Health Economic Aspects of Diabetes Foot Complications: Results from Patients survey

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Summary

Diabetes foot is common complication of late diabetes. It causes not only severe morbidity and infirmity but also results significant health economic consequences. Evidence proves that majority of diabetic foot cases are complicated and mainly diagnosed in surgical departments of the hospitals in Georgia, which represents less cost-effective approach. The proposed research assessed health economic consequences of diabetes foot patients in the capital city - Tbilisi and 5 regions of Georgia. For this purpose, quantitative survey of diabetes foot patients was conducted using face-to-face personal interview method. The patients were interviewed by preliminary trained nurse-podiatrists after visiting diabetes foot rooms (exit interviews). In total, 126 patients with diabetes foot complications were interviewed. The survey indicated that the households of patients with diabetes foot problems have considerably low income compared to their medical expenditure. Diabetes foot patients usually experience out-of-pocket payments during outpatient visits as Universal Healthcare Program (UHP) mainly covers emergency and inpatient services (e.g. amputations). Additionally, UHP does not cover patients' expenses on pharmaceuticals. As a result 64% of surveyed patients with diabetic foot problems cannot afford to buy necessary medicines. The survey indicated high rates of risky behavior and low awareness of patients on issues related to disease prevention and healthy life-style. Due to financial problems and absence of proper services, only 18% of diabetes patients with foot complications wear special shoes. The survey results clearly indicated that appropriate changes in the Governmental policy and programs are required. The major issue is to switch focus of state healthcare programs from expensive and high resource consuming in-patient care to much more cheap and effective preventive outpatient services.

Abbreviations: *UHP-Universal Healthcare Program*

Key words: diabetes; diabetes foot; health economics; patient survey, prevention.

Introduction:

Diabetic foot is one of the most widespread complications of late diabetes. According to international estimation, about quarter of people with diabetes develop diabetic foot ulcer at some point of their life (Boulton A, 2005). Diabetes foot ulcers often cause lower extremity amputations. According to International Working Group on Diabetes Foot, 70% of all low limb amputations are related to diabetes (IDF, 2017). Particular alarming is situation in low and middle income countries. If there is positive trends of reduction in rates of amputations among adults with diabetes during the past 10–15 years in some industrialized nations (e.g. the United Kingdom, Sweden, Denmark, Spain, the United States of America and Australia), no such encouraging data is available from low or middle-income countries (WHO, 2016).

In addition to causing suffering and morbidity, foot lesions in diabetic patients have substantial economic consequences as diabetes is a chronic disease that requires a life-long commitment of resources to prevent and treat complications. For example, 33% percent of the $116 billion in direct costs of treatment of diabetes and its complications in the U.S. in 2007 were associated with the treatment of foot ulcers (Carls G. et al, 2011). In England, there are estimated to be 6,000 diabetes related amputations per year, with the estimated cost of diabetes related foot disease in particular ulceration and amputation calculated to be between £639 and £662 million per annum (Gooday C. et al, 2013). The disease affects an increasingly large number of people around the world, putting them at risk for disability and diminished quality of life.

There is no official data on diabetic foot prevalence/ incidence and end-points available in Georgia, however, it is suspected, that these numbers could be even higher compared to international average. Most of the diabetic foot cases are diagnosed later stages when the patients are admitted to surgical departments. This demonstrates that existing educational and preventive activates among people with diabetes are very poor in Georgia.

In general, health economic research is rarely conducted or published in Georgia. Consequently, no study exists which describes economic consequences of diabetes foot complications in Georgian patients. Without this type of research individuals, health providers, insurance companies, public entities and at the end whole society waste valuable resources as health economics concerns issues of effective allocation of scarce resources in order to achieve improved health outcome. A modeling estimation shows that in USA a 50% improvement in diabetes management and control could reduce annual medical costs for patients with diabetes by $196 billion over a twenty-year period (Fitch, 2010).

In England, Department of Health Audit Office estimated that reducing late referrals by 50% could save £34 million a year through reducing amputation rates. In order to achieve these savings, patients should have ready access to the services of podiatrists who have the necessary knowledge and skills to deal with these complex patients (C. Gooday et al. 2013).

Methodology:

The aim of the study was to assess health economic consequences of diabetes foot patients in the capital city - Tbilisi and 5 regions of Georgia (Adjara, Imereti, Samegrelo, Kvemo and Shida Kartli). These patients visit 11 diabetes foot rooms that have been opened under the framework of a project "Diabetes Foot Care Improvement" The project is supported by World Diabetes Foundation (WDF) and implemented by Welfare Foundation (WF).

The following questions were studied during the survey:

- ◊ Patients financial and geographic accessibility to diabetes foot care services;
- ◊ Patients families income and expenditure
- ◊ Patients expenditure on health care services
- ◊ Patients access and expenditure on pharmaceuticals
- ◊ Patients access and expenditure on special shoes and supportive materials
- ◊ Patients awareness and behaviour related to disease prevention and health life-style

To find the answers on these questions quantitative survey was conducted using face-to-face personal interview methodology. The patients were interviewed by specially trained nurse-podiatrists after visiting diabetes foot rooms (exit interviews). Semi-structured questionnaires were employed for the interviews.

Ethical issues:

All patients were informed about potential risks and benefits of participation in the survey before the interviews. All of them received informed consent forms which described objectives of the study, confidentiality and privacy issues, respondents' right to leave the interviews any time they wish. Only after receiving informed consent the patients were interviewed.

Results:

In total, 126 patients with diabetes foot complications were interviewed. 3 patients refused to be interviewed and 1 of them only partially answered the questions. The table 1 shows distribution of interviewed patients according to the regions.

Respondents age ranged from 39 to 79, (mean - 61, median – 60, mode – 66). Among them 54% were male and 46% female. Slight Majority of respondents (56%) had secondary or professional education, remaining 44% owned university degrees (diploma). Only 9% of interviewed patients were single (5%) or widow (4%), remaining 91% were married. On the question whether they experienced ulcer/wound in their foot – 26% of respondents answered positively and 9% of them undergone amputation (minor, on toe).

Table 1. Distribution of respondents

Region	Number of interviewed patients	%
Adjara	21	17
Imereti	32	25
Samegrelo	10	8
Kvemo Kartli	18	14
Shida Kartli	19	15
Tbilisi	26	21
Total	126	100

The survey indicated that about half of respondents (47%) have lived with diabetes more than 5 years. The others were diagnosed during 2012-2016 years:

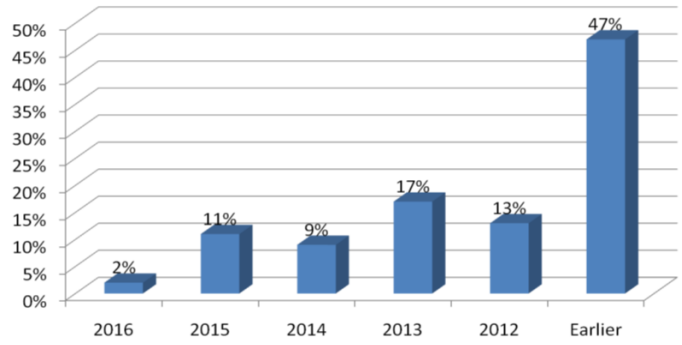

Figure 1. When diabetes was diagnosed among respondents (%)

Similarly, 45% of respondents have diabetes foot problems more than 5 years. At the same time, it is interesting to note that considerably number of new diabetes foot cases was diagnosed in 2016 (28%). This fact may be explained by establishment of diabetes foot rooms in the WDF project targeted regions:

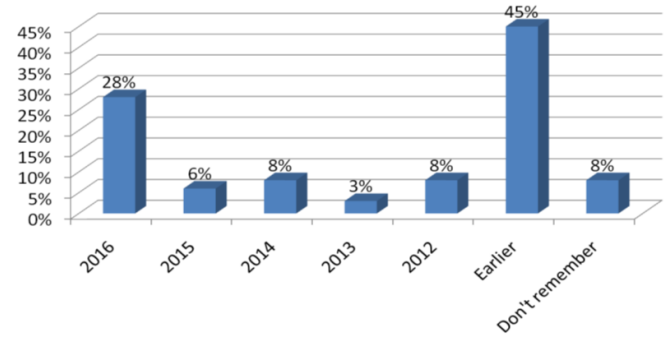

Figure 2. When diabetes foot was diagnosed among respondents (%)

The survey indicated that the households of patients with diabetes foot problems have considerably low income. For example, the household income for majority of respondents (66%) does not exceed 500 Georgian Lari (GEL) and only 14% of respondents have income more than 1000 GEL:

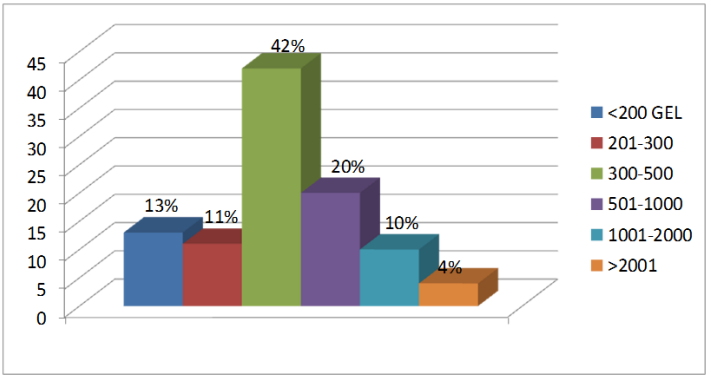

Figure 3. Monthly household income in GEL (%)

The patients with diabetes foot complications have high healthcare expenditures compared to their household income. According to the survey, more than half (56%) of the respondents reported monthly healthcare expenditure in the range of 100-300 GEL:

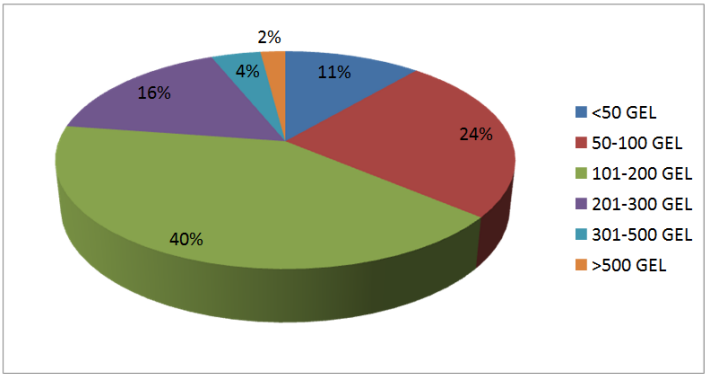

Figure 4. Monthly healthcare expenditure in GEL (%)

Diabetes foot patients usually experience out-of-pocket payments during outpatient visits. In 2013, The Government of Georgia launched ambitious Universal Healthcare Program in order to improve financial accessibility of people without private insurance to healthcare services. However this program mainly covers emergency and inpatients services. Thus, ¾ of respondents reported out-of-pocket payments during the last outpatient visits:

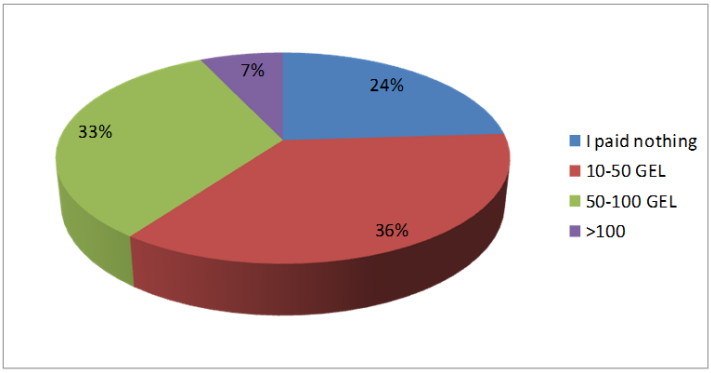

Figure 5. patients expenditure during the last outpatient visits in GEL (%)

More than half of respondents (52%) reported that they avoid visit to their doctor during illness, which is mainly explained by health care cost. They simply cannot afford payment of service fee in private medical facilities (27%). Problems related to geographical accessibility and time are less important in this case:

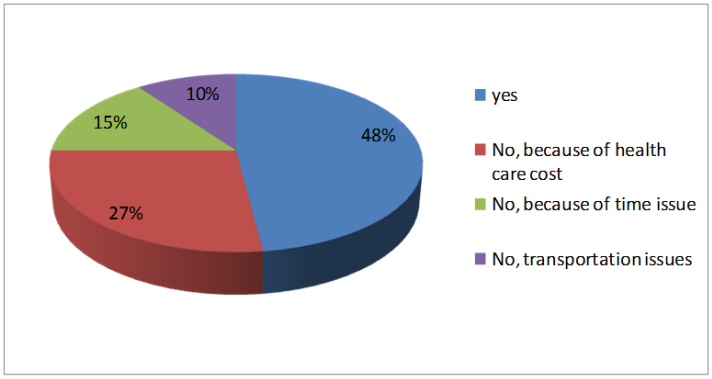

Figure 6. patients visits to doctor during illness (%)

Almost all respondents are beneficiaries of State Universal Healthcare Program (UHP) and seldom have private insurance, which limits their access to outpatient healthcare services and pharmaceuticals. Currently, UHP does not cover expenses on pharmaceuticals. As a result 64% of surveyed patients with diabetic foot problems cannot afford to buy necessary medicines.

As it was mentioned above 9% of respondents reported amputation on their toe. All these cases were funded by the state program. This fact once more proves that the Government mainly covers inpatient medical expenses.

Majority of respondents reported financial issues as a main barrier in terms of accessibility to healthcare services. Long distance to medical facility, low skills of medical personnel or other reasons were mentioned in a few cases:

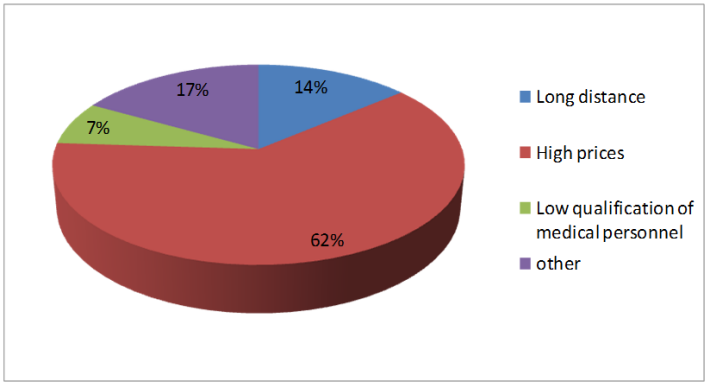

Figure 7. Main barriers to access to healthcare services (%)

The survey indicated high rates of risky behavior and low awareness of patients on issues related to disease prevention and healthy life-style. In spite of high adverse effect, 27% of patients are smokers and more than half (58%) do not have regular, any type of physical activity. 18% of respondents attended educational session on diabetes foot care/prevention. It is interesting to note that 89% of them did it during last 6 months. This fact may be explained by the "Diabetes Foot Care Improvement" project. In the framework of this project, most active community members (mainly nurses) were selected and trained as peer-educators who later carried out educational sessions for patients and their family members. Additionally, 36% of respondents read printed information materials on diabetes foot care and prevention (mainly distributed through the project activities). The survey indicated high rate of interest among diabetes foot patients to learn more about diabetes foot care and prevention - 95% of interviewed patient expressed interest in these issues.

The survey indicated lack of supportive services and materials that help patients avoid diabetes foot complications. Financial accessibility issue is leading factor in this case as well. For example, only 18% of diabetes patients with foot complications wear special shoes:

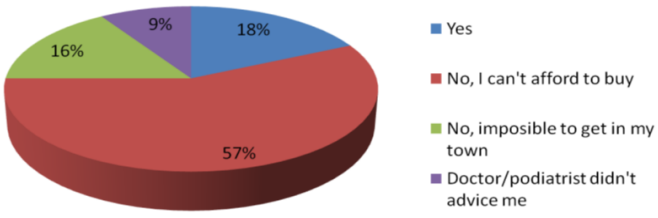

Figure 8. Do patients wear special shoes (%)?

Discussion and Conclusions:

Diabetic foot infections are one of the most costly foot complications because of their long healing time and often poor outcome. The survey indicated high healthcare expenditures of diabetes foot patients compared to their income. Particularly, it relates to fees for outpatient services which are mainly covered by the patients themselves. As a result, the patients often delay/postpone visit to their doctors which cause further foot complications. Almost all interviewed patients are covered by state Universal Healthcare Program (UHP), which mainly covers the cost of in-patient services (e.g. amputation). Such design of the main state healthcare program is less cost-effective as causes high rates of expensive surgical procedures and in-patient treatment. According to international experiences management strategies that speed up healing and reduce the number of amputations are much more cost effective. At the same time, the authors concluded that rate of amputations may be related to patients' reimbursement options. For example, higher rate of lower-extremity amputation is more evident when the cost of an amputation procedure is reimbursed but the costs of outpatient care are not (Van Houtum & Lavery, 1996).

Over the past several years there have been various attempts to adopt complex, system-wide health reforms aimed at improving health and social wellbeing of Georgian citizens. Means-based targeted approach of the former government has been radically changed by "Georgian Dream" government that decided to universally cover Georgian population with social and health insurance schemes. Public health budget increased almost three times during the last 4 years. Though, these resources are not directed for disease prevention and Georgia's health sector still demonstrates (as it always have been) system imbalances between curative and preventive services. Regular outpatient examinations cost around 300 United State Dollar (USD) at the National Centre for Diabetes Research (leading health care center for diabetes treatment). The similar situation is in other health care facilities (currently absolute majority of Georgian hospitals/clinics are private, for profit oriented) specializing in diabetes treatment and care. Self-blood glucose monitoring equipment costs 50 USD and 50 test strips cost 30 USD. These amounts are too expensive for the majority of patients, if high rates of out-of-pocket payments are taken into consideration. Poor access to medications, lack of regular routine examinations and preventive measures conditions often cause complications such as diabetic foot problems.

In the existed situation assistance from the international donors has great importance. Under the framework of "Diabetes Foot Care Improvement" project nurse-podiatrists were trained and 11 diabetes foot rooms established in 6 regions of Georgia. These developments noticeably contributed to early detection of diabetes foot problems. However, it is obvious that only detection without appropriate and timely treatment has little effect. Additionally, the role of nurse-podiatrist is not well understood by the majority of managers of medical facilities. Another research conducted by Welfare Foundation revealed that the podiatrists mainly deal with "minor foot issues" as according to written internal regulations (or informal verbal directives) the complicated cases are referred to surgical department for further examinations and operations.
Limited access to pharmaceuticals is another issue that prevents timely prevention of diabetes foot complications. As research indicated majority of diabetes foot patients are UHC program beneficiaries which does not cover outpatient drug expenses. As a result 64% of patients can't afford to buy prescribed medicines. In general, diabetes foot patients have significantly high medical expenditure in relation to their income which is also considerably related to access and cost of pharmaceuticals.

Based on more emergency and inpatient focus of healthcare programs in Georgia there is no surprise that patients exhibit risky behavior and have low awareness on diabetes foot prevention or care and healthy life style. However, high interest of the patients to learn more about these issues is optimistic signal that should be adequately considered with relevant actions by the policymakers. Additionally, the State role in supplying diabetes foot patients with supportive materials (e.g. shoes) is significant. As majority of the patients cannot afford to purchase such shoes, private companies have little interest to develop suitable services especially, in the regions.

Coming from these findings, more work is necessary from the professional associations, individual experts and civil society organizations to achieve appropriate changes in the Governmental policies and programs. The major issue is to switch focus of state healthcare programs from expensive and high resource consuming in-patient care to much more cheap and effective preventive outpatient services.

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