

Prevalence of Type 2 Diabetes and its Determinants: A Cross Sectional Analysis

Subha P P¹ & Roy Scaria^{2*}

¹Assistant Professor, Research Department of Economics, Government College, Nattakom, Kottayam, Kerala, India.

²Assistant Professor, Department of Economics, T.M Jacob Memorial Government College, Manimalakunnu, Kerala, India (Research Guide, Research Department of Economics, Government College, Nattakom, Kottayam).

*Corresponding author email: royscariath@gmail.com

Abstract

The number of people with type 2 diabetes is growing rapidly worldwide mainly because of ageing populations, economic development, increasing urbanisation, less healthy diets and reduced physical activity. Therefore, various factors like demographic, socio economic and life style have an influence on the prevalence of type2 diabetes. By using cross sectional data, the proportion of people having Type 2 diabetes and its determinants in Malappuram District of Kerala has been analysed with descriptive statistics and Binary Logistic Regression Econometric Model. The Model results show that age, place of residence, tobacco use, obesity and duration of diabetes are significant factors influencing the likelihood of prevalence of Type 2 diabetes. Age is a significant factor affecting the prevalence of the disease.

Keywords: *Type 2 diabetes, Prevalence of diabetes, Determinants of prevalence of diabetes, Econometric model for diabetes prevalence.*

1.1 Introduction

Diabetes has emerged as a major health challenge of the present century. The number of people with diabetes, especially Type 2 diabetes, is escalating exponentially around the world. The global prevalence of type 2 diabetes is 9.3% and in India, it stands at

8.9 % (Report of International Diabetic Federation, 2019). It is a disturbing fact that Kerala, despite being the most literate state with high life expectancy, tops in diabetic prevalence among the Indian states. “The state of Kerala which presently has large proportion of elderly population has the highest literacy rate in the country (90.9%) and is the most advanced in terms of life expectancy, but, ironically enough, the state presently has an un-proportionately large number of people suffering from NCDs, including diabetes” (cited in Daivadanam, et.al., 2013.p.2).

Kerala is designated as the Diabetes Capital of India with the prevalence rate of 22% of population, which stands more than double of the national average of 8.7% and the global average of 8.8% (Health and Family Welfare Department, Government of Kerala, 2013, Ministry of Health and Family Welfare, Government of India, 2014 and International Diabetes Federation, 2015). Another alarming fact is that, Kerala tops in the sale of diabetic drugs and insulin in India. Even though the state has only 3% of India’s population, the sale of diabetic drugs including insulin accounted for 7% of the total sales in India (P, 2015). There is no gainsaying that the social, economic and life style factors have largely contributed to the spike in the incidence of the disease in the state.

“The Shape of Global Health” reminds us that “good health the foundation on which to build- a life, a community, and an economy” (Hayden, 2014). Being health is an important productive resource; the present analysis is backed with Human Capital, which is a key factor for increasing productivity and economic growth. Education and skills were considered as the important human capital in earlier times, though, recently much attention is being given to health. A healthy life style reduces stress improving the feeling of wellness, which again reduces absence due to sickness. Becker defined human capital as “activities that influence future real income by imbedding resources in people such as schooling, on- the job training, medical care, and consumption of vitamins and acquisition of information about the

economic system as investment in human capital” (Becker, 1962, p. 9). For Schultz, direct expenditures on education, health and internal migration are investment in human capital (Schultz, 1961, p. 1).

1.2 Statement of the Problem

With each passing day, diabetics, especially Type 2 diabetics multiply in Kerala irrespective of their urban or rural habitat and irrespective of their gender or literacy. As has been reported by the Achutha Menon Centre for Health Science Studies and Kerala Health Service Department, 2016, one among five adults in Kerala in the age group spanning 45-69 years of age has the disease. It is in this context that the researchers have sought to study the factors influencing the high prevalence rate of the disease in Malappuram district of Kerala.

1.3 Significance of the study

An investigation into the various factors that function as the determinants of the occurrence of diabetes would go a long way in enlightening the authorities concerned as well as the patients themselves on the steps to be taken to obviate the onslaught of the fatal disease. As a corollary, governmental agencies will be compelled to earmark more funds for effective control and prevention of the malady. The present study is designed to estimate the prevalence rate of type 2 diabetes and analyse its determining factors, demographic, socio-economic and life style.

1.4 Methodology

It is both a descriptive and analytical study using cross sectional data. The area of the study is Malappuram district in Kerala where the prevalence of diabetes has been high (25.9%) (Zachariah & Rajan, 2008). The analysis has been based on the responses 360 sample patients selected from among the casual workers of Malappuram district. The sample size has been estimated using the Taroyaman formula for sample size calculation. A Multi

Stage Stratified Random Sampling Method is used for the selection of samples. Individuals above 20 years of age constitute the unit of analysis of the study. Both primary and secondary sources of data have been used.

1.5 Results and Discussion

The present study analyse the proportion of people who have Type 2 diabetes and its determinants in Malappuram District, Kerala. The data collected have been analysed using both descriptive statistics and Binary Logistic Regression Model. The researcher also analysed the demographic, socio-economic and life style profile of the sample respondents as illustrated in Table 1.1, which greatly influence the prevalence of Type 2 diabetes as evident from the existing literature.

Table 1.

Demographic, Socio-economic and Life style profile of the Sample Respondents

Variables	No. of Type 2 Diabetic Patients(N=360)	Percentage
Age		
20-29	1	.3
30-39	25	6.9
40-49	77	21.4
50-59	179	49.7
More than 60	78	21.7
Gender		
Male	183	50.8
Female	177	49.2
Place of Residence		
Rural	134	37.2
Urban	226	62.8
Education		
Illiterate	56	15.6
Primary level	165	45.8
High school level	115	31.9
Higher secondary level	20	5.6
College level	4	1.1
Religion		
Hindus	84	23.3
Muslims	267	74.2
Christians	9	2.5

Tobacco use		
No	187	51.9
Yes	173	48.1
Alcohol use		
No	300	83.3
Yes	60	16.7
Regular Exercise		
No	279	77.5
Yes	81	22.5
Dietary Type		
Vegetarian	103	28.6
Non vegetarian	257	71.4
Obesity		
Not Obese	150	41.7
Obese	210	58.3
Family History of Diabetes		
No	140	38.9
Yes	220	61.1
Co morbidities		
BP	165	45.8
Cholesterol	36	10.0
Both of them	159	44.2

Note. From Primary Data collected from Malappuram District, Kerala

1.6 Proportion people having Type 2 diabetes

The proportion of sample respondents having type 2 diabetes is represented in Figure 1. Among the 360 sample respondents, surveyed 77% (276 respondents) have Type 2 diabetes and that 23 % (84 respondents) have no prevalence of Type 2 diabetes.

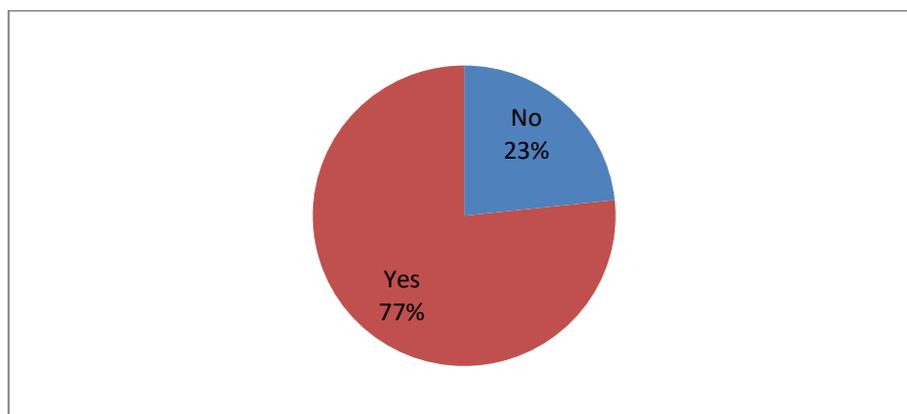


Figure1. Proportion people having Type 2 diabetes

Source: Primary Data collected from Malappuram District, Kerala

1.7 Determinants of Prevalence of Type 2 Diabetes

World Health Organisations Global Diabetes Report, 2016, reported, “type 2 diabetes is determined by an interplay of genetic and metabolic factors. Ethnicity, family history of diabetes, and previous gestational diabetes combine with older age, overweight and obesity, unhealthy diet, physical inactivity and smoking to increase risk”. Weerasinghe, 2016 in his study “A review of socio-economic factors affecting for diabetes” found that the male gender, decreased literacy, long duration of diabetes, family history of diabetic nephropathy and poor glycemic control had significant association with the diabetic prevalence. It has also been pointed out that environmental and life style factors were the other important factors that increased the prevalence of diabetes”. However, there are findings like “Female gender, old age and low educational attainments were vulnerable to diabetes mellitus” (Suwannaphant, Laohasiriwong, Puttanapong, Saengsuwan & Phajan, 2017). Ramachandran, Snehalatha & Viswanathan (2002), in their study “The burden of type2 diabetes and its complications- the Indian scenario” argued that there is an urban-rural difference in the prevalence of diabetes. According to them, the prevalence of type 2 diabetes is 4-6 times higher in urban population of India than in rural areas.

The present study analyses the determinants of prevalence of Type 2 diabetes by using a Binary Logistic Regression Model. The dependent variable in the Model is a dichotomous variable, the value of which is equal to one if the respondents having prevalence of Type 2 diabetes and zero if otherwise. The independent variables in the model include demographic, socio economic and life style characteristics of the sample respondents. The Model summary is given Table 2.

Table 2

Binary Logistic Regression showing determinants of prevalence of Type 2 diabetes.
Dependent Variable- Prevalence of Type 2 diabetes

<i>Predictors</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z</i>	<i>p-value</i>	<i>Odds Ratio</i>
const	-4.06899	1.39677	-2.913	0.0036***	
Age	0.0752635	0.0218703	3.441	0.0006***	1.0782
Female (RC)					
Male	-0.0448020	0.344435	-0.1301	0.8965	0.9562
Urban(RC)					
Rural	0.648937	0.308994	2.100	0.0357**	1.9135
Illiterate(RC)					
Primary Level	-0.0643910	0.500369	-0.1287	0.8976	0.9376
High School Level	-0.224516	0.557079	-0.4030	0.6869	0.7989
Higher Secondary Level	0.370115	0.859940	0.4304	0.6669	1.4479
College Level	-1.49427	1.34450	-1.111	0.2664	0.2244
Hindus (RC)					
Muslims	-0.194153	0.430138	-0.4514	0.6517	0.8235
Christians	0.332005	1.14774	0.2893	0.7724	1.3938
Tobacco use (No) (RC)					
Tobacco use (Yes)	1.40835	0.392622	3.587	0.0003***	4.0892
Alcohol use (No) (RC)					
Alcohol use (Yes)	-0.435501	0.578640	-0.7526	0.4517	0.6469
Exercise(No) (RC)					
Exercise(Yes)	0.169229	0.365581	0.4629	0.6434	1.1844
Vegetarian					
Non Vegetarian(RC)	0.0687806	0.320832	0.2144	0.8302	1.0712
Not Obese(RC)					
Obese	1.28116	0.313405	4.088	<0.0001***	3.6008
Family history(RC)					
Family history	0.193014	0.303577	0.6358	0.5249	1.2129
BP(RC)					
Cholesterol	0.0182055	0.310168	0.05870	0.9532	0.5663
Both of them	0.0687806	0.320832	0.2144	0.8302	1.0184

Note. From Primary Data collected from Malappuram District, Kerala

The Table 2 shows that age, place of residence, tobacco use and obesity are significant factors influencing the likelihood of prevalence of Type 2 diabetes. Age is a significant factor affecting prevalence of the disease (Odds Ratio=1.0782, p=0.0006), which

shows that the prevalence of diabetes is 1.0782 times higher among respondents having higher age. Place of residence also significantly affecting the prevalence of Type 2 diabetes (Odds Ratio= 1.9135, $p=0.0357$), reveals that the prevalence of Type 2 diabetes is 1.9135 times higher in rural areas than in urban areas. Tobacco consumption also has significant influence on the likelihood of the prevalence of Type 2 diabetes (Odds Ratio=4.0892, $p=0.0003$) indicating that individuals using tobacco products causes 4.0892 times prevalence of the disease as compared to patients having no consumption of tobacco products. The next important factor affecting the prevalence of the disease is obesity (Odds Ratio=3.6008, $p<0.001$) indicating that the prevalence of Type 2 diabetes is 3.6008 times higher among individuals having obesity than those of having no obesity.

The Table again shows that gender, education, religion, alcohol consumption, regular exercise, dietary type, family history of diabetes, co morbidities have no influence on the prevalence of Type 2 diabetes.

1.8 Conclusion

It is crystallized from the secondary data that victims of Type 2 diabetes account for 90% of all diabetic patients globally and that it is the changes in the life style of people in recent times, which has had a pivotal role in the escalation of the malady of diabetes across the world, and in the survey area. It is to be emphasised in this context that the attitude of people toward food, dieting, regular exercise, proper diagnosis and medication is central to reducing the prevalence rate of the disease and decrease the chances of the ailment turning disastrous for the individual, society and economy by deteriorating the health, the precious wealth of humans. The role of governments at all levels, national, state and regional or local cannot be undermined their responsibility in organising and endorsing massive awareness programmes, the cost of which would be marginal relative to heavy treatment costs, about a healthy and disease free life for a better society and economy.

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