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Psychosocial stress in South African patients with type 2 diabetes

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Objective: Diabetes mellitus is considered an emotionally and behaviourally demanding condition which adds to the stress of a patient's daily living. There is a paucity of literature in South Africa regarding stress and diabetes. This study therefore aims to identify the areas and contributory factors of psychosocial stress in South African patients with diabetes.

Method: A cross-sectional study was conducted at two public facilities and five private medical practices on the north coast of KwaZulu-Natal, South Africa. The Questionnaire on Stress in Diabetes – Revised was administered to 401 participants.

Results: Eighteen percent of the sample reported having extreme psychosocial stress. Depression, physical complaints and self-medication/diet were the main areas which contributed to high psychosocial stress. Factors that also contributed to high levels of psychosocial stress were low educational level, unemployment, female gender, attending the public sector and high HbA1c levels.

Conclusion: Psychosocial stress affects metabolic control in patients with diabetes, thereby increasing the risks of long-term complications.

Introduction

The prevalence of diabetes mellitus (DM) has increased globally with an estimate of 415 million adults living with the disease in 2015.[1] Type 2 diabetes is most common and affects millions of people worldwide.[2] Diabetes prevalence has also rapidly risen in middle- and low-income countries.[2] The International Diabetes Federation estimates that in Africa, 14.2 million adults have diabetes. This figure is expected to increase to 34.2 million in 2040.[1] In South Africa, 2.3 million people are estimated to be living with diabetes, with 1.39 million people who have not yet been diagnosed.[1] In 2014, diabetes was among the first three leading causes of death in South Africa.[3]

Diabetes is considered an emotionally and behaviourally demanding condition[4] which adds to the stress of a patient's daily living. Stress is associated with both the onset and exacerbation of diabetes because of the demanding nature of the disease. Stress is a physiological or psychological response to external stimuli or stressful events themselves, which can be negative, positive or both.[5] Although some individuals respond positively to stress, others cannot cope with the additional demands of the disease.[5]

Björntorp[6] formulated a theory on the stress–diabetes association which states that perceived psychological stress with a helplessness reaction can lead to an activation of the hypothalamic–pituitary–adrenal axis resulting in high cortisol levels which antagonise the actions of insulin. Many studies support this theory that psychosocial stress and stressful life events have been associated with the onset of type 2 diabetes.[7,8] Further, stress significantly affects compliance to treatment and management of DM.[9] The daily self-management tasks of diabetes (diet, adherence to medication and monitoring glucose) can also be a source of stress.[5,10] Patients feel frustrated or 'burned out' by the daily hassles of disease management and the self-care demands.[11]

Stressful experiences have been linked to poor metabolic control[12,13] which can lead to deleterious long-term complications in patients with diabetes, such as blindness, kidney failure and lower limb amputation.[2] Further, these complications have financial implications for the patients with diabetes and their families and impacts on health systems and national economies through direct medical costs, loss of work and income.[2]

In South Africa, rapid urbanisation and globalisation have given rise to higher rates of chronic diseases of lifestyle such as hypertension and DM.[14,15] Some of the factors that contribute to the increase of chronic diseases are an unhealthy diet, obesity and a sedentary lifestyle.[2,14] Furthermore, psychosocial stress is associated with and contributes to the development of chronic disease.[9,16]

There is a dearth of literature in South Africa about stress and diabetes. This study therefore aims to identify sources of stress for the patient with diabetes in the South African context.

Method

This was a cross-sectional study involving 401 participants at two public and five private medical practices in one region of South Africa.

Participants

Participants 18 years and older diagnosed with type 2 diabetes for at least 6 months and who were fluent in either English or isiZulu were included in the study. The total sample size (N = 401) consisted of 200 participants from the private sector, and 201 were from the public sector.

Procedure

Trained research assistants approached patients waiting for their scheduled appointments, explained the study to them and requested their participation. Those who agreed to participate were requested to sign informed consent forms. A research questionnaire was administered to the patient in the language of their choice.

Instrument

This article forms part of a larger study on psychological well-being and type 2 diabetes. Participants completed a comprehensive questionnaire which included demographic details and co-morbidities. Participants took 45–60 minutes to complete this questionnaire. Participants were provided with refreshments and time to take a break. None of the participants reported to be tired during the collection of data. Data were collected over a period of 6 months. This article focuses on their responses to the Questionnaire on Stress in Diabetes – Revised (QSD-R). This questionnaire can be administered to patients with type 1 and type 2 diabetes. The questionnaire was designed based on interviews with patients, consultations with psychotherapists and reports from diabetes specialists. After a comprehensive survey with 90 items, the QSD was modified for clinical reasons and reduced to 45 items.[17] The QSD-R is a self-assessment questionnaire which measures sources of stress for people with diabetes.[18] The items in this questionnaire are grouped into eight subscales: 'leisure time' which covers activities such as travel, hobbies or other interests which cannot be pursued to the desired extent as a consequence of the diabetes; 'depression and fear of future' which refers to a worsening of mood and feelings as a result of the diabetes and includes worrying about the future; 'hypoglycaemia' which describes problems that are associated with low blood sugar such as the fear of further low blood sugars, fear of being alone or fear of unpleasant symptoms during a hypoglycaemic episode; 'self-medication/diet' that deals with problems related to the treatment plan such as monitoring blood sugar levels, injecting themselves to check blood sugar levels and keeping to the diet; 'physical complaints' which lists the most frequent physical complaints of patients with diabetes such as increased thirst, excessive sweating, episodes of weakness, gas or painful feet; 'work' which refers to problems that patients with diabetes may have at work, for example, not being able to find a new job, limited advancement opportunities or days being sick due to diabetes; 'partner' which describes problems that may arise with partners, for example, worrying about the partner or having less sex; and 'doctor–patient relationship' which deals with patients' experiences with their doctor. Participants are presented with a list of situations that they might encounter which might cause stress. They are requested to indicate whether the statement applies or does not apply to them. If the statement applies, participants are requested to indicate on a five-point scale, ranging from 1 = 'only a slight problem' to 5 = 'a very big problem', how much of a problem the situation is for them.[18] The above-mentioned subscales were totalled to given an overall QSD-R score (mean global stress score). If any participant had a score greater than one standard deviation above the mean, they were classified as having extreme psychosocial stress.[18] The Cronbach's alpha values for the scales vary from 0.96 to 0.81.[19] In this study, the values ranged from α = 0.67 to 0.82.

Data analysis

STATA version 13.0[20] was used to process and analyse the data. T-test or Wilcoxon rank-sum test was used to compare means (or ranks) of continuous data across two groups (e.g. public vs. private sector), while Pearson χ^2 test or Fisher's exact were used for the cross tabulations of categorical variables. In addition, bivariate and multivariable logistic regressions were performed to assess factors associated with extreme psychosocial stress. Model fit was assessed.

Ethical considerations

Ethical approval was obtained from the Biomedical Ethical Research Committee of the University of KwaZulu-Natal. The Provincial Department of Health granted permission for the study to be conducted at the public health facilities. Doctors in the private sector consented to the research being conducted at their practices.

Results

The mean age of the study participants was 53.7 years (s.d. = 10.7) with 243 (60.60%) being women. The average duration of the disease was 10.3 years (s.d. = 7.9). The racial breakdown of the patients was as follows: 100 (24.90%) were black African, 3 (0.75%) mixed race, 274 (68.33%) Indian and 24

(6.00%) white people. A majority of the participants (276 [68.80%]) were married, and 304 (75.81%) had an educational level of below Grade 12 (Table 1).

The mean HbA1c levels of the group with extreme psychosocial stress (M = 13.25, s.d. = 5.82) were significantly higher than the mean HbA1c levels of the group with low psychosocial stress (M = 11.78, s.d. = 4.80; p = 0.039).

Seven of the subscales of the QSD-R were positively and significantly associated with HbA1c with the exception of the doctor-patient relationship scale. The confidence intervals (CIs) and p values were as follows: leisure time (95% CI: 0.50, 0.30; $p > 0.004$), depression (95% CI: 0.58, 0.20; $p > 0.000$), hypoglycaemia (95% CI: 0.70, 0.30; $p > 0.001$), self-medication/diet (95% CI: 0.55, 0.20; $p > 0.000$), physical complaints (95% CI: 0.53, 2.00; $p > 0.000$), work (95% CI: 0.54, 0.22; $p > 0.001$), partner (95% CI: 0.39, 0.18; $p > 0.003$) and doctor-patient relationship (95% CI: 0.00, 0.30; $p > 1.89$).

TABLE 1: Demographic characteristics of the total study sample.

Characteristic	*n*	%
Educational level		
< Grade 12	304	75.81
Post–Grade 12	97	24.19
Employment		
Employed	183	45.64
Retired or homemaker	104	25.94
Unemployed	114	28.43
Gender		
Female	243	60.60
Male	158	39.40
Marital status		
Married	276	68.80
Never married	53	13.20
Separated or divorced	24	6.00
Widowed	48	12.00
Race		
Black	100	24.90
Mixed race	3	0.75
Indian	274	68.33
White	24	6.00
Sector		
Private	200	49.88
Public	201	50.12

Eighteen percent of the sample reported having extreme psychosocial stress. Table 2 shows the participants' responses to the subscales. Participants had high scores on the depression/fear of the future, self-medication/diet and physical complaints subscales. This implies that these areas were the most stressful. The mean scores for depression/fear were 10.90 (s.d. = 8.07) and 5.80 (s.d. = 5.44) for hypoglycaemia and 14.55 (s.d. = 9.94) for self-medication. According to the QSD-R, almost 21.00% (n = 84) of the participants had depressive symptomatology, 18.95% (n = 76) had physical complaints, 17.96% (n = 72) found that self-medication/diet was stressful to manage, 17.46% (n = 70) had problems with hypoglycaemia, 17.21% (n = 65) had a stressful relationship with their doctor as a patient, 16.21% (n = 65) experienced poor leisure time quality, 15.96% (n = 64) had work-related stress and 15.46% (n = 62) had stress with their partner.

As shown in Table 3, participants with a lower educational level (n = 58, 19.08%) had higher extreme psychosocial stress

TABLE 3: A comparison of the QSD-R by gender, sector, marital status, educational level, ethnic group and employment.

Variable	Low psychosocial stress, *n* (%)	Extreme psychosocial stress, *n* (%)	*p-value
Age	328 (81.79)	73 (18.20)	0.2501
Educational level			
< Grade 12	246 (80.92)	58 (19.08)	0.422
Post–Grade 12	82 (84.54)	15 (15.46)	
Employment			
Employed	149 (81.42)	34 (18.58)	0.003
Unemployed	84 (73.68)	30 (26.32)	
Retired or homemaker	95 (91.35)	9 (8.65)	
Gender			0.040
Female	191 (78.60)	52 (21.40)	
Male	137 (86.71)	21 (13.29)	
Marital status			
Married	236 (85.51)	40 (14.49)	0.001
Never married	33 (62.26)	20 (37.74)	
Separated or divorced	20 (83.33)	4 (16.67)	
Widowed	39 (81.25)	9 (18.75)	
Sector			
Private	176 (88.00)	24 (12.00)	0.001
Public	152 (75.62)	49 (24.38)	

*$p < 0.001$

TABLE 2: Participants' responses as per subscale.

QSD-R subscale	Mean score	s.d.	Min	Max	Classification				
					Only a slight problem				Major problem
					< 1	1–1.99	2–2.99	3–3.99	4–4.99
Leisure time (items 2, 9, 18, 30)	4.9	5.2	0	20	x				
Depression/fear of future (items 28, 34, 40, 42, 43, 45)	10.9	8.1	0	30			x		
Hypoglycaemia (Items 12, 22, 25, 31)	5.8	5.4	0	20		x			
Self-medication/diet (items 1, 5, 8, 10, 13, 21, 26, 37, 39)	14.6	9.9	0	45			x		
Physical complaints (items 6, 17, 19, 20, 38, 44)	11.1	8.1	0	30			x		
Work (items 4, 11, 16, 27, 33, 41)	6.3	6.7	0	30		x			
Partner (items 3, 14, 15, 24, 35, 36)	7.8	7.4	0	30		x			
Doctor-patient relationship (items 7, 23, 29, 32)	3.5	4.5	0	20	x				

s.d., standard deviation.

scores compared with those who had a post-Grade 12 education (n = 15, 15.46%). Participants who were unemployed (n = 30, 26.32%) had higher stress levels compared with those who were employed (n = 34, 18.58%) and with those who were either retired or homemakers (n = 9, 8.65%). Women had statistically significantly higher levels of stress (n = 52, 21.40%) compared with men (n = 21, 13.29%) (p = 0.040). Participants who attended the public sector (n = 49, 24.38%) were twice as stressed as those who attended the private sector (n = 24, 12%) ($p < 0.05$).

Before multivariable adjustment, the following factors were associated with extreme psychosocial stress (Table 4): female gender [odds ratio (OR) = 1.78; 95% CI: 1.02, 3.09], attending the public sector (OR = 2.36; 95% CI: 1.39, 4.03) and having five or more co-morbidities (OR = 6.15; 95% CI: 1.94, 19.47). Variables that were adjusted were age, gender, employment, education, marital status, sector and co-morbidities. After multivariable adjustment, having five or more co-morbidities (OR = 5.39; 95% CI: 1.58, 18.32) was still associated with extreme psychosocial stress. Factors associated with lower odds of having extreme psychosocial stress were being retired or a homemaker (OR = 0.42; 95% CI: 0.18, 0.99) and being married (OR = 0.45; 95% CI: 0.21, 0.95).

Table 5 shows that before bivariate adjustment, hypothyroidism (OR = 8.00; 95% CI: 1.86, 34.13), glaucoma (OR = 3.05; 95% CI: 1.37, 6.78), retinopathy (OR = 2.21; 95% CI: 1.20, 4.07), HIV (OR = 3.95; 95% CI: 1.17, 13.30), HIV and/or TB (OR = 4, 24, 95% CI: 1.49; 12.10) and other co-morbidities (OR = 3.11; 95% CI: 1.77, 5.45) were associated with significantly increased odds of having extreme psychosocial stress. Other co-morbidities predominantly consisted of arthritis and asthma. After multivariable adjustment, hypothyroidism (OR = 6.77; 95% CI: 1.32, 34.62), HIV and/or TB (OR = 4.22; 95% CI: 1.31, 13.58) and other co-morbidities (OR = 2.62; 95% CI: 1.40, 4.90) were still associated with significantly increased odds of having extreme psychosocial stress.

Discussion

In this study, we found that 18.2% of the participants had extreme psychosocial stress scores. Depression, physical complaints, self-medication/diet and hypoglycaemia were identified as the predominant areas contributing to psychosocial stress. We also found that other factors contributing to high stress levels were lower educational level, unemployment, female gender, attending public sector facilities and high HbA1c levels.

Similar to our findings, Herpertz et al.[18] found that 17% of patients with diabetes had extreme psychosocial stress and also found that depression, self-medication/diet and physical complaints were predominant in the psychosocial stress profile for patients with type 2 diabetes. Herschbach et al.[19] also found that patients with type 2 diabetes had high levels of stress associated with self-medication, diet and physical complaints.

TABLE 4: Bivariate and multivariable regression for factors associated with extreme psychosocial stress.

Variable	Bivariate	*p-value	Multivariable adjusted	*p-value
	OR (95% CI)		OR (95% CI)	
Age	0.99 (0.96, 1.01)	0.25	1 (0.97, 1.03)	0.802
Gender				
Female	1.78 (1.02, 3.09)	0.041	1.47 (0.76, 2.81)	0.249
Male	1 (ref)		1 (ref)	
Employment				
Unemployed	1 (ref)		1 (ref)	
Employed	0.64 (0.37, 1.12)	0.116	1.23 (0.6, 2.53)	0.574
Retired or homemaker	0.27 (0.12, 0.59)	0.001	0.42 (0.18, 0.99)	0.046
Race				
Indian	4.4 (0.58, 33.43)	0.152		
Education				
< Grade 12	1 (ref)		1 (ref)	
Post–Grade 12	0.78 (0.42, 1.44)	0.423	1.19 (0.56, 2.52)	0.655
Marital status				
Never married	1 (ref)		1 (ref)	
Married	0.28 (0.15, 0.53)	< 0.001	0.45 (0.21, 0.95)	0.036
Separated or divorced	0.33 (0.1, 1.11)	0.072	0.50 (0.14, 1.76)	0.279
Widowed	0.38 (0.15, 0.95)	0.038	0.50 (0.18, 1.38)	0.182
Sector				
Private	1 (ref)		1 (ref)	
Public	2.36 (1.39, 4.03)	0.002	1.63 (0.82, 3.24)	0.167
Comorbidities				
None	1 (ref)		1 (ref)	
1–2	1.95 (0.78, 4.85)	0.153	1.86 (0.72, 4.78)	0.198
3–4	2.91 (1.1, 7.68)	0.031	3.30 (1.16, 9.37)	0.025
5 +	6.15 (1.94, 19.47)	0.002	5.39 (1.58, 18.32)	0.007

CI, confidence interval; OR, odds ratio.
*$p < 0.001$

TABLE 5: Co-morbidities associated with extreme psychosocial stress.

Co-morbidities	Bivariate		Multivariable adjusted	
	OR (95% CI)	*p**	OR (95% CI)	*p**
Hypertension	1.34 (0.79, 2.30)	0.276	1.10 (0.61, 1.99)	0.745
High cholesterol	1.3 (0.78, 2.20)	0.307	1.45 (0.82, 2.55)	0.202
Cardiac	1.26 (0.66, 2.38)	0.482	0.77 (0.36, 1.63)	0.489
Hyperthyroidism	0.50 (0.61, 3.95)	0.505	0.37 (0.03, 4.44)	0.433
Hypothyroidism	8.00 (1.86, 34.13)	0.005**	6.77 (1.32, 34.62)	0.022
Vitamin B12 deficiency	1.12 (0.23, 5.42)	0.882	0.67 (0.12, 3.72)	0.650
Glaucoma	3.05 (1.37, 6.78)	0.006**	1.97 (0.81, 4.81)	0.135
Nephropathy	1.43 (0.51, 4.05)	0.496	1.02 (0.30, 3.44)	0.973
Neuropathy	1.04 (0.29, 3.74)	0.954	1.22 (0.32, 4.61)	0.767
Retinopathy	2.21 (1.20, 4.07)	0.011*	1.41 (0.70, 2.88)	0.338
Impotency	1.63 (0.66, 4.02)	0.386	1.70 (0.64, 4.56)	0.289
Stroke	0.22 (0.18, 3.74)	0.789	0.78 (0.16, 3.91)	0.765
TB	3.05 (0.50, 18.60)	0.226	-	-
HIV	3.95 (1.17, 13.30)	0.027*	-	-
HIV and/or TB	4.24 (1.49, 12.10)	0.007*	4.22 (1.31, 13.58)	0.016
Other†	3.11 (1.77, 5.45)	< 0.001**	2.62 (1.40, 4.90)	0.002

CI, confidence interval; OR, odds ratio.
†, Arthritis, asthma.
*$p < 0.05$; **$p < 0.01$

Almost 21% of the participants in this study reported having depressive symptoms. Anderson et al.[21] and Ali et al.[22] have documented that the presence of diabetes doubles the odds of having depression. DM is a chronic disease which demands lifestyle changes such as diet, constant monitoring of glucose levels and strict adherence to medication; however, depression has been associated with a decline in self-care behaviour such as poor adherence to medication and diet.[23] Depression is associated with poor metabolic control and an increased risk of diabetic complications.[21,24] Patients with diabetes can become frustrated and overwhelmed by the disease when they are unable to achieve acceptable metabolic targets which further makes them feel hopeless and despondent about possible long-term complications.[25] Management of depressive symptoms will assist in achieving good metabolic control,[26] thereby decreasing the risk of long-term complications.

Adherence to treatment regimen and diet was stressful for participants. Diet is a major barrier to diabetes self-management which is mostly as a result of a lack of knowledge about the disease, financial constraints and/or food portion control.[27,28,29] As part of a diabetes treatment programme, public health dietary advice is for patients to adhere to a balanced diet of fruit and vegetables, protein, a limited fat intake and a total energy intake of 45% – 60% carbohydrates.[30] Although this may be the prescribed requirement for effective management, for many South African families, carbohydrates such as maize, sorghum and brown bread are a staple diet which forms a large portion of meals, thereby constituting an unbalanced diet.[29] In a local study done by Muchiri et al.,[28] it was also found that family members were reluctant to change diets because the patient with diabetes was the only one in the family. Therefore, the patient with diabetes experienced a lack of support in adherence to diet as part of the treatment of the disease. Furthermore, Muchiri et al.[28] also found that family members do not have enough information about the disease, especially regarding diet, metabolic control and the resultant long-term complications. Studies have shown that family support decreases stress in the patient with diabetes.[31,32] It is therefore important to involve the family in the education of diabetes so that they can understand the nature of the disease and the lifestyle changes such as diet and treatment adherence which are essential elements in treating the disease.

Women in this study had higher stress levels compared with men, a finding similar to other studies.[8,33] Given that women are often the breadwinners who have many responsibilities such as caring and providing for the family, a chronic condition like diabetes adds to the already stressful demands. It is therefore important that health care services in South Africa cater for the needs of women and provide more resources in terms of treatment and access to services.[34]

The average HbA1c level of 12.02% (s.d. = 5.00) in our sample is much higher than the acceptable target figure of ≤ 7.00%.[1] In keeping with other studies,[18,19,31] we found that the group with extreme psychosocial stress had higher HbA1c levels. Poor glucose control cannot be helped by advice to consume 45% – 60% of the diet in the form of carbohydrates, a substance that patients with diabetes are unable to handle. Another factor to consider is the possibility that stress can lead to a vicious cycle of emotional eating (which typically consists of carbohydrates) which leads to worsened diabetes outcomes which in turn creates more stress and more emotional eating of carbohydrates.[35] Elevated glucose levels because of stress cannot be metabolised properly in a patient with diabetes, resulting in hyperglycaemia.[13] As a result, psychological stress affects metabolic control and poor metabolic control leads to complications.[36] The management of stress is therefore of paramount importance in achieving good metabolic control.

As expected, we found that an increase in medical co-morbidities was associated with extreme psychosocial stress.

In this sample, hypothyroidism, HIV and/or TB and other co-morbidities (arthritis and asthma) were associated with an increased chance of having extreme psychosocial stress. Hypothyroidism has been linked to type 2 diabetes[37,38] by being associated with insulin resistance which results in impaired glucose metabolism in type 2 diabetes.[38,39] South Africa, particularly KwaZulu-Natal, has high levels of HIV and a concomitant TB burden.[3] In the light of this, HIV and TB have been identified as priority areas to reduce infection and increase awareness of the diseases.[40] Health practitioners need to adequately screen patients with type 2 diabetes for HIV and TB and also take these co-morbidities into account when treating diabetes. Although highly active antiretroviral therapy (HAART) has improved CD4 counts and the suppression of the viral load in patients with HIV, it has led to an increase in metabolic dysfunction which includes insulin resistance.[41] Patients with HIV frequently present with diabetes and metabolic complaints.[41] Patients with the double burden of diabetes and HIV and/or TB require psychosocial support and coping skills to help them deal with adherence to medication in addition to the stigma associated with HIV.

In this study, hypertension was not significantly associated with extreme psychosocial stress, which is in contrast to other studies that link hypertension to stress.[42] This is unusual, especially since exposure to chronic stress is a risk factor for hypertension[43] and that South Africa is known to have the highest prevalence of hypertension in the world.[44] Given the high rates of hypertension in South Africa, participants in this sample may not be aware that they are hypertensive. People are often unaware that they have hypertension unless their blood pressure is specifically measured and monitored at a health care facility.[14] Hypertension frequently occurs with diabetes and is part of the metabolic syndrome which, if left untreated, can lead to target-organ damage and premature death.[14] Therefore, patients need to be educated about hypertension and should be closely monitored by health care workers.

In our sample, the percentage of participants who were unemployed (28.43%) was higher than the national unemployment rate (25.4%).[45] The economic climate adds to the stresses of daily living and also affects the patient's ability to access health care services and to take adequate care of his or her health. A patient with diabetes has to regularly attend health care facilities because of the chronic nature of the disease. However, financial constraints and a lack of transport impact on patients accessing health care facilities.[46]

Another finding in this study was that participants who attended the public health care sector endorsed twice the amount of stress as compared with those who attended the private health care sector. There are long waiting times when attending the public health care facilities which are a deterrent to those who are employed. In many instances, attending a hospital or a clinic for the whole day is a loss of income.[47] Therefore, health-seeking behaviour is not a priority.[48] Patients have long waiting times and have limited interaction with the health care provider. The public health sector has limited resources and large demands and therefore cannot cater for the individualised needs of a patient with a chronic condition.[46] Given this situation, patients choose to go to work to provide for their families rather than spending a whole day at the hospital or clinic with the threat of loss of income for not being at work.

While South Africa has limited resources, the health services have to cope with the burden of disease.[14] South Africa has embarked upon instituting a National Health Insurance strategy which 'aims to provide access to quality, affordable personal health services for all South Africans based on their health needs, irrespective of their socio-economic status'.[49] This initiative will assist patients with diabetes as well as other health conditions to access health care services irrespective of their socio-economic status.

Further, treatment for patients with diabetes should be individually tailored in lieu of their unique stresses and their contexts[50] and their treatment should be holistic. Stress management and support groups should be an integral part of the management of diabetes as well as incorporating a psychologist into the diabetes team and increasing the psychological care of patients with DM. In this way, the patient's mental health will also be addressed which will lead to a reduction in stress in the patient.

Conclusion

Psychosocial stress affects metabolic control in patients with diabetes, thereby increasing the risks of long-term complications. It is therefore imperative that interventions to deal with stress, family support and diabetes education should be considered an integral part of the treatment regimen for patients with diabetes. Accordingly, a mental health clinician should be a part of the multidisciplinary team to help the patient deal with psychosocial stress.

Limitations

The cross-sectional design limits causal inferences. Some ethnic groups had small sample sizes; therefore, results cannot be generalised for these groups. The QSD-R has not been standardised although good reliability and validity have been demonstrated in research.

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Competing interests

The authors declare that they have no financial or personal relationships which may have inappropriately influenced them in writing this article.

Authors' contributions

S.R. was the principal investigator, B.J.P. co-authored the manuscript and B.S. performed the statistical analyses. B.J.P. supervised the research and co-authored the manuscript.

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