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THE ASSOCIATION BETWEEN BODY WEIGHT AND THE PREVALENCE OF DIABETES MELLITUS

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ABSTRACT

The diabetes mellitus is becoming an important cause of worldwide mortality and morbidity. With the development of technology and the changes occurred in life styles lead people to have a sedentary life. As a result of that overweighed people and obsessed people are increasing quickly. It is a known fact that obesity is a risk factor for non-communicable diseases like diabetes mellitus. Diabetes is a disease occurs when the body of a person is no more able to produce enough insulin for the process of the body. Thus this study was carried out to find the effects of importance of body mass index (BMI) on diabetes mellitus onset. A cross sectional study was conducted among 100 participants chose from a cluster sampling and a simple random sampling. The data about the demographic features, socioeconomic status, body mass index, and food routine were collected and analyzed. Out of 100 participants, 51% were suffered with diabetes mellitus. They were from various occupations, educational levels and socio-economic levels. In the diabetic community 51% were overweighed. And in the non-diabetic community 81.60% were normal weighed. There was a significant association between diabetic community and BMI $\chi 2$ (3) = 31.041, p = .000. With a decreasing level of physical activity, people are more likely to be diagnosed with diabetes. Body weight is strongly connected with onset of diabetes mellitus. The majority of diabetic patients was doing sedentary work, thus they are suffering from overweight or obesity. Therefore measures must be taken to aware the society about the reasons for obesity and the risk of diabetes mellitus.

KEY WORDS: ***Diabetes Mellitus, BMI, Obesity, Overweight, Food Pattern, Sedentary Work***

INTRODUCTION

International Diabetes Federation (2017) stated that in 2017, there were 425 million Diabetic patients all over the world. From that, 82 million people were from the South East Asian Region. It is the second highest diabetes prevailing region. They estimated that in 2045, the global diabetic patients' amount will increase up to 629 million while the South East Asian Region's amount will increase up to 151 million. In 2017, 1.1 million of diabetic patients were died due to the disease in the South East Asia region. And they revealed that diabetic patients would die six years before non-diabetic persons due to the illness. In order to prevent the development of diabetes mellitus, it is necessary to find its risk factors.

Several studies have stated a strong relationship between overweight and increased risk of death, assigning the overweight group at a 40% greater and the people who are obsessed at up to 300% greater risk of mortality than individuals whose BMI is normal ($18.5 \leq BMI < 25$) (Abdullah et al., 2010; Hossain et al., 2007; Levy, 2001; Pinkney, 2002; Racette, Deusinger, & Deusinger, 2003). People tend to use more high sugar food and do sedentary work with the changing lifestyles, as a result of globalization and industrialization. With that Diabetes Mellitus has increased (Kolb & Mandrup-Poulsen, 2010). Lack of physical activity is the main reason for the rise of Diabetes Mellitus. Nearly 9% of the adult population of the WHO South-East Asia Region has Diabetes Mellitus (International Diabetes Federation, 2017).

A study done in India stated that hypertension, overweight, obesity, smoking, tobacco use, alcohol consumption, exercise pattern, fruit and vegetable consumption are main risk factors of diabetes mellitus (Venugopal & Iyer, 2010). According to Hu et al. (2017), risk factors of diabetes are older age, lower educational level, being married/live together, higher BMI, larger waist circumference, having an unhealthy diet and having more comorbidities. A study done in Pakistan also stated that there is a high positive relationship between diabetes mellitus and lack of exercise, and poor dietary pattern (Shaikh et al., 2013). In the modern world, the food routine of the people has changed drastically. They tend to eat more fast food than the ancient people. Due to the busy schedule, modern man lacks exercises. And the many people are used to work all the day sitting on a chair. Thus many people are suffering from the overweight and obesity. International Diabetes Federation (2017) has stated that overweight as a main risk factor for the prevalence of diabetes mellitus.

OBJECTIVE

This study, analyzed the relationship between the body weight and the occurrence of diabetes mellitus among elderly individuals. Even though obesity is a major risk factor for diabetes mellitus, there are only few amount of analyses carried out in Sri Lanka on that topic.

This study was carried out to find the association between Body Weight and the Diabetes Mellitus in Sri Lanka.

METHODOLOGY

A Cross-sectional study was conducted in Kirillawala – West Grama Niladhari (GN) Division in Mahara Divisional Secretary's (DS) Division in Gampaha District, Sri Lanka. In this study, multistage cluster sampling method was used. A study done in Sri Lanka also used the multistage cluster sampling method (Katulanda et al., 2012). Gampaha District was selected because it is one of the top 3 diabetes prevailing districts in Sri Lanka. As well as it is the second highest population district. Not only that Gampaha district is consisting with people from all over Sri Lanka. It represents all kinds of ethnicity groups, religious groups, income groups and employment status. From that randomly, Mahara PS Division was selected. And out of 92 GN Divisions, Kirillawala – West GN was selected randomly.

Individuals with age of ≥18 years were included in the study, because the prevalence of Diabetes Mellitus in children is very low. According to the Medical Statistical Unit (2015), the incidence of Diabetes Mellitus under age 16 was 1.1%. So it is meaningless to add people who are under 16 years to the survey. And another reason for selecting adults who are aged older than 18 is because the sampling frame can only make with adults. The sampling frame for this research was the election registry. The Kirillawala – West GN Division has a population of 2491 people. It has 1793 people who are older than 18 years. So the population size of this study was 1793. Also, the study has used the "population proportion sample size" formula to choose the sample size (Israel, 2013). The sample size derived was 100 units.

Questionnaire was used as schedules to collect data from the participants. Illiterate participants were explained regarding the study and essential details were collected from them. The parameters studied were demographic features, and socioeconomic status. Body mass index of each participant was calculated and was categorized into underweight, normal, overweight and obese.

Moreover, the data has been analyzed by SPSS Version 21 Software and Ms. Excel 2010 Software. Statistical tools such as descriptive statistics, chi-square test, were used to analyze the collected data.

RESULTS

Among all the participants, 49% people who are not suffering from diabetes mellitus and 51% people

who are suffering from diabetes mellitus were included in the study. Among all the participants, 8% people were underweighted, 55% were normal weighted, 30% were overweighed and 7% were obsessed.

Table 1 depicts the socio demographic characteristics of the sample. The study revealed that in the diabetic community, out 51 participants, 61% were female and the rest 39% were male. On the contrary, in the non-diabetic community, among 49 participants, 53% were male and the rest 47% female. In the diabetic community, the majority (49%) of the participants were in the age group 41-55 years.

Table 1: Demographic Characteristics

	Diabetic		Non-diabetic	
	N	%	N	%
Gender				
Male	20	39	26	53
Female	31	61	23	47
Age				
18-25	1	1.9	5	10.2
26-40	7	13.8	19	38.8
41-55	25	49.1	16	32.7
56-70	9	17.6	7	14.2
70<	9	17.6	2	4.1
Religion				
Buddhist	40	78.4	41	83.7
Hindu	5	9.8	1	2
Christian	2	3.9	3	6.1
Islam	4	7.8	4	8.2
Occupation				
Unemployed	16	31.4	11	22.4
Student	1	2	1	2
Businessman	4	7.8	3	6.1
Housewife	17	33.3	10	20.4
Clerk	1	2	0	0
Labourer	1	2	3	6.1
Mason	4	7.8	3	6.1
Other	7	13.7	18	36.7
Monthly Income (Rs.)				
Below 20,000	8	15.7	3	6.1
20,000 - 40,000	16	31.4	16	32.7
40,000 - 60,000	17	33.3	15	30.6
60,000 - 80,000	7	13.7	4	8.2
80,000 - 100,000	1	2	5	10.2
Above 100,000	2	3.9	6	12.2
Weight (kg)				
40-60	18	35.3	25	51
60-80	27	52.9	22	44.9
80-100	6	11.8	2	4.1
Height (cm)				
130-150	5	9.8	5	10.2
150-170	39	76.5	35	71.4
170-190	7	13.7	9	18.4
Smoking				
Never	29	56.90	37	75.50
Former	4	7.80	6	12.20
Current	15	29.40	2	4.10

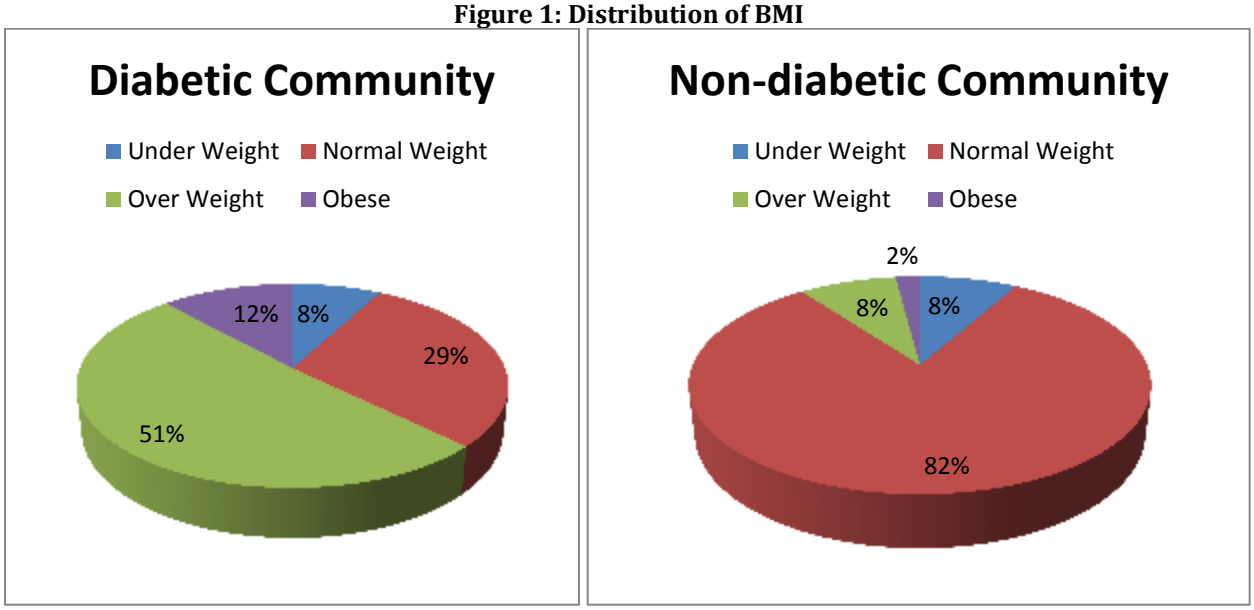
Occasional	3	5.90	4	8.20
Alcoholism				
Never	27	52.90	35	71.40
Former	3	5.90	4	8.20
Current	17	33.30	3	6.10
Occasional	4	7.80	7	14.30

When considering the prevalence of overweight and obesity among the study sample, there was not a significant association between BMI and gender $\chi 2$ (3) = 7.255, p = .064. As well as, there was not a significant association between BMI and age of the participants $\chi 2$ (12) = 7.676, p = .81. Likewise there was not any significant association between education and religion with the BMI. But there was a significant association between BMI and the way of physical activity done by the participants $\chi 2$ (9) = 30.641, p = .000.

For an ideal body weight, a better food routine is a must. When comparing the different type of food intake and the body weight it is discovered that rice, bread, fish, eggs and non – sugary fruits do not have a significant relationship with the body weight. But there was a significant association between body weight and the intake of fast food $\chi 2$ (3) = 8.537, p = .036. There was a significant association between body weight and the intake of sugary food $\chi 2$ (3) = 9.729, p = .021.

As shown in the figure 1, regarding BMI, among the diabetic community, the majority (51%) was in overweight, followed by 29.40% normal weight and 7.80% were underweight. On the other side, in the non-diabetic community, the majority (81.60%) was in average weight while both underweight and overweight was 8.20%. There was a significant association between diabetic community and BMI $\chi 2$ (3) = 31.041, p = .000.

Figure 1: Distribution of BMI



Source: Personal Collection (2017)

DISCUSSION

This study expected to determine the prevalence of diabetes mellitus among the people who are overweighed and obsessed. The study observed high prevalence (51%) of overweight and 12% of obsessed people are suffering from diabetes mellitus. It also confirms that the majority of participants with complications of diabetes mellitus are either overweight(49%) or obese (14%). Begic et al. (2016), also stated that diabetes mellitus has a positive association with irregular fat profiles, changes in seditious mediators and clotting. The urbanization, and the globalization of the world seems to be the major reason for the high prevalence of obesity and the over weighted people. As well as many participants were adopted to western culture and enhances in a little physical activities.

From this study we could conclude that BMI is truly a high factor that affects diabetes mellitus. Majority of the obsessed participants were suffered with diabetes mellitus. A study done in Sri Lanka by Pinidiyapathirage et al. (2012), showed that there is a definite relationship between BMI and prevalence of diabetes mellitus. Another study was done in Sri

Lanka by Katulanda et al. (2012) proved that prevalence of diabetes mellitus was higher in provinces where the BMI value is higher when compared to the provinces with a lower BMI value. International Diabetes Federation (2015) has stated that the obesity is a major risk factor for diabetes and its prevalence. They have further explained that obesity is becoming a major issue especially in Low and Middle-Income Countries.

In this study we have observed that there is no any significant gender difference in the prevalence of overweight and obesity. But many other researches done globally shows that males are tend to prevail obesity or overweight rather than females (Racette et al., 2003). A possible reason for this difference might be unhealthy eating behaviours and individual lifestyles among people in Sri Lanka.

Moreover, eye-catching advertisements on fast food on marketing in the country might expose people to unhealthy food routine. This might be the major reason for the prevalence of overweight or obesity in this study sample. This study suggest that weight loss or having a balance diet is an important preemptive approach for overweight and obsessed persons with diabetes mellitus to control the disease as well as those who do not have the disease to prevent from it. As well as weight management is a main fact for the prevention of diabetes mellitus and its complications (Gray, Picone, Sloan, & Yashkin, 2015).

CONCLUSION

Prevalence of diabetes mellitus is increasing at a rapid pace in Sri Lanka. Overweight of the people is a main risk for this. Modern man is suffering from overweight and obesity due to the lack of exercises and bad food routine.

The government should take measures to aware the public about diabetes mellitus as well as to launch educational programs to who are at higher risk for developing obesity. As well as government should aware the public about the correct managing styles of weight and diabetes mellitus.

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