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Hand gripping ability of type-II diabetics and non-diabetic individuals

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Abstract

As per the World Health Organization, Diabetes Mellitus is a heterogeneous metabolic disorders characterized by common feature of chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism. The incidence of diabetes mellitus is increasing day by day all over the world. To achieve the purpose of the study 100 individuals were selected from Outpatient in general medicine department in RMMCH their age is between 50-60 years and these subjects were divided into Group A type-II diabetic individual (50 males) and Group B non-diabetics individual (50 males). The grip strength of both groups was measured by hand dynamometer. SPSS 16.0 version statistical software was used for statistical. Mean and standard deviation was used to evaluate the descriptive statistics. This study concluded that there is a significant reduction in grip strength in diabetic group.

Keywords: Grip strength, type II diabetic, non-diabetic, hand dynamometer

Introduction

As per the World Health Organization, Diabetes Mellitus is a heterogeneous metabolic disorders characterized by common feature of chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism. The incidence of diabetes mellitus is increasing day by day all over the world. Diabetes mellitus (DM) is associated with an increased incidence of functional disability. In several epidemiological studies it has been reported that arthritis, obesity, older age, coronary and peripheral vascular disease, nephropathy, neuropathy, retinopathy, stroke, depression and cognitive impairment are predictor of disability seen in diabetics. Grip strength is one of the many components to be considered in the examination of hand function. Grip strength is the force applied by the hand to pull on or suspend from objects and is a specific part of hand strength. Many daily functions and sporting events require high activity levels of the flexor musculature of the forearm and hands. The functional view point of the hand is the effector organ of the upper limb which supports it mechanically and allows it adopt the optimal position for any given action. A successful object manipulation is crucial for living an independent life. As diabetic individuals could present sensory deficits in their hands, they could decrease functional performance in task involving object manipulation. The aim of the study was to compare the grip strength in type-II diabetic and non – diabetic individuals.

Method

To achieve the purpose of the study 100 individuals were selected from Outpatient in general medicine department in RMMCH, their age is between 50-60 years and these subjects were divided into two equal groups Group A type-II diabetic individual (50 males) and Group B non-diabetics individual (50 males). The grip strength of both groups was measured by hand dynamometer. Before testing, the procedure was explained and demonstrated in local language.

Statistical Procedure

SPSS 16.0 version statistical software was used for statistical. Mean and standard deviation was used to evaluate the descriptive statistics i.e distribution of study subjects by grip strength of diabetic and non-diabetic individuals, mean age of diabetic and non-diabetic groups.

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Results

Table I: Mean and standard deviation of study samples
Groups Mean age (years) Standard deviation

Groups	Mean age (years)	Standard deviation
Diabetic	57.16	3.00
Non-diabetic	57.10	3.58
total	57.13	3.29

Table 1 shows the distribution of the study subjects with respect to mean age of diabetic and non-diabetic groups this table shows the mean age for diabetic is 57.16 and for non-diabetic is 57.10.

Table II: Comparison of Diabetic and Non-Diabetic Groups With Respect To Grip Strength (Kg) By Unpaired,, T'' Test

Variables ,,	Groups	Mean	S.D	t'' value	P- value
Grip strength in left hand	Diabetic	6.9	1.05	8.69	0.00
	Non-diabetic	8.34	0.52		
Grip strength in right hand 0.00	Diabetic	7.84	1.11	9.15	0.00
	Non-diabetic	9.46	0.58		

Significant at 5% level of significance ($P < 0.05$). df 98

Table II shows the distribution of study subjects with respect to grip strength for both right and left hand in diabetic and non-diabetic groups. The mean grip strength for diabetic left hand was 6.9 kgs. While for non-diabetic it was 8.34 kgs and the mean grip strength for diabetic right hand was 7.84 kgs. While for non-diabetic it was 9.46 kgs.

Discussion

Hand is an important target for diabetic musculoskeletal complications. Hand function is crucial for productivity and quality of life. This study value of grip strength was significantly lower in diabetic group compared with control non-diabetic group. The mean grip value for diabetic in left hand was 6.9 kgs and for non-diabetic was 7.84 kgs. The mean grip value for diabetic in right hand was 8.34 kgs and for non-diabetic was 9.46 kgs. The grip strength in right hand has greater value in both groups. These difference in the mean grip strength was significant at $P < 0.05$ ($P = 0.000$). This finding is in accordance with studies by centinus *et al.*, & sayer *et al.*, evaluated muscle strength and physical function in 1391 diabetic subjects it was found that mean grip strength in diabetic was 41.8 kg while as in normal nondiabetic it was 44.7 kgs ($P = 0.002$) and also the study done by Ezema C.I, I.welu E.V demonstrated that the increased risk of upper limb functional limitations in older individuals with long standing type 2 diabetes was higher value than the value for their diabetic. The difference in the mean grip strength also found to be significant at $P < 0.05$. The age of participants in this study is 50-60 years. The duration of type 2 diabetes is more than 5 years. The occupation of both group is office worker. The mean BMI of diabetic is 23.22 kg/m² and the mean BMI of non-diabetic is 22.59 kg/m². The mean grip strength in diabetic subjects for under weight (right 5.5 kgs ; left 4.5 kgs), healthy subjects (right 7.4 kgs ; left 6.4 kgs), over weight (right 8.9 kgs ; left 8 kgs). The mean grip strength in non-diabetic for healthy subjects [R 9.19, L 8.14], overweight (R 9.75, L 8.5). The subjects with higher BMI has greater grip strength in both group. This study value of grip strength was

significantly lower in diabetic group compared with control non diabetic group. The mean grip value for diabetic in left hand was 6.9 kgs and for non-diabetic was 7.84 kgs. The mean grip value for diabetic in right hand was 8.34 kgs and for non-diabetic was 9.46 kgs. The

Conclusion

This study concluded that there is a significant reduction in grip strength in diabetic group and so the evaluation and treatment at the earlier stages may help in preventing complications and also show better outcome in hand function.

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