http://www.pjbs.org

PJBS

ISSN 1028-8880

Pakistan Journal of Biological Sciences

ANSInet
Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

OPEN ACCESS Pakistan Journal of Biological Sciences

ISSN 1028-8880
DOI: 10.3923/pjbs.2020.1285.1290

Research Article
Prevalence and Impact of Weight Self Stigmatization on Type II Diabetes Glycemic and Cardiovascular Markers Control

[1]Khaled A. Alswat, [1]Reem Waslallah Alsuwat, [1]Kholoud Metaeb Aljaed and [2]Daif Allah M. Almalki

[1]School of Medicine, Taif University, Taif, Saudi Arabia
[2]Prince Mansour Diabetes Center, Taif, Saudi Arabia

Abstract

Background and Objective: Patients with Type II Diabetes (T2D) are at high risk for developing serious diabetes related complications. The primary study goal was to assess the weight stigma among our T2D patients and its relation to various diabetes and cardiovascular related markers. **Materials and Methods:** A cross-sectional study was carried out for adult T2D patients whom had a routine clinic visit between the period of May-August, 2019. Validated Weight Self Stigma (WSS) Questionnaire was used and those with a total score of >30 points were considered at increased risk of stigmatization. Study included a total of 663 T2D patients with a mean age of 57.3±22.0 years, mostly female with long standing diabetes and a mean BMI in the overweight range. **Results:** About 45.6% of the sample were considered to have high risk for self-stigmatization. Compared to those whom considered to have low risk for self-stigmatization, those who were high risk were mostly female (p 0.046), have longer T2D duration (p 0.161), higher BMI and higher systolic blood pressure (p<0.001 and 0.006), lower diastolic blood pressure (p 0.004), higher resting heart rate (p 0.002), more likely to be divorced (p 0.046), higher educational level and income (both p<0.001), have retinopathy and neuropathy (p<0.001 and 0.009) and exercise more than 150 min/week if physically active (p<0.001). **Conclusion:** High risk self-stigmatization was highly prevalent among T2D patients' sample. It was also associated with worsening in some of the measured cardiovascular markers and having more microvascular complications despite the comparable HbA1c and lipid profiles.

Key words: Type 2 diabetes, stigma, obesity, body mass index, lipid profile, hypertension, diabetic complications

Citation: Khaled A. Alswat, Reem Waslallah Alsuwat, Kholoud Metaeb Aljaed and Daif Allah M. Almalki, 2020. Prevalence And impact of weight self stigmatization on type II diabetes glycemic and cardiovascular markers control. Pak. J. Biol. Sci., 23: 1285-1290.

Corresponding Author: Khaled A. Alswat, School of Medicine, Taif University, Taif, Saudi Arabia Tel: +966555449878

Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Diabetes Mellitus (DM) is described as a metabolic disorder of various etiology characterized by elevated plasma glucose along with a disturbance in metabolism resulting from insulin deficiency, resistance or both[1]. Not only the sedentary lifestyle and obesity are responsible for the high number of patients been diagnosed with DM but also population aging and urbanization contributes to the observed epidemics[2]. Cardiovascular and renal related complications is commonly prevalent in those with type II diabetes (T2D)[3].

Globally, in 2000 the prevalence of DM was estimated to be 2.8% which expected to double in 2030[2]. About 23.7% of the Saudi population has either type I or type II diabetes according to a recent published study[4]. Saudi Arabia ranks number one in the prevalence of DM according to the 2013 Middle East and North Africa region (MENA) statistics[5]. The global burden of T2D is increasing dramatically, with an estimated 23.6 and 370 million in the United State and worldwide have DM respectively[6-7].

Individuals with a Body Mass Index (BMI) of 30 and above are considered to have obesity. There is an association between obesity and T2D[8]. Published studies indicated that the prevalence of obesity is increasing in Saudi[9]. Worldwide, in 2008 overweight adults reached 1.5 billion with around five hundred million of them were obese[10].

A study showed that an increase in the health care avoidance were observed among those with higher BMI. Weight related causes for delaying health care includes weight gain since last clinic visit and not willing to measure weight during the clinic visit[11]. Being overweight or obese was associated with an increased risk of weight related Stigma[12]. Recent study showed a positive association between weight stigma and both obesity and DM risk[13]. Another study showed that weight gain is a barrier that negatively affect glycemic control[14].

Interventions to reduce the impact of weight stigma on the T2D patient's life are needed to be implanted[15]. The need to increase the community and the healthcare providers weight stigma awareness is very important to develop strategies that will help prevent this stigma[13]. Study goal was to assess the weight stigma among our T2D patients. Also, the aim was to evaluate the relation between weight stigma and various diabetes and cardiovascular related markers.

MATERIALS AND METHODS

Study area: This is a cross-sectional study for adult T2D patients whom had a routine clinic visit to Prince Mansour Diabetes Center, Taif, Saudi Arabia between the period of May-August, 2019. Those with existed psychiatric diagnosis, T1D and those with gestational diabetes were excluded.

Data collection: The study was approved by the ethical committee of Alhada Military Hospital. Verbal consent was given by the patients who participated and each response was kept strictly confidential. Data were collected through a questionnaire which was administered to each patient by one of the research team members. Study included the following items: Personal information's, physical activities, duration of T2D diagnosis and T2D related complications and medications. At the time of the clinic visit, vital signs were measured including Blood Pressure (BP), heart rate and weight and height for each patients and BMI was calculated by the researchers. Recent laboratory data was collected from the patient's electronic medical record. Those who reports monthly income above 15000 Saudi Riyals were considered to have high income while those reports monthly income less than 5000 Saudi Riyals were considered to have low income.

Clinical measurements: To screen for weight stigma risk, a validated Weight Self Stigma (WSS) Questionnaire was used. The WSS questionnaire includes 12 items with each one contains 5 point Likert scale choices as follow with its scoring, completely disagree (1 point), mostly disagree (2 points), neither agree nor disagree (3 points), mostly agree (4 points) and completely agree (5 points). The maximum score for each item is 5 points and the lowest score for each item is 1 point. The maximum overall score for the 12 items is 60 points while the lowest is 12 points. Participants can be classified into high Risk or low Risk based on their overall scores in WSS. Higher scores on this measure indicate increased risk of stigmatizing while lower scores on this measure indicate low risk of stigmatizing. Since our mean WSS score was 29.5±13.0, we considered those with a total score of 30 points or more to be at increased risk of stigmatization while those scored less than 30 points were at low risk of stigmatization.

Statistical analysis: Data were entered and analyzed by using the Statistical Package for the Social Sciences (SPSS) version 23. To study the relationship between variables Chi-squared test and to compare between means t-test was been used.

RESULTS

Baseline characteristics: Study included a total of 663 patients who agreed to participate with a mean age of 57.3±22.0 years, mostly female with long standing diabetes (Table 1). The mean BMI was in the overweight range and the mean blood pressure readings were controlled. Majorities of the patients were married and have low educational achievements of high school or less and were considered to have an average economic status based on their reported income. Hyperlipidemia was the most common comorbid conditions followed by retinopathy while end-stage renal disease and stroke was the least prevalent among the study sample. Oral hypoglycemic agents alone were the most common treatment modalities followed by the combined oral and injectable medications. The mean HbA1c and fasting glucose were in the uncontrolled range while the measured lipid profile was at goal for the majorities of our sample. Interestingly, more than two third of the study sample reports were physically active but unfortunate most of those physically active individuals didn't meet the minimal required physical activity goal for individuals with T2D.

Weight stigmatization prevalence and characteristics: 45.6% of the sample were considered to have high risk for self-stigmatization based on the WSSS score (Table 2). Compared to those whom considered to have low risk for self-stigmatization, those who were high risk were mostly female (p 0.046), have longer T2D duration (p 0.161), higher BMI (p<0.001), higher systolic blood pressure (p 0.006), lower diastolic blood pressure (p<0.004), higher resting heart rate (p<0.002), likely to be divorced (p 0.046), higher educational level (p<0.001), higher income (p<0.001), hyperlipidemia (p 0.086), retinopathy (p<0.001), neuropathy (p 0.009), end-stage renal disease (p 0.236), complex treatment regimen (combined oral and insulin) (p 0.038), higher HbA1c (p 0.381), comparable lipid profiles (all p>0.05), lower serum creatinine (p 0.189), report sedentary lifestyle (p 0.096), exercise more than 150 min/week if physically active (p<0.001), but less likely to have stroke (p 0.093).

Table 1: Baseline characteristics of the whole cohort

Baseline characteristics (N = 663)	
Mean age (years)	57.3±22.0
Female (%)	59.3
Mean diabetes duration (years)	13.5±8.70
Mean WSSS (points)	29.5±13.0
Mean BMI (kg m^{-2})	29.7±5.80
Mean systolic blood pressure (mmHg)	126.6±15.9
Mean diastolic blood pressure (mmHg)	77.8±11.3
Mean heart rate (beats min^{-1})	85.2±11.6
Socioeconomic (%)	
Married	92.5
Divorced	1.8
Single	5.7
Bachelor degree or higher	21.3
High income	9.9
Low income	40.0
Comorbidities and complications 60 (%)	
Hypertension	28.8
Hyperlipidemia	60.0
Retinopathy	49.6
Neuropathy	44.9
End stage renal disease on dialysis	8.0
Cardiac disease	13.0
Stroke	6.2
Management modalities (%)	
Diet only	0.9
Oral hypoglycemic agents only	36.5
Insulin only	30.3
Oral hypoglycemic agents and insulin	32.3
Laboratory data	
Fasting glucose (mmol L^{-1})	10.4±7.6
HbA1c (%)	8.8±2.2
Total cholesterol (mmol L^{-1})	4.3±1.4
LDL (mmol L^{-1})	2.5±1.0
HDL (mmol L^{-1})	1.1±0.4
Triglyceride (mmol L^{-1})	1.7±1.0
Serum creatinine (mmol L^{-1})	80.0±36.1
Positive urine microalbuminuria (%)	21.0
Lifestyle habits	
Sedentary lifestyle (%)	27.0
Exercise <150 min/week	67.9
Exercise 150-300 min/week	23.1
Exercise >300 min/week	9.0

There was no relationship between the WSSS score and the HbA1c level when compared the cohort based on the WSSS quartile (Fig. 1).

Partial correlation adjusting for gender, marital and educational status, monthly income, management modalities and microvascular and macrovascular complications showed non-significant negative correlation between the following; WSSS and age (r-0.024, p 0.549), WSSS and HbA1c (r-0.013, p 0.749) and WSSS and T2D duration (r-0.021, p 0.604).

Table 2: Baseline characteristics based on WSSS classifications

	High risk for self-stigmatization	Low risk for self-stigmatization	p-value
Baseline characteristic			
Number of patients (%)	45.6	54.4	n/a
Mean age (years)	57.2±14.8	57.4±26.7	0.885
Female (%)	63.5	56.8	0.046
Mean diabetes duration (years)	14.0±9.0	13.1±8.5	0.161
Mean BMI (kg m^{-2})	31.1±6.4	28.6±5.1	<0.001
Mean systolic blood pressure (mmHg)	128.5±17.1	125.0±14.8	0.006
Mean diastolic blood pressure (mmHg)	76.4±11.0	78.9±11.5	0.004
Mean heart rate (beats min^{-1})	86.7±11.7	83.9±11.4	0.002
Socioeconomic (%)			
Married	92.6	92.2	0.046
Divorced	3.1	0.9	
Single	4.3	6.9	
Bachelor's degree or higher	31.1	13.1	<0.001
High income	15.8	5.1	<0.001
Low income	39.5	40.4	
Comorbidities and complications (%)			
Hypertension	28.4	29.4	0.430
Hyperlipidemia	62.9	57.3	0.086
Retinopathy	57.5	43.2	<0.001
Neuropathy	50.2	40.7	0.009
End stage renal disease on dialysis	9.0	7.2	0.236
Cardiac disease	12.4	13.6	0.368
Stroke	4.7	7.5	0.093
Management modalities (%)			
Diet only	0.0	1.7	0.038
Oral hypoglycemic agents only	35.8	37.1	
Insulin only	28.1	32.1	
Oral hypoglycemic agents and insulin	36.1	29.1	
Laboratory data			
Fasting glucose (mmol L^{-1})	10.3±5.4	10.5±9.1	0.662
HbA1c (%)	8.9±2.2	8.7±2.2	0.381
Total cholesterol (mmol L^{-1})	4.4±1.3	4.3±1.4	0.162
LDL (mmol L^{-1})	2.5±1.0	2.5±1.0	0.721
HDL (mmol L^{-1})	1.1±0.4	1.1±0.4	0.221
Triglyceride (mmol L^{-1})	1.7±0.9	1.7±1.0	0.928
Serum creatinine (mmol L^{-1})	77.7±35.5	81.7±36.5	0.189
Positive urine microalbuminuria	21.1	20.8	0.501
Lifestyle habits			
Sedentary lifestyle (%)	29.8	24.9	0.096
Exercise <150 min $week^{-1}$	55.9	78.1	<0.001
Exercise 150-300 min $week^{-1}$	31.4	15.8	
Exercise >300 min $week^{-1}$	12.7	6.1	

DISCUSSION

This study is the first to measure weight stigmatization among patients with T2D in Taif city and identify their clinical and biochemical characteristics. Our findings showed that 45.6% of sample were consider having high risk for self-stigmatization and those were mostly female, divorced, have longer T2D duration, high BMI and have high educational level. Previous study showed that divorced and unmarried female were at high risk for weight stigmatization although the former study was conducting among females in the general population and wasn't specify for diabetic females[16]. Another study showed that divorced women with a high BMI and long T2D duration were at high risk to develop weight stigmatization than divorced females who had normal BMI and short T2D duration[17]. All these findings indicated that both gender and marital status have a positive correlation with weight self-stigmatization.

Recent study showed that longer duration of diabetes and poorly controlled diabetes were both increased the risk to develop complications[18]. The study showed that high BMI and long T2D duration have positive correlation with weight stigmatization in T2D patients.

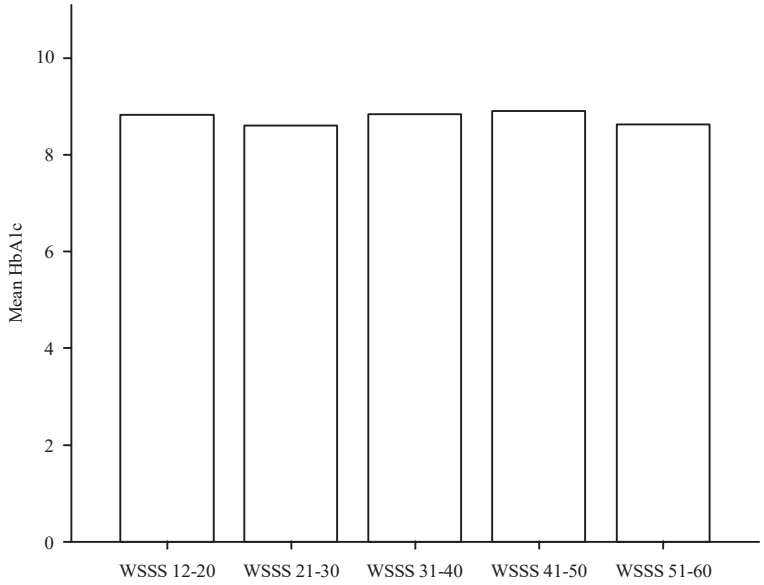

Fig. 1: Relation between the WSSS quartile and HbA1c

Majority of the study patients have higher systolic BP and heart rate. Prospective study demonstrated that high baseline heart rate and systolic BP predict the development of obesity and T2D 20 years later[19]. This study also demonstrated that T2D patients who have hyperlipidemia is more likely to develop weight stigmatization. This may indicate a relationship between both the measured cardiovascular markers and the hyperlipidemia with obesity stigmatization in T2D patients.

Obesity links to physical and psychological factors that result in stigma as a recent study showed that weight stigmatization impact diabetes management[20]. This may explain that why most of the study samples whom they are at high risk for weight stigmatization were on both oral hypoglycemic agents and insulin.

Also, this study showed that there is no relationship between weight stigmatization and HbA1c level. No previous study found relationship between weight stigmatization and HbA1c but there was a study showed that obese T2D patients more likely to have poor HbA1c control[21]. On other hand patients with uncontrolled HbA1c were more likely to develop hyperlipidemia, retinopathy, neuropathy and end stage renal disease. These complications will increase the risk of weight stigmatization. So, we may consider there is indirect relationship between HbA1c level and develop weight stigmatization.

Low level of exercise can lead to weight gain and obesity[22]. This study showed that patients whom at high risk for weight stigma were more likely to report lower level of physical activity. We are not sure about these relations it may consider as bidirectional relationship, as weight stigmatization may lead to decrease level of activity or the low level of exercise develop obesity that may lead to weight stigmatization.

This study strength includes evaluation of the biochemical and the clinical characteristic of stigmatized patients along with been the first study in Taif city. This study limitations were single center and cross-sectional design. More future studies with a prospective design and long-term outcomes are needed to better understand the consequence of self-weight stigmatization on patients with T2D and to help identify a clinical strategy to prevent it.

CONCLUSION

High risk self-stigmatization was highly prevalent among the study T2D patients' sample. It was associated with been female, divorced, having higher educational level and monthly income and with longer T2D duration. It was also associated with worsening in some of the measured cardiovascular markers and having more microvascular complications despite the comparable HbA1c and lipid profiles.

ACKNOWLEDGMENTS

The authors thank every one of the patients who were enrolled on this examination. Superior thanks to the nursing and medical staff at the participating hospital for their help.

SIGNIFICANCE STATEMENT

This study will help the researcher to uncover the critical areas of weight self-stigmatization that many researchers may not be aware about it. High risk of weight self-stigmatization is highly prevalent among type 2 diabetes patients especially female with prolonged duration of T2D and it was associated with microvascular complications, elevated systolic blood pressure and heart rate despite having higher level of education and monthly income.

REFERENCES

1. Alberti, K.G.M.M. and P.Z. Zimmet, 1998. Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: Diagnosis and classification of diabetes mellitus. Provisional report of a WHO consultation. Diabetic Med., 15: 539-553.
2. Wild, S., G. Roglic, A. Green, R. Sicree and H. King, 2004. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. Diabetes Care, 27: 1047-1053.
3. Bianchi, S., R. Bigazzi, C. Valtriani, I. Chiapponi, G. Sgherri, G. Baldari, A. Natali, E. Ferrannini and V.M. Campese, 1994. Elevated serum insulin levels in patients with essential hypertension and microalbuminuria. Hypertension, 23: 681-687.
4. Elhadd, T.A., A.A. Al-Amoudi and A.S. Alzahrani, 2007. Epidemiology, clinical and complications profile of diabetes in Saudi Arabia: A review. Ann. Saudi Med., 27: 241-250.
5. Majeed, A., A.A. El-Sayed, T. Khoja, R. Alshamsan, C. Millett and S. Rawaf, 2014. Diabetes in the Middle-East and North Africa: An update. Diabetes Res. Clin. Pract., 103: 218-222.
6. J.A. Bell, M. Kivimaki and M. Hamer, 2014. Metabolically healthy obesity and risk of incident type 2 diabetes: a meta-analysis of prospective cohort studies. Obes. Rev., 15: 504-515.
7. Wardian, J. and F. Sun, 2014. Factors associated with diabetes-related distress: Implications for diabetes self-management. Soc. Work Health Care, 53: 364-381.
8. Kopelman, P.G., 2000. Obesity as a medical problem. Nature, 404: 635-643.
9. Al-Nozha, M.M., H.M. Al-Hazzaa, M.R. Arafah, A. Al-Khadra and Y.Y. Al-Mazrou *et al*., 2007. Prevalence of physical activity and inactivity among Saudis aged 30-70 years. Saudi Med. J., 28: 559-568.
10. Alqarni, S.S.M., 2016. A review of prevalence of obesity in Saudi Arabia. J. Obes. Eat. Disord., 10.21767/2471-8203.100025.
11. Drury, C.A.A. and M. Louis, 2005. Exploring the association between body weight, stigma of obesity and health care avoidance. J. Am. Acad. Nurse Practit., 14: 554-561.
12. Lillis, J., J.B. Luoma, M.E. Levin and S.C. Hayes, 2012. Measuring weight self-stigma: the weight self-stigma questionnaire. Obesity, 18: 971-976.
13. Wu, Y.K. and D.C. Berry, 2017. Impact of weight stigma on physiological and psychological health outcomes for overweight and obese adults: A systematic review. J. Adv. Nurs., 74: 1030-1042.
14. Ross, S.A., H.D. Tildesley and J. Ashkenas, 2011. Barriers to effective insulin treatment: the persistence of poor glycemic control in type 2 diabetes. Curr. Med. Res. Opin., 27: 13-20.
15. Teixeira, M.E. and G.M. Budd, 2010. Obesity stigma: A newly recognized barrier to comprehensive and effective type 2 diabetes management. J. Am. Acad. Nurse Pract., 22: 527-533.
16. Farhangi, M.A., M. Emam-Alizadeh, F. Hamedi and L. Jahangiry, 2017. Weight self-stigma and its association with quality of life and psychological distress among overweight and obese women. Eat Weight Disord., 22: 451-456.
17. Miller, C.T., E.D. Rothblum, P.A. Brand and D.M. Felicio, 1995. Do obese women have poorer social relationships than nonobese women? Reports by self, friends and coworkers. J. Personality, 63: 65-85.
18. Duckworth, W.C., C. Abraira, T.E. Moritz, S.N. Davis and N. Emanuele *et al*., 2011. The duration of diabetes affects the response to intensive glucose control in type 2 subjects: the VA Diabetes trial. J. Diabetes Complications, 25: 355-361.
19. Shigetoh, Y., H. Adachi, S.I. Yamagishi, M. Enomoto and A. Fukami *et al*., 2009. Higher heart rate may predispose to obesity and diabetes mellitus: 20-year prospective study in a general population. Am. J. Hypertens., 22: 151-155.
20. Teixeira, M.E. and G.M. Budd, 2010. Obesity stigma: A newly recognized barrier to comprehensive and effective type 2 diabetes management. J. Am. Acad. Nurse Pract., 22: 527-533.
21. Daousi, C., I.F. Casson, G.V. Gill, I.A. MacFarlane, J.P.H. Wilding and J.H. Pinkney, 2006. Prevalence of obesity in type 2 diabetes in secondary care: association with cardiovascular risk factors. Postgraduate Med. J., 82: 280-284.
22. Jebb, S.A. and M.S. Moore, 1999. Contribution of a sedentary lifestyle and inactivity to the etiology of overweight and obesity: Current evidence and research issues. Med. Sci. Sports Exercise, 31: S534-S541.