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# ECONOMIC BURDEN OF DIABETES AMONG RURAL WOMEN IN KULASEKARAM VILLAGE AT KANYKUMARI DISTRICT, TAMILNADU

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*Diabetes imposes a large economic burden on the individual, national healthcare system and economy. It is also imposes large economic burdens in the form of lost productivity and foregone economic growth.The prevalence of diabetes for all-age groups world wide was 5.1% in 2003. It is increased to 6.0% in 2007. It is also expected to increase 7.0% of total population in 2025. The prevalence of diabetes is higher in man than women, but there are more women with diabetes than men. The prevalence of diabetes is 4-6 times higher in the urban population as compared to rural areas. In this study find out that newly diagnosed patient 42.5% are between the age group of 40-50. In case of diabetes control 80% of the sample diabetic patients control their diabetes through diet and oral medicine. 17.5% of the sample diabetic patients do regular exercises to control their diabetes. 67.8% of the sample diabetic patients undergo allopathic treatment. Medicine cost is the major share (80-83%) in the cost of treatment of diabetes and in household expenditure the cost of medical care has the share of 8% to 21%. Lifestyle modifications which include dietary modification, regular physical activity, weight reduction hypertension, and hyperlipidaemic could eventually help to reduce the burden of diabetes.*

## Introduction

Health is a major component of human resources, which contributes to economic development and permits people to lead economically and socially satisfying life. Reduction of sickness will increase work productivity, and life expectancy to promote economic development, increase per-capita income and standard of living. India is world's second largest country with a population of more than one billion. The health profile of India in the 21st century is facing thirdly triple health burden. The first is the still unconquered existing communicable diseases; second is the newly emerging infectious diseases and thirdly the man made degenerative or non-communicable disease or disorder. Diabetes appears to be the major threat to Indians. It is a chronic disorder requiring lifelong medical treatment and lifestyle adjustment by the patients.

## Prevalence of Diabetes

According to Diabetes Atlas (2007) there are 246 million diabetics across the world, with 80% of them in the developing and underdeveloped countries. It is estimated that every fifth person with diabetes will be an Indian and diabetes is the fourth leading cause of global death by disease.

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**Regional Estimates for Diabetes, 2010 And 2030**

| | 2010 | | | 2030 | | | 2010/2030 |
|---|---|---|---|---|---|---|---|
| | *Population (2-79 years)* | *No. of People with Diabetes* | *Comparative Diabetes Prevalence* | *Population (2-79 years)* | *No. of People with Diabetes* | *Comparative Diabetes Prevalence* | *Increase in the no. of people with diabetes* |
| *Region* | *Millions* | *Millions* | *%* | *Millions* | *Millions* | *%* | *%* |
| NAC | 320 | 37.4 | 10.2 | 390 | 53.2 | 12.1 | 42.4 |
| MENA | 344 | 26.6 | 9.3 | 533 | 51.7 | 10.8 | 93.9 |
| SEA | 838 | 58.7 | 7.6 | 1200 | 101.0 | 9.1 | 72.1 |
| EUR | 646 | 55.2 | 6.9 | 659 | 66.2 | 8.1 | 20.0 |
| SACA | 287 | 18.0 | 6.6 | 382 | 29.6 | 7.8 | 65.1 |
| WP | 1531 | 76.7 | 4.7 | 1772 | 112.8 | 5.7 | 47.0 |
| AFR | 379 | 12.1 | 3.8 | 653 | 23.9 | 4.7 | 98.1 |
| Total | 4345 | 1284.6 | 6.4 | 5589 | 438.4 | 7.7 | 54.0 |

*Source:* IDF Diabetes Atlas, 4th ed. International Diabetes Federation-2009.

The above table shows that, regional estimates for diabetes prevalence in 2010 and 2030. The regions are namely, North American and Caribbean (NAC), Middle East and North Africa (MENA), South-East Asian (SEA), European (EUR), South and Central American (SACA), Western Pacific (WP), Africa (AFR). When compared with 2010 to 2030 prevalence rate is increased in all regions. International Diabetes Federation is estimated that, the prevalence of diabetes for all-age groups world wide was 5.1% in 2003. It is increased to 6.0% in 2007. It is also expected to increase 7.0% of total population in 2025. The prevalence of diabetes is higher in man than women, but there are more women with diabetes than men. The prevalence of diabetes is 4–6 times higher in the urban population as compared to rural areas (Ramachandran *et al*, 2002). The five countries with the largest numbers of people with diabetes are India (40.9 million), China (39.8 million), the United States (19.2 million), Russia (9.6 million) and Germany (7.4 million).

In developing countries, the majority of people with diabetes are in the 45 to 64 year age range. In contrast, the majority of people with diabetes in developed countries are >64 years of age. By 2030, it is estimated that the number of people with diabetes >64 years of age will be >82 million in developing countries and >48 million in developed countries (Wild *et al*, 2004). The largest increases in the diabetic population in developing countries are projected to be in the most economically productive age groups (Mohan. et al, 2004).

## The Economic Burden of Diabetes

Diabetes imposes a large economic burden on the individual, national healthcare system and economy. Healthcare expenditures on diabetes are expected to account for 11.6% of the total healthcare expenditure in the world in 2010. About 80% of the countries covered in this report are predicted to spend between 5% and 13% of their total healthcare dollars on diabetes.

Besides excess healthcare expenditure, diabetes also imposes large economic burdens in the form of lost productivity and foregone economic growth. The World Health Organization (WHO) predicted net losses in national income from diabetes and cardiovascular disease of ID557.7 billion in China, ID303.2 billion in the Russian Federation, ID336.6 billion in India, ID49.2 billion in Brazil and ID2.5 billion in Tanzania (2005 ID), between 2005 and 2015 (International Dollars - ID) as a result of lost earnings due to lost work days, restricted activity days, lower productivity at work, mortality and permanent disability caused by diabetes. Such losses are perhaps relatively larger in poorer countries because premature death due to diabetes occurs at much younger ages.

The largest economic burden, therefore, is the monetary value associated with disability and loss of life as a result of the disease itself and its related complications. This economic burden, however, can be reduced by implementing many inexpensive, easy-to-use interventions, most of which are cost-effective or cost-saving, even in the poorest countries. Nonetheless, these interventions are not widely used in low- and middle-income countries.

The future of health care has become an important social and political issue over the last decade. One major issue in this debate is how to keep costs under control while meeting consumers' increasing expectations. The per-capita cost of health care in developing countries is much less than in developed countries. This is partly because of the burden in developed countries of chronic disorder like diabetes. However, a changing prevalence of disease patterns is likely to increase the burden of chronic disease or disorder in developing countries such as India. Two major concerns are that much of this increase in diabetes will occur in developing countries, due to ageing, unhealthy diets, obesity and sedentary life styles, and that there is a growing incidence of Type II diabetes which accounts for about 90% of all cases – at a younger age.

India will spend an amount between $3.3 billion and $5.3 billion by 2025 as treatment costs for diabetes, 40% more than what it does at present. In 2006, WHO has estimated that in next 10 years, India will face a decrease of $330 billion in economic growth due to the disease. In India, the poorest people with diabetes spend an average of 34% of their total income on private care. Calculations have shown that India has spent just $47 per a year per person for diabetes in 2006.

*Objectives*

The researcher has drawn the following objectives to complete this micro-level study:

1. To analyse the socio-economic conditions of diabetic patients.
2. To assess the economic burden of diabetic patients.
3. To discuss direct and indirect costs for diabetic patients.

*Hypotheses*

The researcher has drawn the following hypotheses:

1. Economic conditions of diabetes influence the treatment strategies.
2. Cost of health care expenditure differs significantly between the systems of medical care.

*Methodology*

For this micro-level study is based on the primary data collected from a stratified random sample in Kulasekharam village comprising 49 low income, 46 middle income, and 25 high income female respondents. Medicine cost is major share (80-83%) in the cost of treatment of diabetes and in household expenditure the cost of medical care has the share of 8 to 21%. This village is located in Kalkulam Taluk of Kanyakumari district. A suitable questionnaire is constructed to collect the primary data.

*Economic Conditions of Diabetes*

Economic analysis includes age at onset of diabetes, income, expenditure, treatment details, and treatment cost of the sample diabetic patients. They are under three income groups of low (below Rs. 50,000/-), medium (Rs. 50,000/– Rs. One Lakh) and high (above Rs. One Lakh) level households.

**Table 1**
**Distribution of Diabetes According to Age at Onset of Diabetes**

| | *Income Groups* | | | |
|---|---|---|---|---|
| *Age (in years)* | *Low* | *Medium* | *High* | *Overall* |
| Below 40 | 9 | 10 | 8 | 27 |
| | (18.4) | (21.7) | (32) | (22.5) |
| 40–50 | 20 | 21 | 10 | 51 |
| | (40.8) | (45.6) | (40) | (42.5) |
| 51–60 | 13 | 13 | 5 | 31 |
| | (26.5) | (28.3) | (20) | (25.8) |
| Above 60 | 7 | 2 | 2 | 11 |
| | (14.3) | (4.4) | (8) | (9.2) |
| Total | 49 | 46 | 25 | 120 |
| | (100) | (100.0) | (100) | (100) |

*Source:* Computed
*Note:* Figures in parentheses denote percentages to column total.

Table 1 shows the distribution of respondents according to age at onset of diabetes. 42.5 per cent of the sample respondents have diabetes in the age group of 40–50 years. 25.8 per cent of the sample respondents have diabetes in the age group of 51–60 years. 24.2 per cent have diabetes in the age group of below 40 years and 7.5 per cent have diabetes above 60 years. Majority of the sample respondents have diabetes in the age group of 40–50 years.

**Table 2**
**Source-wise Average Annual Household Income (Rs) of the Sample Diabetics**

| *Sources of Income* | *Income Groups* | | | |
|---|---|---|---|---|
| | *Low (n=49)* | *Medium (n=46)* | *High (n=25)* | *Overall* |
| Rent and Interest | 102 (0.3) | 326 (0.4) | 1220 (1) | 549 (0.6) |
| Occupation | 31938 (99.3) | 74478 (93.8) | 114520 (91.5) | 73645 (94) |
| Others | 122 (0.4) | 4565 (5.8) | 9360 (7.5) | 4682 (5.4) |
| Total | 32162 (100) | 284804 (100) | 125100 (100) | 78877 (100) |

*Source:* Computed
*Note:* Figures in parentheses denote percentages to column total.

In Table 2 the annual household income of the sample respondents is given. Income is considered as one of the indicators of economic status and standard of living of the sample respondents. The respondents get 94 per cent of income from main occupation, 5.4 per cent income from other sources and 0.6 per cent of income from rent and interest. Therefore it is understood that occupation is the major source of household income.

Table 3 expresses the annual household expenditure of the sample respondents. Household expenditure includes the food items, fuel and lighting, education, medical,

**Table 3**
**Pattern of Average Annual Household Expenditure (Rs) of the Sample Diabetics**

| *Expenditure* | *Income Groups* | | | |
|---|---|---|---|---|
| | *Low (n=49)* | *Medium (n=46)* | *High (n=25)* | *Overall* |
| Food Items | 1211 (22) | 13528 (36.1) | 19520 (31.7) | 11419 (33.1) |
| Fuel and Lighting | 423 (7.7) | 1298 (3.5) | 3120 (5.1) | 1613 (4.5) |
| Education | 1530 (27.8) | 10869 (29) | 18560 (30.1) | 10319 (29.4) |
| Medical | 459 (8.3) | 8058 (21.5) | 14000 (22.7) | 7505 (21.0) |
| Recreation | 346 (6.3) | 760 (2) | 1025 (1.7) | 710 (2.2) |
| Travel | 1020 (18.5) | 2173 (5.8) | 4240 (6.9) | 2477 (7.2) |
| Religious | 515 (9.4) | 793 (2.1) | 1140 (1.8) | 816 (2.6) |
| Total | 5504 (100) | 37479 (100) | 61605 (100) | 11620 (100) |

*Source:* Computed
*Note:* Figures in parentheses denote percentages to column total.

recreation, travel, and religious. Food expenditure is 33.1 per cent, education expenditure is 29.4 per cent, medical expenditure is 21 per cent, travel expenditure is 7.2 per cent, fuel and lighting expenditure is 4.5 per cent, religious expenditure is 2.6 per cent and recreation expenditure is 2.2 per cent. The majority of income is spent on food, education, and medical care.

**Table 4**
**System of Medical Treatment wise Distribution of the Sample Diabetics**

| *System of Medical Treatment* | *Income Groups* | | | *Overall* |
|---|---|---|---|---|
| | *Low* | *Medium* | *High* | |
| Allopathy | 31 | 27 | 23 | 81 |
| | (63.3) | (58.7) | (92) | (67.5) |
| Homeopathy | 16 | 15 | 2 | 33 |
| | (32.6) | (32.6) | (8) | (27.5) |
| Siddha | 2 | 4 | - | 6 |
| | (4.1) | (8.7) | | (5) |
| Total | 49 | 46 | 25 | 120 |
| | (100) | (100) | (125) | (100) |

*Source:* Computed
*Note:* Figures in parentheses denote percentages to column total.

Calculated Chi-Square Value = 9.837
Degrees of Freedom = 4
P-Level Significance = 0.0433

Table 4 shows that 67.8 per cent of the sample respondents undergo Alopathy treatment, 27.5 per cent undergo homeopathy treatment and only 5 per cent undergo Siddha treatment. Thus a good number of the sample respondents undergo Allopathy treatment.

**Table 5**
**Average Treatment Cost Structure of the Sample Diabetics (%)**

| *Cost Item* | *Income Groups* | | | *Overall* |
|---|---|---|---|---|
| | *Low (n=49)* | *Medium (n=46)* | *High (n=25)* | |
| Doctor Fees | 6.7 | 6.6 | 6.3 | 6.5 |
| Lab Fees | 7.8 | 8.5 | 5.6 | 7.5 |
| Cost of Medicine | 80 | 80.7 | 83.3 | 81.5 |
| Travel Expenses and Others | 5.5 | 4.2 | 4.8 | 4.5 |
| *Treatment Cost (Rs-Per Month)* | | | | |
| Maximum | 35 | 550 | 1050 | 545 |
| Minimum | - | 200 | 450 | 216 |
| Mean | 17 | 375 | 750 | 108 |

*Source:* Computed
*Note:* Figures are percentage to total treatment cost.

Table 5 shows the cost of the medical treatment. 81.5 per cent of cost is spent for medicine, while lab fees is 7.5 per cent, doctor fees is 6.5 per cent, travel expense is 3.3 per cent and others are 1.2 per cent.

**Table 6**
**ANOVA for Cost of Health Care Expenditure and the System of Medical Care**

| *Type of Treatment* | *N* | *Mean* | *SD* | *F-value* | *P Level Significance* |
|---|---|---|---|---|---|
| Allopathy | 81 | 347.93 | 170.76 | 28.008 | 0.000 |
| Homeopathy | 33 | 94.85 | 164.68 | | |
| Siddha | 6 | 142.50 | 169.73 | | |
| Total | 120 | 268.06 | 203.87 | | |

*Source:* Computed.

There is a significant difference in cost of health care expenditure on the basis of system of medical care (Hypotheses-2).

The Table 6 shows that the Mean, SD and F-value of regarding cost of health care expenditure on the basis of system of medical care. The calculated F-value (28.008) is significant at 0.01 level. Hence the stated hypothesis is accepted. Allopathy medicine has higher cost of expenditure, compared to other systems of medical care.

## Conclusion and Polcy Suggestions

Diabetes is likely to give a huge threat to public health in the years to come. The explosion of the diabetes epidemic in Asia, the Pacific, and other regions of the world, combined with the significant morbidity and mortality due to the enormous burden associated with diabetic implications indicate the need for increased focus on the prevention and the control programmes and the necessary resources to tackle this problem.

Increase in physical activity, and changes in dietary habits could to a great extent, help to prevent or delay, the onset of diabetes and reduce the burden due to its associated complications. A healthy diet is to controlling blood sugar levels and preventing diabetes complications. Regular exercise can help to reduce the risk of developing diabetes. Maintaining ideal body weight and physical activity can also reduce the risk of developing complications of diabetes such as heart disease, stroke, kidney failure, blindness, and leg ulcers.

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| Homeopathy | 16 (32.6) | 15 (32.6) | 2 (8) | 33 (27.5) |
| Siddha | 2 (4.1) | 4 (8.7) | - | 6 (5) |
| Total | 49 (100) | 46 (100) | 25 (125) | 120 (100) |

*Source:* Computed
*Note:* Figures in parentheses denote percentages to column total.

Calculated Chi-Square Value = 9.837
Degrees of Freedom = 4
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| Minimum | - | 200 | 450 | 21 |
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