



KNOWLEDGE, ATTITUDE AND PRACTICE OF DIET CONTROL AND EXERCISE IN PATIENTS WITH DIABETES MELLITUS TYPE-2 IN BISHA, KINGDOM OF SAUDI ARABIA.

Diabetology

Saad Salem

Mohammed

Alqarni

Department of Internal Medicine, King Abdullah Hospital, Bisha, Saudi Arabia.

Ibrahim Awad

Eljack

Department of Community Medicine, College of Medicine, University of Bisha, Bisha, Saudi Arabia.

Vijaya Marakala

Department of Basic Medical Sciences [Biochemistry], College of Medicine, University of Bisha, Bisha, Saudi Arabia.

Mohammad

Muzaffar Mir*

Professor and Head Biochemistry Department of Basic Medical Sciences College of Medicine University of Bisha Bisha, Saudi Arabia. *Corresponding Author

ABSTRACT

Background: Diabetes mellitus type-2 (DM-T2) constitutes a major public health concern and is one of the fastest growing diseases worldwide, projected to affect 693 million adults by 2045. Devastating macrovascular complications (cardiovascular disease) and microvascular complications (diabetic kidney disease, diabetic retinopathy and neuropathy) lead to increased mortality, blindness, kidney failure and an overall decreased quality of life in individuals with diabetes. An optimum glycemic control is a key to reduce the associated complications of DM-T2 and can be achieved by assessing the knowledge and attitude of patients in the management of the diseases followed by proper counseling.

Methodology: This is a descriptive cross-sectional study and was carried out on 400 diabetic patients (DM-T2) who attended diabetic center in King Abdullah Hospital, Bisha. A questionnaire was used for data collection from patients in the outpatient department after taking their prior permission. SPSS v.20 was used to analyse the data. Chi-square test was used to test the relationship between the categorical variables in the attitude and practice of diet control in patients with DM-T2. **Results:** Our results indicated a better understanding of the role of diet (73%) while as only about 42.5% of patients had a good knowledge about the role of exercise in the control of DM-T2. Majority of patients (61.5%) regularly visited their treating physicians and 47.5% of patients reported doing regular exercise, 54.75% patients confirmed the regular consumption of vegetables and fruits. A majority of patients (68.25%) reported that they enquire from their treating physicians about the role of diet and exercise in the prevention of complication associated with DM-T2. **Conclusions:** Our study revealed a good level of knowledge, attitude and practices of diet control and exercise among the diabetes patients attending one diabetic center in Bisha city of Aseer region of KSA. There is a need for more such studies involving a bigger sample size of the diabetic patients from the region.

KEYWORDS

Diabetes mellitus type-2 (DM-T2), Diet control, Exercise, Knowledge, Attitude, Practice

INTRODUCTION

Diabetes mellitus is a chronic metabolic disease which affects individuals, families and societies world over. Nearly half a billion people (463 million) are living with diabetes as of 2019 and the number is expected to increase by 25% in 2030 and 51% in 2045 [1]. The prevalence is higher in urban (10.8%) as compared to rural (7.2%) populations and higher in high income group (10.4%) than low income group (4%). It is among the top 10 causes of death in adults and the global expenditure was estimated to be 727 billion USD [2]. Middle Eastern and North African (MENA) countries have a higher prevalence of diabetes as compared to other regions in the world; the prevalence rate was 9.6% in 2017, and the rate is expected to increase to 12.1% by 2045 [3]. The high prevalence of DM in the MENA region is attributed to the urbanization process, high obesity rates and the increase in the aging population in these countries [4]. According to the International Diabetes Federation, Saudi Arabia has the highest rate of DM in the MENA region (prevalence rate of 17.7%) [5].

There are three major types of diabetes (type 1, type 2 and the gestational) and the type 2 diabetes mellitus (DM-T2) accounts for about 90% of the total cases [1]. (DM-2) is a progressive condition in which the body becomes resistant to the normal effects of insulin and/or gradually loses the capacity to produce enough insulin in the pancreas [6].

The short-term complications of diabetes mellitus include loss of weight and electrolytes as well as diabetic ketoacidosis (DK). The long-term complications of diabetes mellitus are renal failure (diabetic nephropathy), blindness (diabetic retinopathy), coronary artery disease (myocardial infarction) and locomotor system disorders or diabetic neuropathy [7-9].

Obesity, considered to be pandemic of the present century by WHO and other international organizations [10, 11] is associated with the development of important non-communicable chronic diseases

including DM-T2 [12,13]. The obesity in KSA has been on the rise for several years [13, 14] that in turn contributes to the increasing burden of DM-T2 in KSA. As DM-T2 is the most prevalent disease in Saudi Arabia, carrying a substantial economic burden [14], it is essential that public health interventions consider how to influence behavior in the Saudi population to better prevent and control this disease. The American Diabetes Association has made several recommendations regarding the medical nutrition therapy of diabetes which emphasize the importance of minimizing macro vascular and micro vascular [15] complications in people with diabetes. Four types of diets (that include the Mediterranean diet, a low carbohydrate/high-protein diet, a vegan diet and a vegetarian diet), have been shown to improve metabolic conditions in diabetic patients but the degree of improvement varies from patient to patient [16, 17].

With this background in mind, the current study was planned to find out the level of "Knowledge, Attitude and Practice (KAP)" among DM-2 patients in Bisha region of Saudi Arabia regarding importance of diet in overall control of DM-2 and its complications.

Patients & Methods:

Study Design: This descriptive cross-sectional hospital based study was conducted during the period from January to June 2020 by using the KAP questionnaire.

Study Area: Bisha is a city in the south-western Saudi Arabian province, Asir. It is located at 20°0'0"N 42°36'0"E. Bisha has a population of 205,346 according to the latest census.

Study Population: Both male and female DM-T2 patients were randomly selected from diabetic center of the King Abdullah Hospital. Children less than 15 years were excluded.

Data Collection Plan: The questionnaire was answered by random samples of patient who live in and around Bisha city. All the

participants consented voluntarily for their participation in the study.

Data Analysis: We used SPSS version 20 to analyze our data. Categorical variables were presented as frequencies and percentages. Chi-square was used to measure the correlation between two variables. P value of less than 0.05 was considered as significant.

Ethical Considerations: This study was approved by the institutional Ethics committee vide reference No: UBCOM/H-06-BH-087(03/19).

RESULTS

Demographics profile: A total of 400 patients were enrolled in the study comprising of 237 females (59.2%) and 163 males (40.8 %). Most of the patients were in the age group of 31-40 years [117 (29.3%)], followed by 41-50 years [112 (28.0%)], 51-65 years [99 (24.8%)] and 18-30 years [72 (18.0%)]. The minimum age of the patients was 18 years and the maximum was 65 years with a mean of 41.95 years. The age distribution of the study population is shown in Figure 1. The educational background of the study population is depicted in Figure 2. 20% (80) of the study population only attended primary school, 32% (128) attended high school, 39 (156), 9% (36) attended intermediate and 39% (276) obtained academic degrees. The characteristics of BMI for the study population are given in Figure 3. BMI of less than 18 was observed in 12(3%), 18-25 in 64(16 %), 26-30 in 108 (27%), 31-35 in 144(36 %), 36-40 in 48 (12) and > 40 in 24 (6%) study subjects.

Response of Participants to the KAP variables:

Knowledge: Out of 400 respondents 292 (73.0 %) were aware about role of diet in the control of DM-2, 63 (15.75%) didn't know about the role of diet in the control of DM-2 and 45(11.25%) were not sure about the role of diet in the control of DM-2. A total of 170 patients (42.5%) appreciated the role of exercise in the prevention of diabetic complications, 54 patients (13.5 %) were not sure about this and 176(44%) had no knowledge about the role of exercise in the prevention of diabetic complications. About the choice of best exercise for DM-2 patients of different age groups, 162(40.5) were aware of the suitable exercise, 160 (40%) were not aware at all and 78 (19.5) were not sure about the choice of exercise suitable to them. The response of the patients regarding the knowledge related to role of diet and exercise in DM-2 is summarized in Table 1.

The overall scoring of knowledge section regarding the role of diet and exercise in the control of DM-2 is shown in Fig. 4. As can be seen, 46.75% had good knowledge, 38.81% of the respondents had no knowledge and 14.43% of respondents had fair knowledge section regarding the role of diet and exercise in the control of DM-2.

Attitude towards diet and exercise: The Overall score of attitudes of the study population towards diet and exercise are summarized in Table 2. Out of 400 respondents, 168 (42%) consume vegetables and fruits in their daily meals and 197 (49.3%) consume them sparingly but 35 patients (8.8%) do not consume vegetable and fruits at all. Out of 365 respondents who ate vegetables and fruits in their daily meals, 229(57.3%) ate them once, 100 (25%) ate them twice daily and 36 (9%) ate three times daily. 108 patients (27%) followed their diet charts strictly, 138(34.5%) followed sometimes and 154(38.5%) didn't follow at all. 115(28.7%) patients claimed that they are performing their exercise daily, 126(31.5%) are irregular in their exercise schedule, 105(26.3%) perform exercise weekly and 54(13.5%) patients do not perform exercise at all.

Practices: Various pertinent questions were asked to the patients regarding their physician visits, the sources of diet advice, the exercises status and plan, consumption of vegetables and fruits in their daily meals and their efforts to be aware about the role of diet and exercises in the prevention of complications of DM-2 by. The patient responses are represented in Table 3. Majority of the patients (61.5 %) regularly visited their treating physicians, 24 % visited sometimes and 15.5 % were very irregular. In response to the question about the sources of advice for their diet plans, majority of the patients (51.7%) reported that they get it from their physicians, 24.8% from internet, 14.5% from social media and 2.8 % from TV. In response to the question on regular exercise, 47.5 % replied in affirmation, 31% reported sometimes and 21.5% replied they didn't do any exercise at all. On being asked about the consumption of vegetables and fruits regularly in their meals, 54.75% consumed regularly, 26.75% consumed sometimes and 18.5 % didn't consume at all. The response

to the question about the patient's enquiry from the treating physician's on role of diet and exercise in the prevention of DM-2 complications was positive in majority of cases (68.25%), 12.5% patients reported that they ask their physician sometimes about this issue while as 18.75 reported that they never ask their treating physician about this.

DISCUSSION

In our study 18%, 29%, 28% and 25% patients belonged to age groups of 18-30, 31-40, 41-50 and 51-65 year respectively, which is at a variance to some early studies which showed majority of the patient population above the age of 41[18 and 19]. This observation in our study points to the fact that perhaps the DM-T2 has an early onset in Saudi Arabia which might correlate with the life style of the local population. This might need more elaborate studies with high sample number and involving multiple centers in KSA.

The overall KAP scores of our patients were on the higher side as compared to few earlier studies which reported low KAP indices [20-22]. Other studies from Malaysia and Ethiopia reported good KAP scores [23, 24]. The variation in the KAP scores reported in different studies may reflect the socioeconomic status and literacy rate of the participants. In addition, it could also be due to differences in the training and available information on diabetes to the study populations. In our study a substantial percentage of patients (39%) had academic degrees, a reflection of the fact that educational background is strong indicator of high KAP scores as reported by earlier studies from other regions of Saudi Arabia [25, 26]. Our results indicated a better understanding of the role of diet (73%) while as only about 40% of patients had a good knowledge about the role of exercise in the control of Dm2. About 54 % of patients reported knowledge about the role of fruits and vegetables and about 68% showed their keenness to engage with their treating physicians about the complications of diabetes. Some of the earlier studies from some regions of Saudi Arabia reported low awareness about the different facets of DM-T2 [27, 28], which is contrary to our findings. The high KAP scores in our study can be attributed to the fact that government agencies especially ministry of health, KSA has immensely invested in the healthcare infrastructure in the form of many specialized diabetic centers and also community educations programmes through print and social media for last more than a decade. Our findings are consistent with other studies which reported high awareness from Saudi Arabia [23, 25-27].

A better disease control in DM-T2 patients necessitates a better coordination between the patient and the treating physicians and other healthcare workers [22]. In order to achieve better outcomes in the DM-T2 patients, the overall awareness regarding the role of diet, exercise and other modifications in the life style needs to be emphasized through different engagement programmes.

In a country like Saudi Arabia where the overall burden of DM-T2 is increasing day by day, this is very important and the healthcare organizations should actively provide education to diabetes patients from time to time. Since sedentary life style contributes to the complications of the disease, it is imperative on the care givers to increase the awareness of the patients about this important issue. Our observation of higher KAP values associated with higher levels of education in our patients points to the importance of education and awareness level of the society.

The healthcare providers need to lay more focus on the awareness programmes in the patients with low education levels in particular, that could be achieved through community outreach of medical and other healthcare institutions, government sponsored communication media and other print and social media platforms.

CONCLUSION:

Our study revealed a good level of knowledge, attitude and practices of diet control and exercise among the diabetes patients attending one diabetic center in Bisha city of Asir region in KSA. There is a need for more such studies involving a bigger sample size of the diabetic patients from the region.

Limitations of the study:

The limitation of this study is that it was conducted only on the patients who reported to the outpatients department of the diabetic center, in Bisha. There are other healthcare institutions in this region which also cater the diabetic patients. As such the findings in our study population

cannot be extrapolated in general to the overall diabetic population of the Asir region.

Conflict of interest: The authors declare no conflict of interest.

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Legend to Figures:

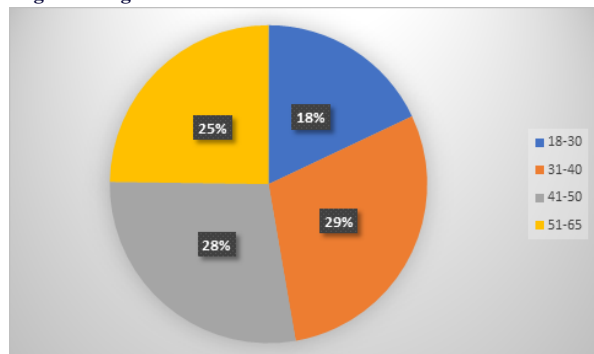


Figure 1: Age distribution of study population.

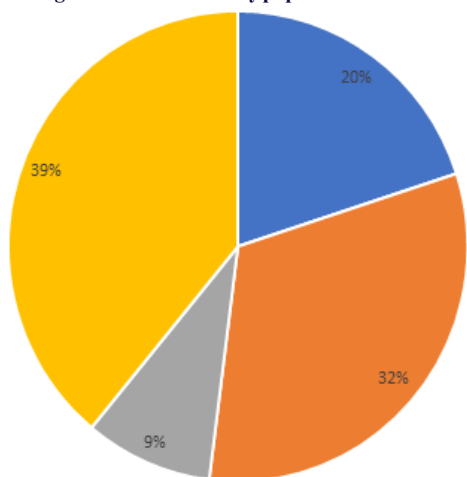


Figure 2. Educational background of the study population

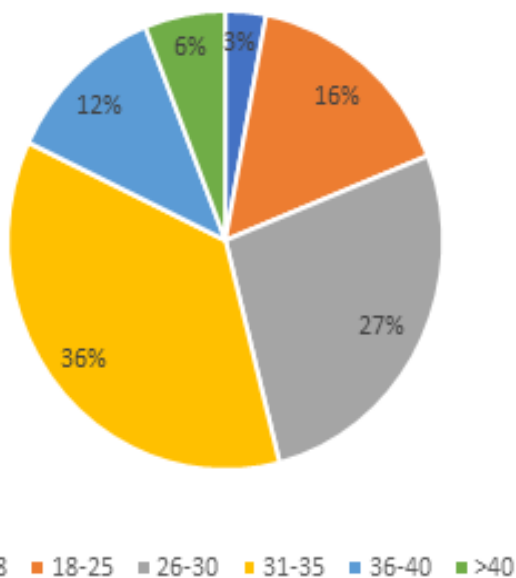


Figure 3 The BMI details of the study population.

- 1. Fair knowledge
- 2. No Knowledge
- 3. Good Knowledge

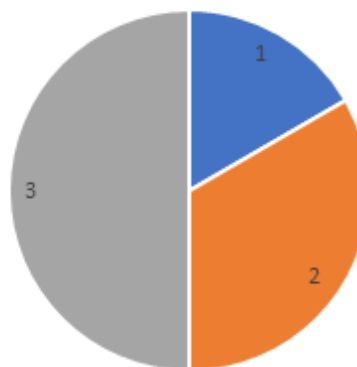


Figure 4. The overall score of knowledge regarding the role of diet and exercise in the control of DM-2 patients.

Table. 1 The response of the patients regarding the knowledge related to role of diet and exercise in DM-T2 [N=400]

Item of questionnaire	Response	Frequency	Percent
Do you know diet can help in control of DM-2?	No	63	15.75
	Not sure	45	11.25
	Yes	292	73.00
	Total	400	100
Do you know the diets which you have to follow in your case?	No	222	55.50
	Not sure	54	13.50
	Yes	124	31.00
	Total	400	100.0
Do you know exercises can prevent DM-2 complication?	No	176	44.00
	Not sure	54	13.50
	Yes	170	42.50
	Total	400	100.0
Do you know the best exercises for your age group?	No	160	40.00
	Not sure	78	19.50
	Yes	162	40.50
	Total	400	100

Table: 2 Overall score of attitudes of DM-T2 patients towards diet and exercise. N=400

Item of questionnaire	Response	Frequency	Percent
Do you eat vegetables and fruits in your meals?	No	35	8.8
	Sometimes	197	49.3
	Daily	168	42.0
	Total	400	100.0
If your answer to the above question is yes, how many times do you eat vegetables and fruits in your meals?	3 times or more	36	9.0
	Once	229	57.3
	Twice	100	25.0
	Total	400	100.0
Do you follow a diet chart in your meals daily?	No	154	38.5
	Sometimes	138	34.5
	Yes	108	27.0
	Total	400	100.0
If your answer to the above question is yes, which of these diets do you follow?	None	120	30.0
	A low carbohydrate diet	68	17.0
	A vegan diet	26	6.5
	Mediterranean diet	178	44.5
Do you perform any exercises daily or weekly?	Vegetarian diet	8	2.0
	Daily	115	28.7
	Irregular	126	31.5
	No	54	13.5
Total	Weekly	105	26.3
	Total	400	100.0

Table: 3 Overall score of attitudes of DM-T2 patients (N=400)

		Frequency	Percent
Do you visit your doctor regularly?	No	58	14.5
	Sometimes	96	24.0
	Yes	246	61.5
	Total	400	100.0
From which of these sources do you get advice about your about diet plan?	TV	11	2.75
	Internet	99	24.75
	Physician	221	55.25
	Social media	69	17.25
Do you exercise regularly?	No	86	21.50
	Sometimes	124	31.00
	Yes	190	47.50
	Total	400	100.0
Do you consume vegetables and fruits regularly in your meals?	No	74	18.50
	Sometimes	107	26.75
	Yes	219	54.75
	Total	400	100.0
Do you ask/enquire from your doctor about the prevention of the complications of DM-2	No	75	18.75
	Sometimes	52	12.50
	Yes	273	68.25
	Total	400	100.0

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The Effect on Stroke Survivors Functional Outcome According to their Gender

Abdulmajeed Ali Alkathami¹, Omar Khaled Ameen^{2*}, Reem Hussein Darwich³, Ali Mahmoud Albalawi² and Elhadi Miskeen⁴

¹5th Year Medical Student, Bisha University, KSA

²Stroke Fellow Physician, King Fahad Medical City, Riyadh, KSA

³Pediatric Cardiology Fellow Physician, Prince Sultan Cardiac Center, Riyadh, KSA

⁴Assistant Professor of Obstetrics and Gynecology, Bisha University, KSA

*Corresponding Author: Omar Khaled Ameen, Stroke Fellow Physician, King Fahad Medical City, Riyadh, KSA.

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Abstract

Introduction: Functional impairments accumulated after the stroke significantly affect daily living activities, and these patients often need assistance in performing basic life activities. The study aimed to assess the gender differences in functional disabilities among stroke survivors in home care facilities in the Bisha City of Saudi Arabia.

Methodology: An institutional survey was conducted using a standardized proforma. The proforma had the provision for recording sociodemographic details, and post-stroke functional status (degree of disability) was recorded using the Modified Rankin Scale (MRS). Pearson's chi-square test was used to see the association of degrees of disability with various sociodemographic and medical status of the stroke survivors.

Results: The mean mRS score was found to be 3.87 ± 0.8 , where male stroke survivors showed significantly higher scores (4.10 ± 0.9) compared to females (3.70 ± 0.7) ($p = 0.034$). The IRS assessment also showed that severe disability was seen in 25.9% of patients, and it was comparatively higher in male stroke survivors. The degree of disability was also significantly higher among stroke patients who didn't involve in any physical activities ($p = 0.047$).

Conclusion : Functional status was more severe in male stroke survivors than females. Understanding the gender differences in the health profile would help the health professional for a better orientation of rehabilitative care in order to improve current intervention and/or implement new treatment strategies.

Keywords: Rehabilitation; Stroke; Functional Disability; Health Related Quality of Life

Introduction

The global prevalence of stroke was estimated to be 101.5 million in 2019, where it was the second leading cause for disability-adjusted life-years in the geriatric population [1]. Approximately 90% of stroke survivors have compromised functions, and more than half of the affected individuals need assistance with activities of daily living (ADLs) or instrumental activities of daily living (IADLs) [2,3]. Thus healthcare professionals, including physical therapists, have a pivotal role in reducing the impact of stroke on ADLs. Adequate follow-up and assistance in recovering health and

functionality are essential to prevent further disability and also to promote health and functionality. Several factors influence post-stroke functional disability such as older age, lesser educational level, the severity of stroke symptoms, depression, anxiety, family support and physical activity or rehabilitative care, and stroke recurrence within 5-years follow-up [4-6]. The stroke rehabilitation clinical guidelines recommend the following: systematic follow-up of patients by a multidisciplinary team, participation of patients in physical exercise programs, and assessment of patients at least once a year to verify the need for new rehabilitation [7].

In the Kingdom of Saudi Arabia, the total estimated population size in 2020 was 35.1 million, of which 21.3 million are native Saudis, and 13.6 million are non-Saudis [8]. There is a lack of data regarding the prevalence of stroke and also about the post-stroke functional disabilities experienced by the affected individuals. Even though there is no recent nationwide data regarding the incidence and prevalence of stroke, the rates are low compared to other western countries, as reported by some population-based studies [9-11].

Health-Related Quality of Life (HRQoL) is an imperative index for measuring the functional outcomes in stroke survivors. Many factors such as age, gender, social support, disability undertaking, and rehabilitative care are some of the main determinants of HRQoL in these affected individuals [12]. Numerous studies have stated poor functional disabilities among stroke survivors compared to that of the general population [12,13]. Although, stroke survivors almost have a less physical disability by the end of the first three to four months and tend to show some gains in functional measures [14]. It is reported that only 25% of the stroke survivors returned to the level of everyday participation and physical functioning compared to the stroke-free community dwellers [15]. A study done in KSA reported that age and functional abilities play vital roles in influencing HRQoL [16]. The gender differences in numerous aspects of stroke, such as risk factors, clinical features, mortality rate, and functional measures, etc., are well recognized. Female stroke patients who have higher life expectancy than male patients may become a huge burden for society and the healthcare sector [17]. It is thus important to investigate the gender differences in post-stroke functional disabilities among the geriatric population who are stroke victims. There is a scarcity of information related to mortality and functional outcomes in stroke patients in Saudi Arabia. Identifying the health and functional profile of the stroke survivors of a particular region would help assess the common needs of this group. This could be used to implement new and/or modify existing rehabilitative and home care services based on these survivors' identified common needs. Hence this study was aimed to assess the gender differences in post-stroke functional disabilities and associated factors among stroke survivors in the Bisha region of Saudi Arabia.

Methodology

A cross-sectional study was done among stroke survivors who were residents of elderly home care facilities in Bisha City, Saudi

Arabia. We identified 85 stroke survivors out of 404 home care beneficiaries. The ethical approval to perform the survey was taken from the Research and Ethics Committee of Bisha University. The identified subjects were informed about the purpose and benefits of the study, and consent was taken from all 85 participants.

A standardized proforma was used to collect information that included Sociodemographic characteristics, personal and medical history, information related to rehabilitative (physiotherapy) and home care activities, and a modified Rankin Scale (mRS) [18] was used for assessing functional independence. A single calibrated examiner through a mixture of interview and examination collected information.

Data management and statistical analysis

The responses obtained were entered in Microsoft Excel and subjected to statistical analysis by an independent biostatistician. An SPSS version 23 (IBM Corp. USA) was used for carrying out the required statistical analysis. Continuous variables were expressed as means with standard deviations, and categorical variables were presented as frequencies and percentages. Association between categorical variables was tested using Pearson's Chi-square test. A probability value (p-value) less than 0.05 was considered to be statistically significant.

Results

The mean age of the subject in our study was found to be 79.6 ± 10.7 years. The sociodemographic characteristics showed that 54.1% were females, 68.2% lived in Bisha city, 97.6% had no formal education, and 65.9% had a normal Body Mass Index. It was found that 96.5% were hypertensive, 54.1% had Diabetes Mellitus, and 14.1% had Heart diseases. A family history of stroke was reported by 41.2% of the participants.

The assessment of the Degree of disability or dependence was done using the modified Rankin Scale (mRS). The mean mRS score was found to be 3.87 ± 0.8 , where male patients showed significantly higher scores (4.10 ± 0.9) than females (3.70 ± 0.7), $p = 0.034$. It was found that all the subjects had some form of disability where 25.9% had a severe disability, 37.6% had a moderately severe disability, and 34.1% had a moderate disability (Figure 1). When we evaluated the relationship of Degree of disability with the gender of the participants, it was found the severe disability was comparatively higher in male patients (68.2%) compared to

females (31.8%), whereas moderately severe disability and moderate disability were found to be more in females (56.3%, 72.4%) than males, which showed a statistically significant association ($p = 0.013$). There was no statistically significant relationship observed with age ($p = 0.971$) and the Body mass index of the participants ($p = 0.466$). Our study found that 45.5% were doing physical activity during home care, and it was observed that severe disability (54.5%) was comparatively more in patients who didn't do any physical activity, which showed a statistically significant association ($p = 0.047$). Patients' Degree of disability didn't have any significant relationship with the duration spent in-home care ($p = 0.788$) (Table 2).

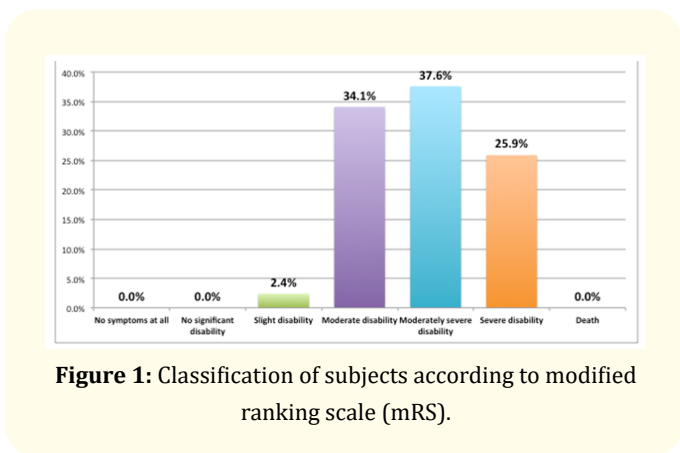


Figure 1: Classification of subjects according to modified ranking scale (mRS).

		Frequency	Percent
Gender	Female	46	54.1
	Male	39	45.9
Residence	Bisha city	58	68.2
	Bisha villages	27	31.8
Education	No formal education	83	97.6
	High school	1	1.2
	University education	1	1.2
Occupation	Jobless	73	85.9
	Retired	12	14.1
Body Mass index	Underweight	15	17.6
	Normal	56	65.9
	Obese	6	7.1
	Overweight	8	9.4
Smoker	No	83	97.6
	Yes	2	2.4
Comorbidities	Hypertension	82	96.5
	Diabetes Mellitus	46	54.1
	Heart diseases	12	14.1
Family history of stroke	No	50	58.8
	Yes	35	41.2

Table 1: Baseline characteristics of the participants.

Slight disability		Degree of disability or dependence				Total	P value*
		Moderate disability	Moderately severe disability	Severe disability			
Sex	Female	0	21	18	7	46	0.013
		0.0%	72.4%	56.3%	31.8%	54.1%	
Sex	Male	2	8	14	15	39	0.013
		100.0%	27.6%	43.8%	68.2%	45.9%	
Age	<=65 years	0	3	3	2	8	0.971
		0.0%	10.3%	9.4%	9.1%	9.4%	
Age	>65 years	2	26	29	20	77	0.971
		100.0%	89.7%	90.6%	90.9%	90.6%	
Body Mass Index	Normal	2	19	21	14	56	0.466
		100.0%	65.5%	65.6%	63.6%	65.9%	
	Obese	0	3	2	1	6	
		0.0%	10.3%	6.3%	4.5%	7.1%	
	Overweight	0	1	2	5	8	
		0.0%	3.4%	6.3%	22.7%	9.4%	
	Underweight	0	6	7	2	15	
		0.0%	20.7%	21.9%	9.1%	17.6%	

Physical activity	No	0	6	14	12	32	0.047
		0.0%	20.7%	43.8%	54.5%	37.6%	
	Yes	2	23	18	10	53	
		100.0%	79.3%	56.3%	45.5%	62.4%	
Duration in home care	1-2 years	1	13	11	11	36	0.788
		50.0%	44.8%	34.4%	50.0%	42.4%	
	2-5 years	1	8	14	7	30	
		50.0%	27.6%	43.8%	31.8%	35.3%	
	> 5 years	0	8	7	4	19	
		0.0%	27.6%	21.9%	18.2%	22.4%	

Table 2: Relationship between degree of disability and other baseline characteristics.

*p value <0.05 is considered statistically significant.

Discussion

The current study findings showed that all the stroke survivors in the home care facilities experienced some form of disabilities, with approximately 30% suffering from severe disability. The literature search shows that there are no long-term follow-up studies done that assessed post-stroke functional disabilities in Saudi Arabia. The male stroke survivors showed comparatively more severe disability than females. A study done by Kim, *et al.* among Korean stroke survivors reported that females had significantly higher functional disabilities than males [19]. It is suggested that females have worse post-stroke functional outcomes due to many factors such as weaker social and family support, with a majority of them being aged and widowed [20]. Also, females are being frailer and exhibit an imbalance between medical and social factors that make them more vulnerable to functional disabilities [21]. In our study, more than one-third of the stroke survivors didn't attend any physical activities. The social activities of the geriatric population are usually restricted and may have a tendency to receive less physical activity compared to other younger populations.

There are inconsistent findings regarding gender differences in stroke prevalence as some studies showing higher prevalence in aged women [22,23] while some other studies reporting higher prevalence among aged men [24-26]. Many factors influence stroke patients' functioning and/or disability, including body structure and function, participation in physical activity [27]. The environment is found to be a determining factor for the improvement of functional outcomes in stroke patients [4,28]. There is a decline in

life satisfaction and well-being after stroke in the majority of stroke patients, which is the result of loss of activities [29,30]. Additionally, older people suffering from chronic diseases were found to have a more functional disability and disability in self-care than others free from comorbidities [31]. In our study, the majority of the stroke survivors were suffering from one or more chronic conditions, and these hindered their recovery to normal functional activities. Moreover, these patients often have other impairments of different magnitude, often making it difficult to attend outpatient medical visits independently. Stroke survivors may sometimes find it difficult to reengage in valued post-stroke activities due to money, family, and social support, which are needed to supply personal adapted equipment such as assistive aids, good quality transportation service, and educational support. Thus, it is highly relevant that the rehabilitative activities should focus on constructing a supportive 'post-discharge environment.' Rehabilitative professionals should recognize and eliminate those environmental barriers that pose risks in the improvement of functional disabilities. A family member is usually responsible for caregiving and assisting with healthcare tasks. Thus it is essential to include these family members in the post-stroke follow-up and rehabilitative service planning. Evidence shows that caregivers' involvement in rehabilitative care plans and providing essential education to them could reduce economic burden and increase the care recipients' satisfaction [32].

This survey research has some limitations, and these should be addressed before interpreting the findings. Firstly, this was a single

institutional study than a multicenter-based or population study, and thus the findings cannot be generalized for all Saudi stroke survivors. Secondly, we didn't collect the pre-stroke mRS scores, and thus it was not possible to evaluate the premorbid functional status and compare it to the post-stroke status. Finally, we couldn't get other information about the stroke patients, such as economic status, caregivers' characteristics, or familial support, all of which might influence the functional outcomes.

Conclusion

The study findings showed that the severity of disability was comparatively higher among male stroke survivors. The disability was severe in people who didn't involve in any physical or rehabilitative activities. There is a need to identify the factors that influence the severity of functional disabilities, and gender-specific management guidelines should be developed when planning rehabilitative care or physical activities in post-stroke patients.

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