic as well as human terms, this is so because diabetic foot ulcer mostly affects men who are the bread winners of their families. In Nigeria, the economic burden of diabetic foot ulcer is colossal because many of the patients present to the

hospital late. This is motivated by ignorance, poverty and utilization of non-orthodox care which often worsen the condition thereby prolonging hospital stay. Diabetic foot ulcer imposes heavy economic burden on the patients with increase in the cost due to severity of the condition. The cost of managing diabetic foot ulcer is several folds more than the cost of managing diabetes without foot ulcer. Patients with foot ulcers require more frequent hospital visits, are commonly admitted to hospital and needing longer stays, all of which translate to increase cost of care. The aim of the study is to estimate the direct and indirect costs of illness of diabetic foot ulcer in Minna General Hospital, Niger State, Nigeria. To this end, the rest of the paper covers review of literature, data and methods, results and conclusions. However, the paper is particular about the cost incurred by patients with diabetic foot ulcers receiving treatment at General Hospital

Minna valued in local currency (Naira).

LITERATURE REVIEW

Figures released by the International Diabetes Federation suggest that worldwide in 2014, there were almost 422 million people with diabetes - a global prevalence of 8.5%. The report predicted that over the coming decade, the greatest increases in the numbers of people with the condition will occur in Africa and Asia, provoking hugely increased rates of death and disability. Diabetes foot complications constitute a major public health problem, particularly for people with diabetes in developing countries. Economic burden of Diabetes correlates logically with a classic cost-of-illness (COI) study in which cost of healthcare is usually divided into direct (healthcare cost) and indirect costs (productivity losses). A third category, intangible cost, is usually not included because of measurement difficulty. A major economic burden for

countries comes from the high prevalence of diabetes and its complications. The prevalence of Diabetes mellitus in the USA has increase by 48%. Lower extremities morbidity contributes substantially to toll diabetes takes on the individual and the health care system (Cook and Simonson, 2012). Chronic non healing lower extremity ulcers are a major source of disability, morbidity and mortality in diabetics and account for a large portion of the financial burden of the disease.

Several studies support the proposal that lower socioeconomic status carries a higher likely hood of amputation. Low education can reduce the individual's health literacy, the understanding of one's health and behaviours that promote a healthy life style. It may also inhibit early recognition of abnormality before becoming limb threatening. Income of the affected individual may impact on the means to seek care. Diabetes is a very expensive

health condition' and its' financial implication is too heavy for the high income earners let alone the poor families. Poverty is linked with poor diabetes outcome due to inability to receive adequate care and procure diabetes supplies regularly (Nwankwo, et al, 2010). Nigeria like any other country, diabetic foot ulcer is the major cause of morbidity and mortality among diabetics affecting mostly the males in their productive ages thereby reducing the family income.

Cost of Diabetic Foot Ulcers in Developed Countries

One of several reasons that resulted in the American Diabetes Association holding a consensus conference on diabetic wound care in 1999 was the vast cost of diabetic foot disease, and the real need to develop cost-effective measures to treat and prevent ulcers. More recently, Shearer et al (2003), confirmed that diabetic patients with neuropathic risk factors (reduced vibration perception) incur five times more direct

medical costs for ulcers and amputations, and live for 2 months less, than individuals without neuropathy. Similarly, a Swedish study reported that an intensified prevention strategy involving education, foot care and footwear would be cost-effective and even cost-saving if applied to patients with risk factors. Average inpatient costs for lower limb complications in 1997 were: foot ulcers \$16,580; toe or toe and other distal amputations \$25,241; major amputations \$31,436. The average outpatient cost for one diabetic foot ulcer episode has been estimated at \$28,000 over a 2-year period. A study done in USA among 27,848 Medicare patients and 4,536 privately insured patients over 12 months found that DFU cost an additional 9 - 13 billion dollars in addition to the cost associated with diabetes. The study found that DFU patients had more days hospitalized (+138.2% Medicare, +173.5 % Private) days requiring home care

(+85.4% Medicare, +230.0% Private), emergency department visits (+40.6% Medicare, +109.0% Private) and Outpatient/ Physician office visits (+35.1% Medicare, 42.5% Private) than matched controls (Bradford et al 2015). Diabetic foot problems remain common all over the world, but are particularly prone to result in amputation in developing countries. While risk factors for ulceration appear to be similar among European countries, differences do exist between European and African and Asian countries, with vascular disease being less common in developing countries. In view of the global problem of diabetic foot disease, the International Working Group on the Diabetic Foot was created several years ago, which later became an official consultative section of the International Diabetes Federation in 2001. This group published an international consensus document and practical guidelines on the management and prevention of the diabetic

foot in 1999 (<http://www.diabetic-foot-consensus.com>) and then updated in 2015 (www.iwgdf.org>file>website_summary). A further consensus document on diagnosing and treating diabetic foot infections was recently published. It is hoped that the continuing activities of groups such as these, in combination with a better understanding of the science of foot wounds and their healing, will result in fewer ulcers and amputations as well as in improved quality of life for our diabetic patients in the 21st century.

Harrington and colleagues (2000) examined excess cost attributable to patients with DFU versus those with diabetes. Among the Medicare population sampled, they found that the direct cost per patient per year were \$15,300 among patients with ulcers versus \$5,200 for patients with no ulcer. Similar findings were noted in Health Maintenance organization (HMO) population where

diabetic patients without ulcer had a cost per patient per year of \$5,080 while it remained substantially higher for patients with an ulcer at \$26,490 patients per year. In Canada, a study done in 2011 to estimate the national burden of illness for diabetic foot ulcer found DFU to associated with 16,883 admissions (327,140 days), 31,095 emergency or clinical visits, 41367 rehabilitation clinic visits and 26,493 interventions. The acute institution care represented \$320.5 million dollars and with an additional \$125.4 million for home care and \$63.1 million for long time care. The annual cost associated with DFU related care was \$4547.0 million (Robert et al, 2016). Study in Germany (2010) to assess the impact of diabetes on cost before and after major lower extremity amputations (LEA) found the total mean costs for one year before LEA to be higher than in those without diabetes (24,504 vs 18961 Euros) which was also confirmed by the multivariate

analysis (CR1.27; 95% CI 1.06-1.52). Costs up to 24 weeks after LEA were virtually the same in the groups (36686 Vs 35858 Euros) but thereafter differences increase again with higher costs for diabetics. Hospitalization accounted for 50% of total cost irrespective of diabetes status and period. In a study of 30 patients that were admitted with diabetic foot ulceration as the primary complaint. They found out that amputation was performed in 8 patients, 2 patients with non healing ulcer died. The average duration of each hospital admission was 20.3 +/- 30.7 days. Net in-hospital expenditure was 704689 an average of 23489.63 per admission. They concluded that the management of foot ulceration has a significant economic impact on the Irish healthcare budget.

Diabetes record keeping in all EU5 countries is poor for prevalence, direct diabetes costs, cost of complications, indirect costs and diabetes

outcomes. No diabetes registers exist in any of the EU5 countries. Diabetes prevalence ranges between 4.8% (Italy) to 8.9% (Germany), and has increased over time. Although none of the EU5 countries record diabetes costs directly, including complications, estimates for 2010 suggest that the total direct annual cost ranges from €5.45bn (Spain) to €43.2bn (Germany); across EU5 the total direct cost burden of people with diabetes was €90 billion; this figure includes the cost of complications or medical conditions some of which may not necessarily be caused by diabetes, but can be exacerbated by it. Incremental costs are reported in Germany only and stand at €19.7 billion in 2010. Per patient direct medical costs are more comparable across countries, with some variation (€1,708 (Spain) to €5,899 (Germany, 2010), suggesting a key driver behind total diabetes costs is prevalence. Inpatient costs are consistently higher than

outpatient costs in all countries, due to increased medical care required with diabetes-related complications. Outpatient costs on the other hand, as well as diabetes medications, can be less than half of inpatient costs due to the relatively low costs of maintaining good glycaemic control via medication and regular monitoring. Expenditure on insulin and oral anti-diabetic medicines ranges between 6.2% and 10.5% of total direct cost. A significant majority of inpatient direct costs account for treatment of diabetes related complications, affecting approximately 18.3 million diabetic patients each year across the five study countries. Indirect costs, relate to reduced productivity, absenteeism, early retirement, social benefits and carer costs; these costs are significant and, having quantified part of these costs for the first time in Europe (relating to absenteeism, early retirement and social benefits), it appears that they stand at €98.4 billion and can exceed direct costs by

at least a factor of 2- or even 3- to-1 depending on the country. Significant variations exist between countries in the availability of outcomes data and the quality of the relevant indicators. In some cases, improvements in quality of care for diabetic patients are shown over time (Italy, UK), whereas in others discrepancies exist between the quality of care in metropolitan versus rural areas (France, Spain) (Kanavos et al, 2012)

Costs of Diabetic Foot Ulcer across Developing Countries

A study done in Peru (Cárdenas et al. 2015) indicated that the direct costs for prevention and management with sub-optimal care for high-risk diabetics is around US\$74.5 million dollars in a single year, which decreases to US\$71.8 million for standard care and increases to US\$96.8 million for standard care plus temperature monitoring. The implementation of a standard care strategy would avert 791 deaths and is cost-saving in comparison to sub-optimal care.

For standard care plus temperature monitoring compared to sub-optimal care the ICER rises to US\$16,124 per death averted and averts 1,385 deaths. The cost of treating a completely healed ulcer in Tanzania is about 102 to 3959 US dollars while the cost trans - tibial amputation ranged from \$3060 to \$188,645 (Cavanagh P et al, 2010). In Pakistan the annual expenditure is \$343 for DFU suggested by Ali et al, 2010. While China and India reported mean individual cost of \$1640 and \$343 in 2011 respectively. In a study in Turkey (2016) the following were calculated in DFU treatment from the public payer's perspective: The annual average per patient outpatient costs \$579.5 (4.1%), imaging test costs \$283.2 (2.0%), laboratory test costs \$284.8(2.0%), annual average per patient cost of intervention, rehabilitation and trainings \$2291.7 (16.0%), annual average per patient cost of drugs used \$2545.8 (17.8%) and annual average per patient

cost of medical materials used in DFU treatment \$735.0 (5.1%). The average annual per patient cost for hospital admission is \$7357.4 (51.5%). The average per patient complication cost for DFU is \$210.3 (1.5%). The average annual per patient cost of DFU treatment in Turkey is \$14287.70. As a result of the sensitivity analysis, the standard deviation of the analysis was \$5706.60 (n = 5000, mean = \$14146.8, 95%CI: \$13988.6-\$14304.9). (Oksuz et al, 2017).

Cost of Diabetic Foot Ulcer in Nigeria

In a study in Enugu, Nigeria (Ijeoma et al, 2015) the major findings were direct cost of type 2 DM of 52,104.28 and indirect cost of 139,659.60. The mean monthly catastrophic type 2 diabetic costs in this study were direct cost 20.35%, indirect cost 54.55% and overall catastrophe of 37.45%. Diabetics from all socio-economic status group suffered catastrophic

expenditure at 40%, 30% and 10% non-food expenditure, but the poorest socioeconomic status group had the highest incidence. At 40% threshold catastrophic expenditure by socio economic status were 44.6%, 27.4%, 17.8% and 13.9% poorest (q1) to the least poor (q4) respectively. At a variable threshold of 10% for the poorest and 30% for the least poor the catastrophic costs were 83.8% and 36.1% respectively. Private funding (Out of Pocket spending and installment payment) were the major payment strategies used. The major payment coping mechanisms used were own money (earmarked savings and earnings), behavioural payment coping mechanisms (installment purchase of drugs) and social support (family and friends paid). In another study in Lagos, Nigeria Ogbera (2006) the total number of people with DM seen in LUTH from 1998 to 2000 was 1500, the hospital prevalence of DFU using the capture-recapture method being 9.5%. A total of 7253 medical admissions were made

in this 3-year period, and of this number 827 (11.4%) were DM related. DFU-related admissions were 97 in number, and this made up 1.3% and 11.7% of the total medical and diabetes admissions, respectively. During this period, a total of 61 lower limb amputations were carried out and 26 (42.6%) of these were DM related. The proportion of medical deaths due to DMFS deaths was greater than the proportion of medical admissions due to DFU ($P = .007$). The case fatality of individuals with DFU was approximately 53%. A total number of 20 patients with DM foot ulcers were hospitalized during a 1-year period of the study (2003-2004). The majority had type 2 DM. A large majority (65%) of these patients had some form of surgery in addition to medical management of their condition. Mean costs for successfully treating a patient with DMFS was Nigerian Naira (NGN) 180,581.60. The total costs incurred ranged from NGN 20,400.00 to NGN 278,029.00.

Drugs or medications accounted for the majority of the total costs incurred by the patients (46.9%).

In a study in Kano (Fakhraddeen, 2015) the total cost of illness of diabetic foot ulcer for 90 participants was N26, 317,500 (mean N292417, 20). Direct cost of illness was 20,158,050 (mean N 223,978.30). It made up 76.6% of the total cost. The indirect cost was N6, 159,580.00 (mean N68, 438.90). Drugs accounted for the largest share of the cost of illness.

DATA AND METHODS

Study Area

The study was conducted in General Hospital Minna, a secondary health care facility and perhaps the biggest of the 21 General Hospitals in Niger State and by far the busiest. Minna is the capital city of Niger state and located in North Central geopolitical region of Nigeria. General Hospital Minna serves as a referral center for many

hospitals and clinics across the state. The study was carried out at the medical wards (male and female) where diabetic foot ulcer patients are admitted and medical outpatient clinic of General Hospital Minna where discharged patients come for follow up.

Study Design

The study was a hospital based cross-sectional type that assessed the cost of illness of diabetic foot ulcer among patients in General Hospital Minna. The survey data were procured from eligible candidates using principally questionnaire. The questionnaire contains among others, personal biodata of each patient; medical history of the patients, cost of illness (direct medical cost, direct non-medical cost and indirect cost).

Inclusion and Exclusion Criteria

The criteria adopted when choosing the patients included in the survey are:

- (i) Patients with diabetic foot ulcer
- (ii) Those currently on admission or follow up cases
- (iii) Those that consented.

However, other patients with diabetic foot ulcer were excluded based on the following criteria:

- (a) Patients with foot ulcer from other causes other diabetes mellitus
- (b) Patients with diabetes but have no foot ulcer
- (c) Diabetic patients that have ulcer but not on foot
- (d) Those that declined consent

Sample Size Estimation

The study population constitutes patients with diabetic foot ulcer that were receiving care in General Hospital Minna as at December, 2016. The total diabetic foot

ulcer patients as at that time that are receiving treatment in General Hospital Minna are 45. While only five (11%) of the patients declined consent, 40 patients (89%) consented and thus, were considered for the survey.

Study Protocol

The study was conducted at the medicals wards and medical outpatient clinic of General Hospital Minna, Nigeria. Patients who fulfilled the inclusion criteria were informed of the study and its details, after which a written consent was obtained. The Questionnaire was used to collect patient's details and cost.

Measurement of Variables

Cost

Cost was estimated in the Nigerian currency (Naira) and the fee for consultation, laboratory investigations, and drugs were captured as direct medical cost of illness. Direct non-medical cost of illness comprised of cost of transportation to and fro

hospital and cost of feeding in the hospital while the indirect cost of illness was estimated as value of job lost for the patient on the day of hospital visit or on admission.

Direct Medical Costs

Direct medical costs are medical charges associated to consultation, laboratory investigation and Drugs.

Direct Non-Medical Costs

Direct non - medical costs are the costs of non-medical services that are result of diabetic foot ulcer but does not involve purchase of medical services. These include transportation costs to and from the hospital and costs of feeding while on admission at the hospital or on the days of visits for follow up.

Indirect Costs

Indirect costs are costs of reduced productivity as a result of ulcer, cost of job lost by the patients as a result of hospitalization and cost of job lost by the care giver.

Collected data from the respondents were subjected to statistical analysis using Excel software package and descriptive statistics were employed and visual demonstrations rigorously adopted.

Ethical Considerations

- (a) Approval was granted by the ethical committee of the hospital to conduct the study;
- (b) Written informed consent was sought and obtained from each participant;
- (c) While administering the consent form participants were adequately informed in the language they understand;
- (d) The study outcome was in no way used to the detriment of the participants;
- (e) Taking part in the study was voluntary and participants were given the liberty to refuse to participate without any negative consequence; and
- (f) All data collected from the participants are kept

confidential with the investigators.

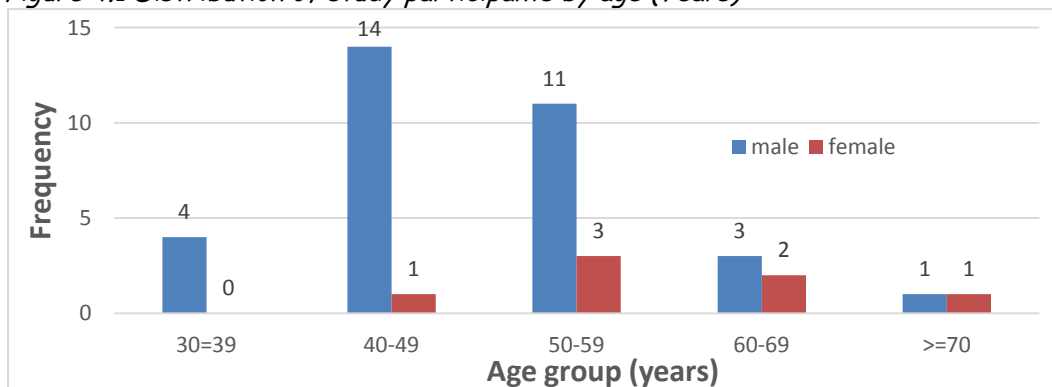
RESULTS AND DISCUSSION
Personal Biodata of Study Respondents

Age

The mean age for participants was 51.3 years. The disaggregated data shows that

the mean age for male was 49.6 years while that of female was 58.9 years. It could be deduced that DFU is common among people within the age bracket of 49 to 60 years even though, male got infected earlier than female.

Figure 4.1 Distribution of study participants by age (Years)



Source: Researchers computation data from field study (2016)

Many (42.4%) of male study respondents were within an economically active age group of 40- 49 years while the majority of female participants were within 50 - 59 years. This agrees with the different prevalence of DFU across gender. Most of the male study participants (25, 75.8%) are within the age group of 40 -59

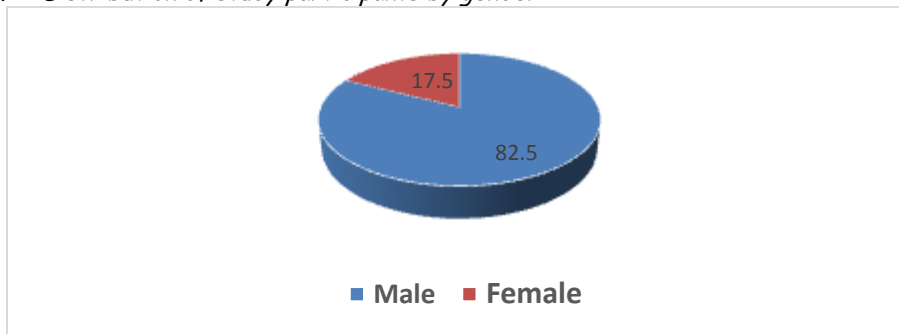
(Mean age = 48.5) while the females (5, 71.4%) were in the age group of 50 -69. This is the age group that most of these men are economically active to carter for their needs and that of their families. Diabetic foot ulcer can also affect their economic productivity which increases the indirect cost of their illness. In a study in Kano

(Fakhraddeen, 2015) the age group of most participants was 50 - 59 (mean age = 54.5 years) the difference may be due to the environment of the study and genetic disposition.

Gender

Majority (33, 82.5%) of the study participants were males who are mostly breadwinners in their respective families.

Figure 4.2: Distribution of study participants by gender

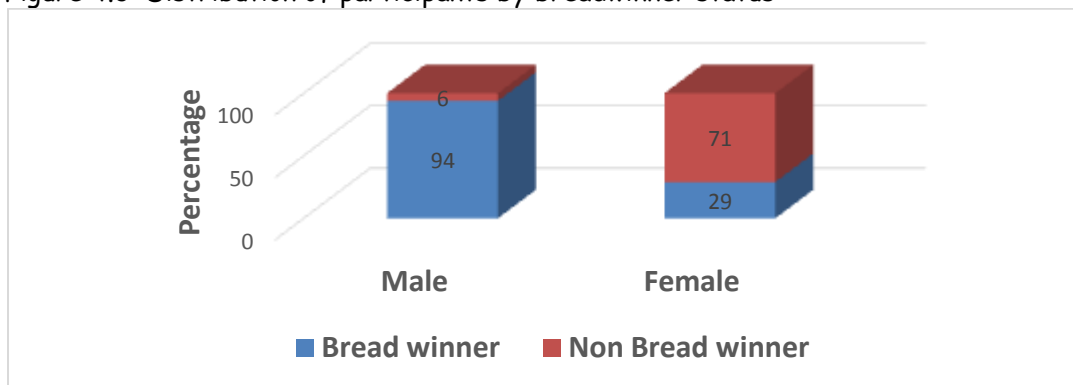


Source: Researchers' computation data from the field study (2016)

Precisely 82.5% of the respondents are men as against 17.5% women. This is consistent with the scientific

fact that more men are likely to suffer diabetic foot ulcer (Monica, 2011).

Figure 4.3: Distribution of participants by breadwinner status



Source: Researchers' Computation data from field study (2016)

This chart (fig 4.3) shows that there are more breadwinners among men than among women in Minna, Niger State and the

finding is consistent with previous researches.

Educational Status and Occupation of Respondents

More than half of the respondents 22 (55%) have had either Qur'anic, primary, secondary or tertiary education as shown in table 4.1. But, the result shows that over 40% of respondents are not educated. Lack of education raises the relative cost of DFU as the concerned patients may not be aware of preventive measures. The high percentage of uneducated constitutes a sharp contrast to the Kano study which reported a low percentage largely due to the presence of many institutions of learning in the State, unlike in Minna, Niger State. About one third of the participants are civil servants followed closely by farmers. The various occupations of the study participants and their proportions are equally shown

Figure 4.4: Distribution of monthly income (Naira)

in table 4.1. Incidentally, 94% of males and 29% of females are family bread winners in the study, this may be because 65% of the study participants were either civil servants or farmers; these two occupations are taken up easily by men in the study environment.

Monthly Income of Respondents

The average monthly income was N25,187.5. Over fifty-seven percent (57.5%) of the study participants earn N20,000 (\$43.5) per month which is consistent with the poverty level of the population where over 70% of the population live below the poverty line (<\$1 per day). Studies from Peru and Turkey show that 23% and 29% of study subjects respectively earn about \$200 monthly.

Assessment of the Cost of Illness among Patients with Diabetic Foot Ulcer (DFU) in General Hospital Minna, Niger State, Nigeria



Source: Researchers' Computation data from field study (2016)

Roughly 57.5% of the participants earned N20, 000 and below denoting that the disease is poverty driven. Glaringly, the prevalence of the disease is within the category of people with low income. Multidimensionality of poverty

framework shows that people could be poor based on education, health or standard of living. In this case, the disease is more with people that could not cater for their health needs.

Personal Biodata of the Respondents

Table 4.1 Personal Biodata of the Respondents

Characteristics	Frequency	Percentage
Age grouping (years)		
30 - 39	4	10
40 - 49	15	37.5
50 - 59	14	35
60 - 69	5	12.5
≥70	2	5
Gender		
Male	33	82.5
Female	7	17.5
Marital status		
Single	0	0
Married	33	82.5
Divorced	1	2.5
Widow	6	15
Educational Status		
Tertiary	12	30
Secondary	7	17.5
Primary	0	0
Quranic	3	7.5
Uneducated	18	45
Occupation		
Civil servant	15	37.5

Farmer	11	27.5
Trader	5	12.5
Business man	1	2.5
House wife	2	5
Mallam	2	5
Retired	3	7.5
No occupation	1	2.5
Monthly Income		
0 - 20000	23	57.5
20001 - 40000	7	17.5
40001 - 60000	6	15
60001 - 80000	3	7.5
>80000	1	2.5

Source: Researchers' Computation data from field study (2016)

Table 4.1 provides the results that were further analysed to specifically address key questions emanating the paper. Frequencies and percentages were presented on age, gender, marital status, education, occupation, and monthly income. Majority of the participants (82.5%) were men where men to female ratio stood at 4:1. This is consistent with the prevalence of diabetic foot ulcer which is more common in males than females as males are more exposed to risk

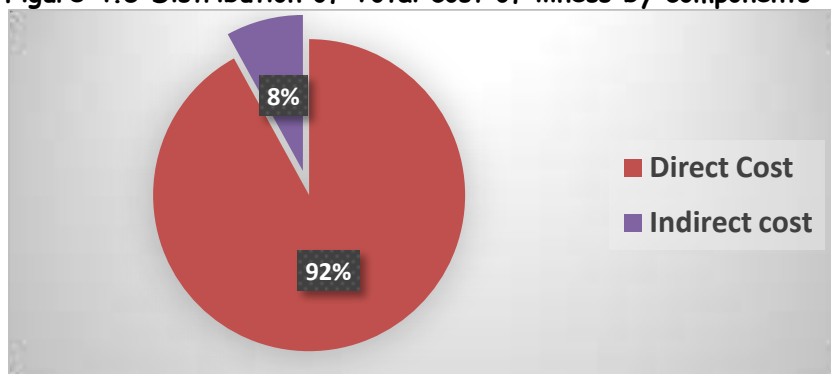
factors such as trauma from their occupation.

Analysis of Cost of Diabetic Foot Ulcer

Total Cost

Total cost of treating diabetic foot ulcer for all the forty (40) participants was 4,526,300.00 naira per annum with the mean of 113,157.50 naira. Direct cost of illness made up 92% of the total cost while the indirect cost was 8%.

Figure 4.5 Distribution of Total cost of illness by components



Source: Researcher's Computation data from field study (2016)

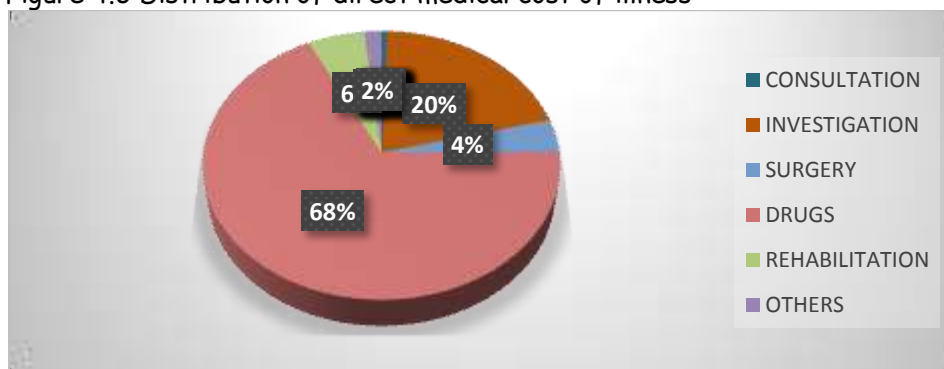
Figure 4.5 shows that the proportion of direct cost is more than indirect cost. This is because direct costs are usually the major costs in the computation of cost of illness (Fahkraddeen, 2015).

Direct cost of illness

The findings of the study show that total direct cost of the illness among the respondents was N4,162,400.00 (92%) with

the mean of N104,060.00. in the same vein, the total direct medical cost and total direct non-medical costs were N3,524,000 (77.9%) with a mean of N88,100 and N638,400.00(14.1%) with a mean of N15,960 respectively. Evidently, the burden of disease on the patients is much that their life expectancy and, indeed, welfare has seriously been affected over the time.

Figure 4.6 Distribution of direct medical cost of illness

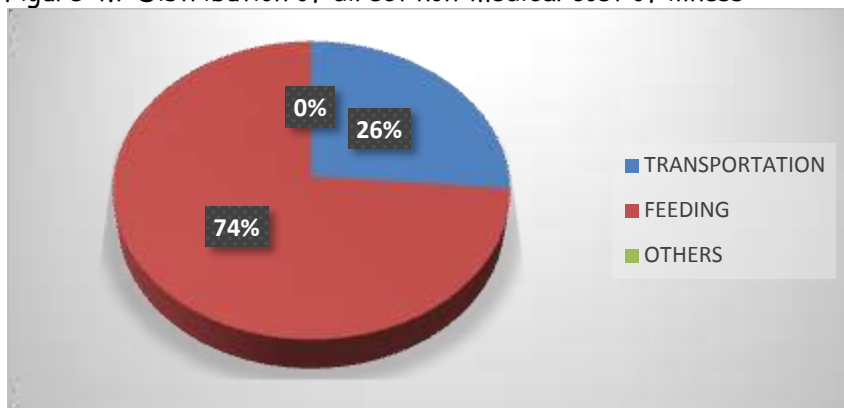


Source: Researchers' Computation data from field study (2016)

The drug component of direct medical cost is higher (68%), about two-third of the total direct cost followed by cost of investigation (20%). This may be because drugs are expensive and are needed both in the treatment of diabetes and

treatment of the diabetic foot ulcer. The remaining 12% of the direct medical costs was incurred on consultation, surgery, rehabilitation and other miscellaneous expenses.

Figure 4.7 Distribution of direct non-medical cost of illness

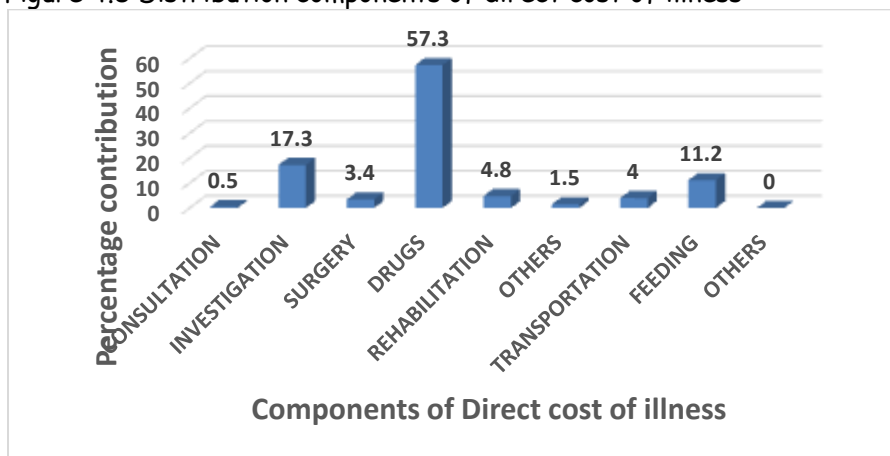


Source: Researchers' Computation data from field study (2016)

Direct non-medical cost of diabetic foot ulcer among the respondents constitute of feeding, transportation and others. Feeding account for (74%) of the direct non-medical cost, this may be due to special diet for diabetes

especially during hospitalization. Transportation expenses to and from the hospital and other logistics constitute the remaining 26% of the total direct non-medical cost of the illness.

Figure 4.8 Distribution components of direct cost of illness



Source: Researchers' Computation data from field study (2016)

Drugs accounted for 57.3% of total direct cost followed closely by investigations (17.3%) and feeding (11.2%). Drugs are needed for the treatment of both diabetes

and diabetic foot Ulcer. Rehabilitation (4.8%), transportation (4%), surgery (3.4%), consultation (0.5%) and other logistics (1.5%). The total cost for treating diabetic foot ulcer for 40 participants per

annum was N4, 526, 300 (\$9839.8) and the mean was N113, 157.5 (\$246) per annum. The Mean amount is in sharp contrast to those of developed countries like Canada (\$1,521) and Germany (\$1,640). The mean amount from this study is lower than what was found in a similar study in Lagos (2006) where the mean cost of diabetic foot ulcer was estimated at N180, 581.6 while that of study in Kano (2015) was N292,417.2 respectively. The cheaper cost in the study may be due to a number of reasons; Lagos and Kano may be using branded drugs which are more expensive while Minna may be using generic drugs that are usually less costly, while hospitalization (Admission fee) is free in Minna, in Lagos and Kano it is not. Income lost in Lagos and Kano may be high and comparable while it's lower in Minna as the civil servants do not loss income as a result of illness. Generally, health care costs and in particular, diabetic foot ulcer depends on the center where care is

sought, the type of equipment and expertise used in managing cases.

The total direct cost was estimated to be N4,162,400 (\$9,048.7) with the average of N104,060 (\$226.22). The Direct Medical cost was N3,524,000 (\$7660.87) with the average of N88,100 (\$191.52). The Direct Non-Medical Cost was N638,400 (\$1,387.83) with mean of N15,960 (\$34.7). Direct medical cost made up of 84.7% of the direct cost of Diabetic Foot Ulcer (DFU) and 77.9% of total cost of DFU. This cost is made up of consultation fee, laboratory investigations, surgery, drugs and other medical expenses. The cost of drugs accounted for the largest share of the direct medical cost of DFU (68%) and total cost of DFU (52.9%). Cost of laboratory investigation is the second most expensive direct medical cos of illness (20%), then cost of rehabilitation (6%) and then cost of surgery (4%). These findings are similar to what was

obtained in Lagos and Kano where the cost of drugs accounted for the majority of total cost incurred by the patients (46.9% and 42.3%) respectively. However, in similar studies in Turkey (2016) and Germany (2010) the highest cost was hospital admission (51.5%) and (50%) of the cost of DFU respectively contrary to the finding of this study. The reason for high cost of drug is that patients in this study center tend to avoid amputation because of the stigma/psychological feelings and so they remained on drug treatment for a long time even when it is evident that the best solution is surgical intervention.

Indirect Cost of the Illness

Total indirect cost of illness was estimated at N363, 900 with a mean of N9, 097.5. Cost

due to loss of job by the patient accounted for N287, 480(79%) while cost due to loss of job by the caregiver accounted for N76, 420 (21%). The total indirect cost was 363900 Naira (\$791.1) with a mean of 9097.5 Naira (\$19.8). The indirect cost of illness accounted for 8% of the total cost of DFU. The components of indirect cost are cost due to lost productivity by the patient (N287480, 79%) and lost productivity by care giver (N76,420, 21%). These findings are similar to the findings in Kano study where the lost productivity by patient accounted for 85.6% of the total indirect cost and 14.4% for lost productivity by the care giver.

Table 4.2 Breakdown of Costs of Diabetic Foot Ulcer in General Hospital Minna

C O S T O F I L L N E S S	A M O U N T (N A I R A)
A. Direct cost	
(i) Direct Medical	
Consultation	20,000.00
Investigation	720,000.00
Admission	0.00
Surgery	140,000.00
Drugs	2,384,000.00
Rehabilitation	200,000.00
Others	60,000.00
(ii) Direct non-medical	
Transportation	168,000.00
Feeding	470,400.00
Others	0.00
B. Indirect cost	
Patients Lost Job	287,480.00
Care Giver lost Job	76,420.00
Total	4,526,300.00

Source: Researchers' Computation data from field study (2016)

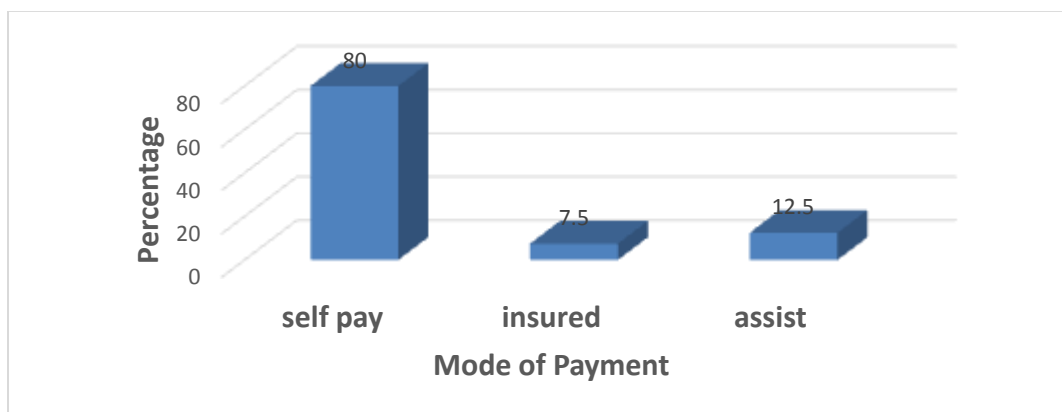
Specifically, table 4.2 contains the components of total costs (direct medical, direct non-medical and indirect costs) as computed from the survey data. On the overall analysis, in the direct medical cost component, N20,000 was incurred for consultation by the 40 respondents, N720,000 and N140,000 were incurred for investigation and surgery respectively. Others are drugs (N2,384,000, rehabilitation (N200,000) and others (N60,000). The overall expense incurred under direct non-medical costs include transportation (N168,000) and

feeding (N470,400). However, indirect medical costs involved patients lost job (N287,480) and care givers lost job (N76,420). The total costs incurred by the respondents was to the tune of N4,526,300.

Mode of Payment

The common mode of payment amongst participants was self-payment which accounted for 80%, followed by assistance from family members 12.5%. Insurance coverage was very low (7.5%). This is because only the federal civil servants are insured in Niger state.

Figure 4.9 Distribution of mode of payments by participants



Source: Researchers' Computation data from field study (2016)

The study revealed that 80% of participants paid out of pocket which is an indication that National Health Insurance Scheme (NHIS) enrolment is very low in the environment of the study (7.5%) and that 12.5% of the participants had to be assisted possibly due to poverty. This finding buttressed the fact that the disease is poverty related.

CONCLUSION

In keeping with objectives of the paper, costs of illness among DFU patients were assessed and results show that DFU is common among people within the age bracket of 49 to 60 years which is part of their economic active years. Majority

of people with DFU are male who are mostly breadwinners in their respective families. Findings reveal that lack of education contributed immensely in increasing the relative cost of DFU and over 60% of people with DFU earned an average income of N25,000 monthly indicating that they are poor, which often makes it overly difficult for them to finance their health needs. Direct cost of illness (drugs, investigation, surgery, consultation, admission, rehabilitation, transport, feeding, others) made up 92% of the total cost amounting to N4,162,400.00 while the indirect cost (patient lost job, care giver lost job) was 8%

amounting to N363, 900. The expenses are incurred through out of pocket financing (self-payment) which was found to be the common mode of payment amongst patients (80%) with DFU in Niger State, Nigeria. besides the direct cost of DFU, productivity lost by the patient accounted for 85.6% of the total indirect cost and 14.4% by their care givers. However, it could be concluded that treatment of DFU to patients in the General Hospital Minna is relatively cheaper compared to cases in Kano and other places. However, the paper does not investigate the extent of success or otherwise of the treated cases.

To this end, the paper recommends the need for the authorities of General Hospital Minna to strengthen the Nutrition department to meet the dietary requirements of diabetes patients. Patient education and counseling on diabetic foot care on regular clinic days to stress the

importance of primary prevention were also recommended. The social welfare department should be funded to take care of the destitute and paupers who are diabetic but cannot afford the treatment to prevent complications. The federal government should strengthen and improve the National Health Insurance Scheme to capture more individuals especially those in the informal sector so as to reduce excessive out-of-pocket spending. There is equally the need for training and retraining of healthcare providers on the current international best practices in the management of diabetes.

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