International Journal in Management and Social Science
Volume 09 Issue 11, November 2021 ISSN: 2321-1784 Impact Factor: 7.088
Journal Homepage: http://ijmr.net.in, Email: irjmss@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal

STUDY ON THE BODY WEIGHT, BODY MASS INDEX (BMI), TRICEPS SKINFOLD THICKNESS(TST) AND HAND GRIP STRENGTH(HGS) OF DIABETIC PATIENTS

PUSPANJALI MISHRA
RESEARCH SCHOLAR, OPJS UNIVERSITY, CHURU, RAJASTHAN

DR. BALRAM KUMAR PANDEY
RESEARCH SUPERVISOR, OPJS UNIVERSITY, CHURU, RAJASTHAN

ABSTRACT

Regardless of the type of diabetes, self-management of the disease involves the integration of multiple self-care activities (e.g., blood glucose monitoring, carbohydrate counting, activity regimens) into daily life. The main aim of the study is Study on the Body Weight, Body Mass Index (BMI), Triceps Skinfold Thickness (TST) and Hand Grip Strength (HGS) of diabetic patients**.** The analysis of data required a sample of closely related operation, such as establishment of categories, tabulation and statistical inferences**.** People with diabetes are also likely to have chronic muscle-skeletal co-morbidities. Pre and post operative malnutrition increase the morbidity rate and length of hospitalization for surgical patients.

KEYWORDS;- Nutritional, Health, Diabetes, Body Weight, Body Mass.

- **INTRODUCTION**

Regardless of the type of diabetes, self-management of the disease involves the integration of multiple self-care activities into daily life. Because diabetes self-management involves alterations of prominent life aspects, persons with diabetes often struggle with incorporating self-management techniques into everyday life (Nagelkerk, Reick, & Meengs, 2006). Although pharmacotherapy methods serve as treatment measures, lifestyle modifications are believed to be critical in preventing and managing type 2 diabetes (Knowler et al., 2002). While the importance of self-management of the disease is evident, many factors impede the self-management process. Things such as economic constraints (Ary, Toobert, Wilson, & Glasgow, 1986), interpersonal conflicts with family members (Cardenas, Vallbona, Baker, & Yusim, 1987), resistance to change (Vallis et al., 2003), lack of knowledge of specific diet plans, failure to understand the plan of care, feelings of helplessness and frustration from lack of glycemic control, and continued disease progression despite adherence efforts (Nagelkerk et al.) cause frustrations for those with diabetes.

Diabetes self-management education is the process of teaching individuals to manage their diabetes and has been considered an important part of the clinical management of individuals with diabetes since the 1930s (Bartlett, 1986). Education plays a central role in improving glycemic control, enhancing quality of life, and reducing the risk of long-term complications (Visser & Snoek, 2004). Lack of motivation, lack of physician referral, and lack of health insurance prevent many individuals from attending diabetes education classes (Funnell, Donnelly, Anderson, Johnson, & Oh, 1992).

A significant portion of diabetes management takes place within the family or home setting (Fisher et al., 1998). Family support has been associated with treatment adherence, illness adaptation, and blood sugar control in studies of individuals with diabetes (Cardenas et al., 1987; Garay-Sevilla, et al., 1995; Primomo, Yates, & Woods, 1990). Alteration of family health routines, defined as behavioral patterns that impact healthcare outcomes, has the potential to change behaviors linked to diabetes care (Chesla et al., 2003). In addition, general family routines, defined as "day to day repetitive activities, which occur within the family unit in a predictable manner," can have a negative or positive impact on disease management (Keltner, Keltner, & Farran, 1990, p. 161). Family routines can incorporate helpful patterns by providing relational support and casual reminders for the diabetic family member (Trief et al., 2003).

- **LITERATURE REVIEW**

Gil et al., (2011), Intake of wholegrain cereals regularly can contribute to reduction of risk factors related to non-communicable chronic diseases. Several studies show consistently that subjects who ingest three or more portions of foods per day based on whole grain cereals have a 20-30 percent lower risk of CVD than subjects who ingest low quantities of cereals. Likewise, high intake of wholegrain cereals and their products, such as whole-wheat bread, is associated with a 20-30 percent reduction in the risk of Type 2 diabetes.Protection against the risk of colorectal cancer and polyps, other cancers of the digestive tract, cancers related to hormones and pancreatic cancer has been associated with the regular consumption of wholegrain cereals and derived cereal Products.

Gonzalez-Anton et al., (2015), An enriched, cereal-based diet affects appetite ratings and glycemic, insulinemic, and gastrointestinal hormone responses in healthy adults in a randomized, controlled trial that was performed by Gonzalez-Anton showed that consumption of the cereal-based diet contributed to appetite control by reducing hunger and enhancing satiety and also consumption of this diet improved glycemic, insulinemic, and gastrointestinal hormone responses in healthy adults.

Lee et al., (2015) suggested that grains, which are a great source of antioxidants, have potential in the prevention of oxidative stress and inflammation-related chronic diseases and hence used in many fortification processes to improve micro and macro nutrient status. The Cross-Sectional Association between Consumption of the Recommended Five FoodGroup "Grain (Cereal)", Dietary Fibre and Anthropometric measures among Australian Adults was studied by Fayet-Moore et al(2017) and found that there was an inverse relationship between core grain serves intake and BMI ($p < 0.001$), waist circumference ($p = 0.001$) and a positive relationship with fibre($p < 0.001$) that lead to conclude ,core grain serves was significantly associated with higher fibre, but marginally clinically significant for lower adiposity.

(Asif et al.,2013), Pulses are the richest sources of plant proteins and provide approximately 10 percent of the total dietary requirements of the proteins world over. Pulses are also high in dietary fibers and complex carbohydrates leading to low GI (glycemic index) foods and help to lower cholesterol and triglycerides as leguminous fibers are hypoglycosuria because of consisting more amylose than amylopectin. Pulses provide tremendous opportunities to be utilized in the processed foods such as bakery products, snack foods, soups, cereal bar filing, etc. that shows excellent opportunities in frozen dough foods either as added flour or as fillings. Pulses in view of their nutrient profile, seem to be ideal for inclusion in designing snack, baby, sports and supplement foods. In the current scenario,increasing costs of production, poor economy, and fluctuating food commodity prices have made a strong case for producers to seek opportunities to increase domestic consumption of pulses through value-added products.

- **METHODOLOGY**

Statistical analysis and interpretation

After the data has been collected, the investigator analysed the data. The analysis of data required a sample of closely related operation, such as establishment of categories, tabulation and statistical inferences (Kothari and Garg,2014). The collected data were properly recorded, consolidated, tabulated and analysed using appropriate statistical techniques such as ANOVA and Correlation was carried out among the selected variables. This helped the investigator, to conclude the effect of intervention with appropriate intervention to promote the nutritional status and enhance the surgical outcome among the selected study group.

- **RESULTS**

Life style pattern of selected participants

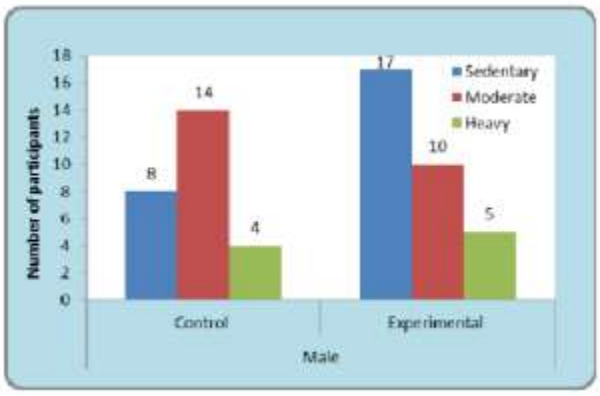
i. Physical activity of the selected participants

Migration to cities and a disproportionate expansion of settlements within urban slums has resulted in an unhealthy lifestyle because of changes in traditional eating habits, decreased physical activity, exposure to stress, etc and reflected in the increase in over nutrition and obesity raise the risk of non- communicable diseases (NCDs) such diabetes and obesity and difficulty in weight management among existing diabetic people. (L'Abbe', et al 2009). Therefore understanding the importance of physical exercise in weight and glycemic management among the Type 2 diabetics, the data on the physical activity among the selected lower limb injured diabetic participants were evaluated and presented in Table 1.

Table 1 Physical activity of the selected participants

Criteria	Control(N=40)				Experimental (N=40)			
	Male		Female		Male		Female	
	N	Percent	N	Percent	N	Percent	N	Percent
Sedentary	8	10	2	2.5	11	13.75	5	6.25
Moderate	14	17.5	9	11.25	11	13.75	5	6.25
Heavy	4	5	3	3.75	4	5	4	5
Total	26	32.5	14	17.5	26	32.5	14	17.5

The above Table 4.31 and figure 4.7 a and 4.7b represented that 17.5 percent of males ,11.2 percent of females and 13.7 percent male and 6.2 percent females of control group and experimental group respectively were engaged in moderate physical activity whereas a total 32.5 percent of lead a sedentary life style. This percent was approximately relates to the normal BMI of the selected participants in spite of their health condition.



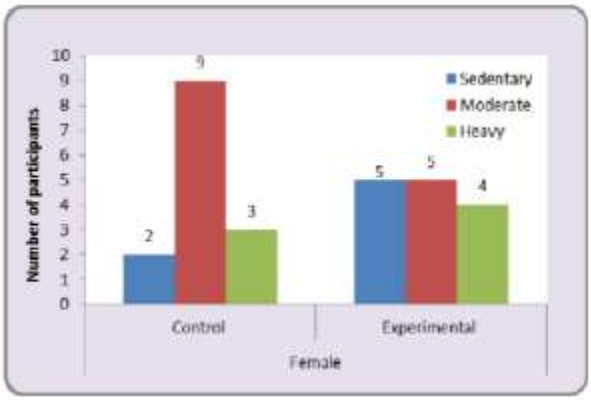


Figure 1a Control group ***Figure 1b Experimental group***

Figure-4.1: Physical activity of the selected participants

ii. Smoking and BMI of selected participants

Body mass index plays an important role in categorising the body physique of any person. Patients with complicated diabetes who have poor glycemic control and use tobacco have the highest risk for complications after foot and ankle surgery (Myerset al,2012).Data on smoking and alcohol intake among the selected subjects were collected as it has the negative effect on the calorie distribution and consumption in the regular diet of diabetics, so as also on BMI. The Table 2 gives the alcoholism and smoking habits and body mass Index of the selected participants

Table 2 Smoking and BMI of Selected participants

Smoking	BMI(below 18.5)		BMI(18.5-24.5)		BMI(above 25)	
	Number	Percent	Number	Percent	Number	Percent
Yes (N= 28)	0	nil	26	32.5	2	2.5
No(N=52)	0	nil	50	62.5	2	2.5
Alcohol						
Yes(N= 25)	0	nil	24	30	1	1.25
No(N=55)	0	nil	54	67.5	1	1.25

Table 4.2 showed data on the smoking, alcohol usage and BMI of the selected participants. Thirty two per cent had a habit of smoking and 30 per cent of them consume alcohol with the BMI between 18.5 to 24.5.One per cent of participants who had the habit of consuming alcohol

were obese. Non smokers (62.5percent) and the participants who dont take alcohol (67.5 percent) were fallen under normal BMI. The results of the present study had the similar results obtained by Fisichella et al(2015) of the study on correlation between diabetes, smoking and age as risk factors with the development of infection at the surgical site with the conclusion that postoperative results can be improved by antibiotic treatment, stringent glycemic control with good compliance of patients.

iii. Sleeping pattern and Appetite of the selected participants

Sleeping was the deciding factor of any persons day today activeness and also their diet pattern. Table 3 exposes the sleeping pattern and the loss of appetite of the selected participants.

Table 3 Sleeping pattern and Appetite among the selected participants

Sleeping Hours	**Loss of Appetite**	
	Number	**Percent**
6 hrs	28	35
7hrs	12	15
8hrs	13	16.25
< 6hrs	27	33.75
Sleeping Disturbances		
Yes	43	53.75
No	37	46.25

Table 3 explains the number of sleeping hours and the loss of appetite details of the selected participants. 33.75 percent of participants who had sleep of less than six hours suffered loss of appetite. 53 percent of participants who had sleeping disturbances reported loss of appetite. But 16.25 percent despite of their good sleep reported the same.The association between fatigue and meal skipping was also noted in the study by Tanaka et al (2008) found breakfast skipping to be more likely in those experiencing fatigue, while Sato-Mito et al (2011)found meal skipping (any meal) to be more likely in those sleep was later in the morning .The present reports confirmed that the sleep which gives relaxation to the brain and body not only reduces the stress but also improves hunger and appetite, thereby have an impact on nutritional status in a positive manner.

iv. Impact of psychological factors among the selected Type 2 diabetic participants

In literature there were three studies documented associations between psychological factors and meal skipping (any meal) and Yilmaz et al 2015 found meal skipping (any meal) to be more

likely in those with depressive symptoms. In the present study understanding the effects of meal skipping on food intake that directly affects calorie distribution and dose of medication in diabetics the data on meal skipping and psychological factors were compared and presented in the Table 4.

Table 4 Impact of psychological factors among the selected participants

Psychological factors	Loss of Appetite	Per cent	Skipping of meals (1-2meals/day	Per cent
Sleeping Hours (<7hrs) (N=55)	**38**	**47.5**	**17**	**21.2**
Anxiety (N=33)	**32**	**40.0**	**18**	**22.5**
Mental Irritation (N=26)	**18**	**22.5**	**12**	**15**
Anger / Tension (N=12)	**7**	**8.75**	**6**	**7.5**
No complaints (N=12)	**-**		**-**	

Table 4 revealed that the 47.5 per cent who were sleeping less than 7 hrs have reported loss of appetite ,among them 21.2 per cent skipped the meals. Among 40 per cent of the subjects with anxiety 22.5 per cent were had the habit of skipping meals, out of them 15 per cent of the subjects reported mental irritation showed the decrease in the food intake and this was similar as reported in four studies related to hunger.

1.Effect of value added health mix on nutritional status of the selected Type 2 diabetic participants

i. Anthropometric measurements of the selected Type 2 diabetic participants before and after intervention

- **Body Weight, Body Mass Index (BMI), Triceps Skinfold Thickness(TST) and Hand Grip Strength(HGS) of the selected participants before and after intervention**

Replacement of traditional diets with energy-dense foods of low nutritional quality is reflected in the increase in the body weight due to the consumption of sugar, oil, milk and animal products and hence it is mandatory to re assess body weight and other anthropometric parameters. Mid-upper arm circumference (MUAC) has been found to be particularly effective in determining malnutrition among adults along with other anthropometric parameters like Triseps Skin-fold Thickness (TST), Mid Arm Circumference and Mid Arm Muscle circumference(MAMC) (Indira

et al,2016). MUAC is a useful indicator of malnutrition that can be used in ill patients (normal MUAC >23 cm in males, >22 cm in females (Tsai et al, 2010).

HGS is used as a proxy for muscle strength in many studies as mentioned in previous literature in the diagnosis of malnutrition in healthy populations (Schlüssel et al 2008) and hospitalized individuals (Pham et al 2007).Table 5 represents the Body Weight, Body Mass Index(BMI),Triceps Skinfold Thickness(TST) and Hand Grip Strength (HGS) of the selected participants before and after intervention.

Table 5 Body weight, BMI, TST and HGS of the selected participants before and after intervention

Parameters	Study Group	Before Intervention		After Intervention			p value
		Mean	SD	Mean		SD	
Body Weight	Control(N=40)	56.68	4.54	55.12	4.32		>0.05
	Experimental(N=40)	57.28	5.06	54.97	4.65		<0.05
BMI	Control(N=40)	22.15	1.96	21.87	2.01		>0.05
	Experimental(N=40)	22.47	2.02	20.78	1.89		<0.05
TST	Control(N=40)	11.84	1.34	11.14	1.23		>0.05
	Experimental(N=40)	11.13	0.97	11.05	1.04		>0.05
HGS	Control(N=40)	19.1	2.36	18.98	2.4		>0.05
	Experimental(N=40)	18.85	2.82	24.37	1.65		<0.05

From the above Table 5, it is evident to note that there was a significant ($p<0.05$) increase in the body weight and hence BMI along with increment in HGS among the experimental group after intervention which was not observed in control group($p>0.05$). Similar findings were also

observed by Alvares-da-Silva and Reverbel da Silveira (2005) among patients nutritional risk in comparison with SGA with the conclusion of HGS can be considered a reliable method to identify malnutrition The Table 4. also evidences from the TST values which was not significant($p>0.05$) showing that there was no deposition of fat among both the experimental and control group after intervention

- **CONCLUSION**

People with diabetes are also likely to have chronic muscle-skeletal co-morbidities. Pre and post operative malnutrition increases the morbidity rate and length of hospitalization for surgical patients. The prevalence of malnutrition in patients on admission to hospital is elevated. Orthopaedic surgery patients with surgical bone fractures and hip surgeries presented a deteriorating nutritional status, and higher incidence of many health problems.

Diabetic patients are at increased risk for adverse outcomes of surgery and results in complications affecting multiple organ systems, potentially resulting in adverse outcomes such as Surgical Site Infections (SSI), impaired wound healing, pseudarthrosis, hardware and implant failure and medical complications after orthopedic surgery. But at the same time, well controlled diabetic patients without co-morbidities have similar outcomes to patients without diabetes.

REFERENCES

1. Asif, M., Rooney,LW., Ali ,R., Riaz, MN. (2013).Application and opportunities of pulses in food system: a review. Crit Rev Food SciNutr.,53(11):1168-79.
2. Gill A., Hoogwerf B., Burger J., Bruce S., Macconell L., Yan P., et al. (2011) Effect of exenatide on heart rate and blood pressure in subjects with type 2 diabetes mellitus: a double-blind, placebo-controlled, randomized pilot study. Cardiovasc Diabetol 9: 6.
3. Gonzalez-Anton, C., Lopez-Millan, B., Rico ,MC., Sanchez-Rodriguez ,E., Ruiz-Lopez , Gil,A., Mesa, (2015). An enriched, cereal-based bread affects appetite ratings and glycemic, insulinemic, and gastrointestinal hormone responses in healthy adults in a randomized, controlled trial. J Nutr., 145(2):231-8.
4. Lee ,Y.M., Han, S.I., Song ,B.C., Yeum,K.J. (2015).Whole grain cereals for the primary or secondary prevention of cardiovascular disease. J Med Food., 18(11):1179-86.
5. Khongsdier R.(2016). Body mass index and morbidity in adult males of the War Khasi in Northeast, India. Eur J Clin Nutr., 56(6):484–489
6. Kim et al., (2016). Effects of dietary pulse consumption on body weight: a systematic review and meta-analysis of randomized controlled trials. Appl Physiol Nutr Metab., 36(5):634 -42.
7. Kiran, RP., Turina ,M., Hammel, J., Fazio, V. (2013). The clinical significance of an

elevated postoperative glucose value in nondiabetic patients after colorectal surgery: evidence for the need for tight glucose control?. Ann Surg., 258(4):599-604.

8. Kirwan,JP.,Malin ,SK., Scelsi , AR., Kullman,EL., Navaneethan ,SD., Pagadala, MR., Haus, JM., Filion.,J, Godin ,JP., Kochhar, S., Ross,AB. (2016). A Whole-Grain Diet Reduces Cardiovascular Risk Factors in Overweight and Obese Adults: A Randomized Controlled Trial. J Nutr., 146(11):2244-2251.
9. Konishi et al.,(2014) Long-term prognosis and clinical characteristics of young adults (≤40 years old) who underwent percutaneous coronary intervention. J Cardiol. 64(3):171-4.
10. Korol et al.,(2013).A systematic review of risk factors associated with surgical site infections among surgical patients.PLoS One., 8(12):e83743.