

Development of a Reliable and Valid Psychosocial Measure of Self-Perception of Health in Type 2 Diabetes

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Abstract

Objectives : The aim was to develop a reliable and valid psychosocial measure of self-perception of health in type 2 diabetes.

Methods : Item analysis and factor analyses were done in order to stabilize and establish principal components of the questionnaire. Reliability (internal consistency aspect) was established using Chronbach's alpha method. Concurrent and discriminant validities were established using conventional methods.

Results : Factor analysis yielded 12 significant factors (eigen value ≥ 1), but first six components were retained based on Scree test. These six principal varimax factors explain 49.7 % of variance of psychosocial measure of self-perception of health.

Conclusions : The final version after all these psychometric procedures had 27 items with six principal components. They were appropriately named as follow: I Positive self-feeling; II Sociality; III Attention seeking; IV Feel healthy; V Worry about health; VI Dependence. Total variance explained is 49.7%. ©

INTRODUCTION

Diabetes a chronic lifelong illness has its impact on quality of life of the patient. Therefore, specialized therapeutic strategies are warranted. The aim apart from metabolic management is the avoidance of handicaps and burdens on the patients and their families and therefore assessment of quality of life is generally accepted.^{1,2} Treatment regimen and possible complications have major effects on physical, social, and psychological well-being.^{3,4}

Psychosocial variables have an impact on self-management, acceptance of therapeutic regimen and treatment success.⁵ Quality of life assessment does increasingly contribute to therapeutic decisions in the context of allocation of resources in health politics.⁶ Quality of life can be measured by assessing opinions and perceptions of patients.⁷

Any comprehensive approach to diabetes care must take into account different domains of patient's subjective feelings and experiences. These are feelings of burden and would adversely affect his quality of life.^{3,4} In the context of psychosocial burden imposed by chronic

illness studies in quality of life become imperative.

Therefore a reliable, valid measure is needed. It has to be free from any reference to psychopathological symptoms and value judgement. Such a questionnaire ensures free participation of subjects in completing the questionnaire. These concerns have been addressed in our attempt to develop a reliable and valid questionnaire to measure self-perception of health, which is an index of quality of life. This could add to the already existing questionnaires in the area of quality of life of diabetic patients. Moreover, most of the previous psychosocial tools have been developed in European western population, which is culturally and socially different from Asian population. Therefore we have attempted to develop a questionnaire for the Indian population.

MATERIAL AND METHODS

Questionnaire Development

Step 1: Item generation :

The preparation of a comprehensive set of items was based on our extensive discussions among social science faculty and diabetologists of Diabetes Research Centre and M. V. Hospital for Diabetes, Chennai (Madras), Southern India. This was supplemented by scanning a few earlier established psychological and psychosocial tests. At the start we had a 65 item questionnaire with a TRUE/FALSE response format.

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Step 2: Item analysis:

This preliminary questionnaire was administered to a sample of 131 Type 2 diabetic subjects. Item-total correlations were computed. Twenty-two items which did not have significant correlations with the total questionnaire were discarded. P value for significance was set at 0.05. The resultant questionnaire with 43 items was again scrutinized by Social Scientists and Diabetologists in the Diabetes Research Centre and M.V. Hospital for Diabetes, Chennai (Madras). As a result five items were eliminated, as they are not applicable to all age groups. These items had reference to son's or daughter's wedding, in-law relations in the family and dependence on children during old age. This left us with a 38 item questionnaire. All these had significant item – total correlations and had a Chronbach's alpha of 0.83 indicating high internal consistency and hence reliable.

Step 3: Factor Analysis:

The 38 item questionnaire was administered to a sample of 337 Type 2 diabetic patients, a sample large enough to satisfy the psychometric criterion of 10 times the number of items in the questionnaire.⁸

The data thus generated were factor analyzed using principal components method with varimax rotation. Based on Eigen value of ≥ 1 we identified 12 significant factors.

However after an examination of the Eigen values by Scree plot we retained first six factors.⁸⁻¹⁰ This resulted in the elimination of 11 items from the questionnaire leaving 27 items for further analysis as the final version of the questionnaire (Appendix).

RESULTS

Reliability:

The final version of 27 item questionnaire had a Chronbach's alpha of 0.91 showing high internal consistency.

Scoring:

Higher the score the better psychosocial experience except in worry about health and dependence where the inference is reversed.

Validity:

Concurrent Validity

A validated measure of psychological well-being, (Bradley and Gomsu) (22items)³ was used to estimate concurrent validity. A sample of 30 Type 2 diabetic subjects completed the new questionnaire and the above mentioned questionnaire. The product moment correlation (validity coefficient) 0.57 was significant ($p=0.001$). This established concurrent validity.

Discriminant Validity

Further, discriminant validity was estimated by administering the new questionnaire to a group of 32 nondiabetic normal controls and 30 Type 2 diabetic

Appendix : Self-perception of health questionnaire an aspect of psychosocial experience

1.	I have emotional security	T	F
2.	I accept myself for what I am	T	F
3.	I have a sense of humour	T	F
4.	I understand myself as to what I am and my experiences are	T	F
5.	I view things objectively	T	F
6.	I am usually happy	T	F
7.	I don't get sick very often	T	F
8.	I am pretty healthy	T	F
9.	My appetite is very good	T	F
10.	I rarely wake up tired	T	F
11.	I have a lot of energy	T	F
12.	I am preoccupied with my health	T	F
13.	I have frequent complaints about my health and seek medical help	T	F
14.	I require physical assistance for my day-to-day maintenance	T	F
15.	I volunteer to tell others that I am worthless	T	F
16.	I sometime feel tingling or pricking sensation in my body, arms or legs	T	F
17.	I have in my life enjoyed acting out and catching attention of others	T	F
18.	I am normally an excessively emotional person	T	F
19.	I enjoy being the center of attention	T	F
20.	I tend to take advantage of circumstances to my own ends	T	F
21.	I am very good in my handling of my problems	T	F
22.	My perception of my physical health status is good	T	F
23.	My social contacts were good	T	F
24.	My present social contacts are good	T	F
25.	I have a high level of life-satisfaction	T	F
26.	Affective feelings of others towards me are good	T	F
27.	My affective feelings towards others are good	T	F

subjects. Data were processed by Student's test. The nondiabetic normal controls had a score of 49.66 ± 2.34 and the Type 2 diabetic subjects had a score of 47.7 ± 3.86 with a mean difference of 1.96. The obtained t value 2.43 with df 60 is significant ($p=0.02$). This established significant discriminant validity. Normal controls had a better psychosocial self-perception of health than the diabetic subjects.

Principal Components of Self-perception of Health

Allotment of items to each of the six principal components was based on the criterion of ≥ 0.30 factor loading.⁸

Factor I has six items heavily loaded with positive self feeling and hence designated positive self-feeling factor. Factor II has six items loaded with social aspects and hence designated as sociality factor. Factor III has four items loaded with attention seeking aspects, and hence designated as attention seeking factor. Factor IV has five items showing positive aspects of health and hence designated as feel healthy factor. Factor V has two items showing aspects of worry over health with frequent illness episodes and hence designated as worry about health factor. Factor VI has four items indicating feelings

Table 1

Component and items	Varimax Rotated Factor Matrix Factor loadings						Variance explained
	I	II	III	IV	V	VI	
I Positive Self-feeling							
Q.no. 1 I have emotional security	0.79	0.13	0.06	0.06	0.08	0.02	
Q.no. 2 I accept myself for what I am	0.84	0.09	0.01	0.07	0.06	0.05	
Q.no. 3 I have sense of humor	0.77	0.10	0.04	0.14	0.05	0.08	
Q.no. 4 I understand myself as to what I am and my experience are	0.88	0.07	0.01	0.07	0.05	0.05	
Q.no. 5 I view things objectively	0.85	0.09	0.02	0.04	0.06	0.11	
Q.no. 6 I am usually happy	0.80	0.12	0.01	0.09	0.11	0.07	21.1%
II Sociality Factor							
Q.no. 21 I am very good in handling of my problems	0.24	0.31	0.24	0.00	0.04	0.09	
Q.no. 23 My past social contacts were good	0.26	0.38	0.02	0.17	0.13	0.00	
Q.no. 24 My present social contacts are good	0.26	0.46	0.08	0.11	0.11	0.02	
Q.no. 25 I have a high level of life - satisfaction	0.24	0.58	0.04	0.13	0.12	0.00	
Q.no. 26 Affective feelings of others towards me are good	0.13	0.87	0.09	0.05	0.00	0.12	
Q.no. 27 My affective feelings towards others are good.	0.16	0.87	0.04	0.09	0.01	0.11	8.3%
III Attention Seeking Factor							
Q.no. 18 I have in my life enjoyed acting out and catching attention of others	0.03	0.02	0.79	0.01	0.00	0.00	
Q.no. 19 I am normally an excessively emotional person	0.00	0.02	0.75	0.01	0.08	0.09	
Q.no. 20 I enjoy being the center of attraction	0.03	0.02	0.84	0.05	0.05	0.06	
Q.no. 21 I tend to take advantage of circumstances for my own ends	0.04	0.01	0.68	0.01	0.09	0.07	6.6%
IV Feel Healthy Factor							
Q.no. 7 I don't get sick very often	0.21	0.25	0.04	0.46	0.07	0.11	
Q.no. 8 I am pretty healthy	0.17	0.09	0.05	0.59	0.23	0.06	
Q.no. 9 My appetite is very good	0.03	0.19	0.05	0.56	0.03	0.12	
Q.no. 10 I rarely wake up tired	0.08	0.00	0.04	0.67	0.07	0.00	
Q.no. 11 I have a lot of energy	0.14	0.02	0.01	0.66	0.25	0.08	5.3%
V Worry About Health Factor							
Q.no. 12 I am preoccupied with my health	0.09	0.03	0.01	0.04	0.85	0.04	
Q.no. 13 I have frequent complaints about my health and seek medical help	0.22	0.03	0.06	0.08	0.78	0.01	4.3%
VI Dependence Factor							
Q.no. 14 I require physical assistance for my day - to day maintenance	0.15	0.11	0.06	0.15	0.07	0.34	
Q.no. 15 I volunteer to tell others That I am worthless	0.06	0.05	0.04	0.08	0.02	0.72	
Q.no. 16 I some time feel tingling or pricking sensation in my body arms or legs	0.03	0.15	0.06	0.01	0.02	0.70	
Q.no. 17 I am just a heap of garbage worth nothing	0.22	0.14	0.04	0.00	0.06	0.69	4.1%
Total variance explained							49.7%

of worthlessness, dependence, etc; and hence designated as dependence factor. Variances explained are Factor I 21.1%, Factor II 8.3%, Factor III 6.6%, Factor IV 5.2%, Factor V 4.3% and Factor VI 4.19%. Thus the questionnaire explains 49.7% (50%) of the variance of self-perception of health-an aspect of psychosocial experience.

The questionnaire data were further processed using Pearson's Product Moment Correlation method.

In the total sample (n=149) we found that Post Prandial Glucose (PPG) was negatively correlated with positive self-feeling (P=.031), sociality (P=.009) and feel healthy (P=.001) self-perception of health. These were on expected lines. But a negative significant correlation (P=.03) between PPG and attention seeking factor was not expected. HbA1C was negatively correlated with sociality factor (P=.016) and feel healthy

factor (P=.03). Duration of diabetes had a negative correlation with sociality (P=.019) and attention seeking factors (P=.008).

In men sample (n=84) PPG was negatively correlated with feel healthy factor (P=.04), BMI was negatively correlated with feel healthy factor (P=.04), positively correlated with worry about health factor (P=.03), and duration was not negatively correlated with sociality and attention seeking (P=.01).

In women sample (n=65) we found that PPG was negatively correlated with positive self-feeling (P=0.02), feel healthy factor (P=0.02) and dependence factor (P=0.05), sociality factor (P=0.02) and feel health factor (P=0.03).

In men sample (n=84) PPG was negatively correlated with feel healthy factor, BMI was negatively correlated with feel healthy factor (P=0.04) and positively

**Table 2 : Self – perception of health factors and medical indices
Total Sample (n= 149)**

Factors	PPG	HbA _{1c}	BMI	Duration
Self confidence	R= -0.17 P=.031	R= -0.12 P= .099	r = 0.12 p= .095	r = -0.06 p = .238
Sociality	R= - 0.21 P = .009	r = -0.19 p = .016	r = 0.03 p = .357	r = -0.19 p = .019
Attention seeking	r = - 0.17 p = .031	R = -0.12 P = .100	r = - 0.05 p = .300	r = -0.22 p = .008
Feel healthy factor	r = -0.29 p = .001	r = -0.17 p = .031	r = 0.07 p = .231	r = -0.04 p = .336
Worry about health	r = - 0.08 p = .188	R = 0.01 P = .456	r = - 0.01 p = .478	r = -0.11 p= .114
Dependence	r = - 0.13 p = .071	r = - 0.05 p = .283	r = - 0.05 p = .294	r = - 0.12 p = .093

correlated with worry about health factor (P= 0 .03). Duration of diabetes had negative correlations with sociality factor and attention seeking factors (P = 0.05 and P=0.01 respectively) (Tables 2 and 3).

Women had higher mean than men in sociality factor (p = 0.002), feel healthy factor (p = 0.005), worry about health (p = 0.006) and dependence (p = 0.04) (Table 4).

In sum, we may infer that metabolic and other medical parameters correlate adversely with psychological dimensions such as positive self-feeling, sociality, attention seeking, feel healthy and worry about health.

CONCLUSION

This short 27 items questionnaire with 6 principal varimax components accounts for 49.7% of variance of self-perception of health an aspect of psychosocial experience. This reliable and valid questionnaire comprises of positive self-feeling, sociality, attention seeking, feel healthy, worry about health, and dependence as its principal components.

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**Table 3 : Self-perception of health factors and medical indices
Male Sample (n = 84)**

Factors	PPg	HbA _{1c}	BMI	Duration
Self confidence	r = -0.02 p = .423	R = 0.02 P = .437	r = 0.13 p = .145	r = -0.06 p = .311
Sociality	r = 0.07 p = .284	R = -0.04 P = .377	r = - 0.05 p = .331	r = -0.20 p = .046
Attention seeking	r = - 0.18 p = .066	r = -0.19 p = .058	r = 0.01 p = .476	r = -0.26 p = .014
Feel healthy factor	r = - 0.22 p = .035	r = -0.07 p = .279	r = -0.21 p = .042	r = 0.01 p = .460
Worry about health	r = - 0.05 p = 0.337	R = 0.07 P = .290	r = 0.23 p = .027	r = -0.01 p = .495
Dependence	r = 0.06 p = .297	R = 0.07 P = .280	r = - 0.07 p = .292	r = -0.16 p = .092
Total score	r = -0.09 p = 0.216	R = - 0.05 P = .353	r = 0.11 p = .186	r = -0.15 p = .107

**Table 4 : Gender differences in self-perception of health
n = 149 (Men 84, Women 65)**

Factors	Men	Women	P values
Self - confidence	11± 2	10.5 ± 2.2	NS
Sociality	11.5 ± 1.2	10.5 ± 1.6	.002
Attention seeking	7.1 ± 1.4	6.6 ± 1.6	NS
Feel healthy	8.8 ± 1.7	7.9 ± 2.1	.005
Worry about health	3.4 ± 0.8	3.0 ± 0.9	.006
Dependence	7.1 ± 1.1	6.6 ± 1.3	.043

Scores are Mean ± SD P values.

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