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Inter-Relationship of Illness Perception, Personality and Quality of Life among Type 2 Diabetes Patients: A Cross-Sectional Survey

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Abstract: Improved psychological aspect among type 2 diabetic patients plays an important role towards an improved quality of life. Therefore, the aim of this study is to determine the inter-relationship of illness perceptions, personality and quality of life of type 2 diabetic patients from the Diabetic Clinic of Universiti Kebangsaan Malaysia Medical Centre (UKMMC). A total of 115 of type 2 diabetic patients were involved in this study. Patients were surveyed using a quantitative questionnaires of Short Form 36 (SF-36), Revised-Illness Perception (IPQ-R) and big five inventory from September to December 2014. Result shows that most of the sub-domains in the Health Related Quality of Life (HRQOL) were correlated either positively or negatively with the sub-domain of illness perceptions ($p<0.05$). In addition, most of the sub-domains of the Big Five inventory were also positively correlated with the sub-domains of HRQOL except for the neuroticism sub-domain ($p<0.05$). It was also found that personality contributed 21.2% of the variation to the PCS domain while 32.6% of the variation contributed to the MCS domain of HRQOL. In addition, 17.1% of the illness perceptions variation contributed to the PCS domain and 32.7% of the variation contributed to the MCS domain of HRQOL. The findings of this study shows that there is a positive inter-relationship between illness perceptions and personality towards the quality of life of type 2 diabetic patients. A better understanding of illness perceptions and positive personality plays an important role in improving the quality of life among type 2 diabetic patients.

Key words: Diabetic, illness perceptions, personality, quality of life, patient

INTRODUCTION

Diabetes mellitus is one of the most psychologically demanding of the chronic diseases in the world. The International Diabetes Federation (IDF) predicts a 72% increase in the number of diabetics from 189 millions in 2000 to 224 millions in 2025 globally and most of the type 2 diabetes constitutes about 85-95% of all diabetes cases in the developed countries. In Malaysia, there are nearly 1.2 million people with diabetes and 98% of the patients are type 2 diabetes.

Most of the individual regards diabetes as an emotional issue in their lives due to adjustment of their behaviour, intellectual and emotional demands which causes a significant burden in their life. Most of the individual with diabetes struggle with loss of freedom, relentless decision making and perceived reduction in quality of life. Despite that over 40% of individual with diabetes experienced significant psychological distress which causes a negative impact on diabetic self-care, increased complication and healthcare cost, lost productivity and also increased mortality rate (De Groot *et al*., 2001).

There is a growing body of evidence corroborating that the perception of the disease plays an important role in the degree of compliance. This is supported by studies by Broadbent *et al*. (2006) shows that a higher degree of perceived personal control over the disease was associated with better metabolic control which includes fasting blood glucose and HbA1c. Bradley studies also reported that the higher level of perceived control over diabetes to be associated with better glycemic control, lower body weight and better psychological adjustment. In fact, patients who have bad perceptions of their illness are reported to suffer more diabetic complications and negative emotions throughout their life. This clearly shows that the perceptions of individual whether it is a good or bad of their illness does affect the glycemic control as well as the HRQOL of the patients.

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Personality is often mentioned as a potential determinant of preferences for decision making, yet very few studies have empirically tested it. The role of personality in determining self-care behaviour has been relatively ignored possibly because of the lack of convergence in concepts and measures (Wiebe and Christensen, 1997). However, with the emergence of the Big Five framework as the predominant model personality is receiving increased attention in health psychology.

According to Digman (1990) and McCare and Costa (1987), low scorers on emotional stability are characterized by the tendency to experience chronic negative emotions and to display related cognitive and behavioral characteristics. In patients with diabetes, lower emotional stability has been associated both with reporting of more symptoms when hypoglycaemic and with greater worry about hypoglycaemia which in turn predicted hypoglycaemia avoidance behaviour (Hepburn *et al*., 1994). These findings suggest that emotional instability may be influencing individual's perceptions of their bodily sensations resulting in more negative illness beliefs and prognoses (Christensen *et al*., 1999; Wiebe and Christensen, 1997).

Therefore, it is clearly shown that even though more and more novel pharmacological anti-diabetic agents come into the market to control diabetes and prevent its complications yet the incidence of diabetes complications increases every year. It is because most of the clinician and professional practitioners are unaware that the cornerstone for diabetes control remains lifestyle modifications through improved psychological functioning which will leads to a consequent benefit on diabetes control. Besides than that most of the clinician and also the health care professionals are also unaware of the importance of patients illness perceptions and also their personality behaviour towards an improved quality of life.

Hence, it is clearly shows that people with diabetes have identified the need for increasing access to psychological support in terms of their illness perception and a positive personality as an issue for priority action in order to achieve a better quality of life and enable to reduce the complication of the diabetic disease. Due to increased prevalence of psychological problems in people with diabetic that predicts poorer clinical outcomes as well as increased diabetic complications would be one of the main concern in this study.

MATERIALS AND METHODS

Ethics statement: Upon approval from the UKMMC Scientific Research and Ethical Committe, subject who met the criteria and gave the informed consent form were interviewed individually by the researcher for about 30 min. Patients were interviewed whilst they were waiting for his/her regular check up in Diabetic Clinic. Patient were surveyed using a quantitative questionnaires of Short Form 36 (SF-36), Revised-Illness Perception (IPQ-R) and Big Five personality.

Study participants: Participants were patients with type 2 diabetes with a medically confirmed diagnosis of diabetes from Diabetic Clinic of Universiti Kebangsaan Malaysia Medical Centre (UKMMC). The 115 participants were involved in this study that age between 30-70 years old. Criteria for recruitment included: diagnosis of diabetes by general practitioners or hospital clinics, patient who had regular check-up at UKMMC, patients who are able to communicate in Bahasa Malaysia and English. Criteria for exclusion includes: patient who had history of cognitive impairment, stroke, dementia, alcohol or drug addiction problems and patients who were unable to communicate well. Patient were also asked about their demographic and biomedical data.

Psychological measures

Short form-36 (SF-36): Quality of life was assessed using the Short Form-36 (SF-36). The SF-36 evaluates various aspects of functioning and well-being so as to provide an overall impression of HRQoL and was developed as the best compromise between response burdens. It is a generic self completed questionnaire with eight dimensions. These eight dimensions include physical functioning, physical role limitation, emotional role limitation, social functioning, pain, mental health, vitality and general health perception. These contribute to the evaluation of two major aspects of patients' functioning-physical (Physical Component Summary, PCS) and mental (Mental Component Summary, MCS). It takes about 15 min to answer the questions. Scoring is by summing the responses for each of the items in the dimensions and converting them by a scoring algorithm to a scale from 0 (poor health) to 100 (good health). A higher score indicates better functioning, less pain or greater well-being.

Revised Illness Perception Questionnaire (IPQ-R): Illness perception questionnaires evaluate the perception of patients towards their disease which is divided into 7 sub-domains that includes timeline, cyclical, consequences, coherence, emotions, personal and treatment (Moss-Morris *et al*., 2002). These questionnaires consist of 3 sections which asked about the participant about their personal opinion on how they

perceived their diseases. The minimum score for this questionnaire would be 38 scores while the max score for this questionnaire would be 190 scores. Section 1 and 2 questions were more focus on the causes of the disease/factors which leads to the diseases despite doctors or the family opinion. The minimum score for this questionnaire would be 19 scores while the max score for this questionnaire would be 95 scores. In section 3, the questions were asked about the symptoms that the participant experienced throughout their illness and the possibilities of symptoms experienced by the participant relate to their diseases. The minimum score for this questionnaire would be 14 scores while the max score for this questionnaire would be 28 scores. It takes at least 15 min to complete the questions.

Big Five Personality Model: Big Five Personality questionnaires were used to assessed the personality of an individual using 5 domain characteristics which is Openess, Conscienousness, Extraversion, Agreableness and Neuroticism. Each of the sub-domain will be analysed individually and categorized into 5 different sub-domain and usually it takes about 15 min to complete the questions.

Statistical analyses: In this study, data were entered using Statistical Package for the Social Sciences (SPSS) 20.0. Descriptive statistics such as participants age, gender, religion, marital status and also working status were calculated based on the frequency and percentage in this population. Pearson correlation were used to analyze the correlation between illness perception and personality towards quality of life. Multiple linear regression were also were undertaken to examine the prediction between illness perception and personality towards quality of life of diabetic patients.

RESULTS

Table 1 shows that a total of 115 patients with type 2 diabetes aged between 30-70 years old from Universiti Kebangsaan Malaysia Medical Centre (UKMMC) were recruited in this study. Of this 62.6% were female and the remaining 37.4% were male. About 86.9% of the patients were married followed by 3.5% were single and 9.6% widowed. Most of the participants were Muslims (70.4%) followed by 19.2% of Hinduism and 10.4% of Buddhism. Most of the patients in this study are unemployed (40.9%) as compared to the employed (27.8%) and retired (31.3%) patients.

Table 2 shows that race has positive correlation with timeline, consequences and emotion scores while coherence score indicate a negative correlation with race. Employment status of the patients also has both

Table 1: Demographic data of type 2 diabetes patient

Demographic variables	Frequency	Percentage
Age		
30-40	2	1.7
41-50	15	13.1
51-60	38	33.1
61-70	60	52.1
Gender		
Male	43	37.4
Female	72	62.6
Marital status		
Married	100	86.9
Single	4	3.5
Widowed	11	9.6
Divorce	0	-
Religion		
Muslim	81	70.4
Buddhism	12	10.4
Hinduism	22	19.2
Others	0	-
Working status		
Employed	32	27.8
Unemployed	47	40.9
Retired	36	31.3

Table 2: Correlation between illness perception and quality of life among patients with type 2 diabetes

Variables	Timeline (r)	Cyclical (r)	Consequences (r)	Personal (r)	Treatment (r)	Coherence (r)	Emotion (r)
Age	-0.110	0.11	-0.09	-0.150	-0.10	0.12	-0.07
Sex	-0.005	0.04	0.09	-0.060	-0.11	0.03	0.09
Races	0.220*	0.10	0.18*	0.002	-0.10	-0.30**	0.25**
Employed	-0.110	0.02	-0.25**	-0.020	-0.04	0.19*	-0.11
Income	-0.030	0.13	-0.03	-0.120	-0.14	-0.04	0.11
Physical functioning	0.040	-0.12	-0.26**	0.010	0.01	0.11	-0.30**
Physical role	0.570	-0.17	-0.17	0.150	0.25**	0.13	-0.23**
Bodily pain	-0.010	-0.26**	-0.33**	0.200*	0.33**	0.11	-0.31**
General health	-0.240**	-0.09	-0.37**	0.300**	0.37**	0.25**	-0.30**
Vitality	-0.190*	-0.21*	-0.51**	0.220*	0.31**	0.30**	-0.56**
Social functioning	0.040	-0.22*	-0.31**	0.220*	0.25**	0.05	-0.35**
Emotional role	0.040	-0.10	-0.14	0.190*	0.20*	0.09	-0.20*
Mental health	-0.280**	-0.03	-0.58**	0.280**	0.43**	0.35**	-0.54**
PCS	-0.004	-0.21*	-0.35**	0.190*	0.27**	0.18*	-0.36**
MCS	-0.280	-0.03	-0.58**	0.280**	0.43**	0.35*	-0.54**

*p<0.05; **p<0.01

negative correlation with consequences score and a positive correlation with coherence score. Despite than that timeline score in illness perception domain were negatively correlated with general health, vitality and mental health of HRQOL. Cyclical score also shows a negative correlation with bodily pain, vitality, social functioning and also PCS. Most of the consequences scale has negatively correlated with most of the HRQOL subscale except for the physical role and emotional role. Despite than that personal score indicate a positive correlation with most of the HRQOL subscale except for both physical function and role. Both treatment and personal scale are highly correlated with HRQOL subscale except for physical function. In addition, coherence score also has some of the sub-domain that are positively correlated with general health, vitality, mental health, PCS and also MCS. Finally, all of the sub-domain in HRQOL were negatively correlated with emotional score which indicate that patients who score higher value on emotions had low score in PCS and MCS.

Table 3 shows that sex has both positive and negative correlation with sub-domain of personality scores which is conscienousness, extraversion and neuroticism. Income also does correlates negatively with openess, conscienousness and agreableness scores while a positive correlation with neuroticism scores. Besides than that openess, conscienousness, extraversion and agreableness score in Big Five personality domain were positively correlated with sub-domain of HRQOL except for physical function while neuroticism score has negatively correlated with most of the sub-domain of HRQOL.

In general linear multiple regression model, PCS and MCS that represent the overall HRQOL in Table 4 and 5 were classified as dependent variable while Big Five personality domain (openness, conscienousness, extraversion, agreableness and neuroticism) were classified as independent variables. Result shows that some of the variables contributed significantly to the regression model whereby 21.2% of the variation contribute to PCS domain while 32.6% of the variation contributed to MCS domain of HRQOL. In PCS domain, even though each of the the variables are not significant enough but it does influence slightly in term of the

Table 3: Correlation between personality and quality of life among patients with type 2 diabetes

Variables	Openess (r)	Conscienousness (r)	Extraversion (r)	Agreableness (r)	Neuroticism (r)
Age	-0.12	-0.07	-0.02	-0.17	-0.11
Sex	-0.17	-0.28**	-0.21*	-0.01	0.19*
Races	-0.22*	-0.10	-0.15	-0.24**	0.11
Employed	0.05	0.06	0.15	0.03	-0.13
Income	-0.40**	-0.26**	-0.17	-0.20*	0.19*
Physical functioning	0.11	0.15	0.19	0.10	-0.21
Physical role	0.29**	0.41**	0.34**	0.33**	-0.26**
Bodily pain	0.25**	0.41**	0.32**	0.27**	-0.36**
General health	0.27**	0.33**	0.31**	0.29**	-0.21*
Vitality	0.42**	0.41**	0.44**	0.28**	-0.40**
Social functioning	0.19*	0.41**	0.32**	0.28**	-0.43**
Emotional role	0.22*	0.35**	0.35**	0.35**	0.34**
Mental health	0.30**	0.33**	0.25**	0.31**	-0.37**
PCS	0.29**	0.42**	0.37**	0.32**	-0.34**
MCS	0.35**	0.48**	0.44**	0.40**	-0.44**

*p<0.05; **p<0.01

Table 4: General linear regression model between personality and quality of life (physical component summary) among patients with type 2 diabetes

Variables	B	SD	β	t-values	p-values	R^2	ΔR^2	Partial correlation
PCS	-	-	-	-	-	0.247	0.212	-
Constant	6.123	19.297	-	0.317	0.752	-	-	-
Openess	0.273	0.321	0.826	0.851	0.397	-	-	0.081
Conscienousness	1.096	0.565	0.216	1.939	0.055	-	-	0.183
Extraversion	0.586	0.359	0.171	1.632	0.106	-	-	0.154
Agreableness	0.267	0.429	0.065	0.623	0.535	-	-	0.060
Neuroticism	-0.355	0.268	-0.132	-1.320	0.188	-	-	-0.126

Table 5: General linear regression model between personality and quality of life (mental component summary) among patients with type 2 diabetes

Variables	B	SD	β	t-values	p-values	R^2	ΔR^2	Partial correlation
MCS	-	-	-	-	-	0.355	0.326	-
Constant	16.111	17.535		0.919	0.360	-	-	-
Openess	0.347	0.292	0.106	1.188	0.238	-	-	0.113
Conscienousness	0.929	0.514	0.186	1.808	0.073	-	-	0.171
Extraversion	0.560	0.326	0.166	1.717	0.089	-	-	0.162
Agreableness	0.517	0.390	0.128	1.326	0.188	-	-	0.126
Neuroticism	-0.611	0.244	-0.231	-2.510	0.014*	-	-	-0.234

*p<0.05

Table 6: General linear regression model between illness perception and quality of life (physical component summary) among patients with type 2 diabetes

Variables	B	SD	β	t-values	p-values	R^2	ΔR^2	Partial correlation
PCS	-	-	-	-	-	0.222	0.171	-
Constant	72.303	19.964		3.622	0.000	-	-	-
Timeline	0.329	0.304	0.105	1.080	0.283	-	-	0.104
Cyclical	-0.431	0.426	-0.093	-1.010	0.314	-	-	-0.097
Consequences	-0.780	0.381	-0.229	-2.040	0.043*	-	-	-0.194
Personal	0.199	0.480	0.043	0.414	0.680	-	-	0.040
Treatment	0.902	0.709	0.139	1.270	0.206	-	-	0.122
Coherence	-0.273	0.391	-0.075	-0.698	0.487	-	-	-0.067
Emotion	-0.697	0.314	-0.241	-2.220	0.028*	-	-	-0.210

*p<0.05

Table 7: General linear regression model between illness perception and quality of life (mental component summary) among patients with type 2 diabetes

Variables	B	SD	β	t-values	p-values	R^2	ΔR^2	Partial correlation
MCS	-	-	-	-	-	0.368	0.327	-
Constant	82.277	17.670		4.656	0.000	-	-	-
Timeline	0.093	0.269	0.030	0.347	0.729	-	-	0.034
Cyclical	-0.151	0.377	-0.033	-0.400	0.690	-	-	-0.039
Consequences	-0.796	0.338	-0.238	-2.350	0.020*	-	-	-0.220
Personal	0.625	0.425	0.139	1.470	0.144	-	-	0.141
Treatment	0.988	0.627	0.155	1.570	0.118	-	-	0.151
Coherence	-0.391	0.346	-0.109	-1.120	0.261	-	-	-0.109
Emotion	-1.050	0.278	-0.372	-3.800	0.000*	-	-	-0.345

*p<0.05

patients quality of life but in MCS domain, neuroticism item were significant and highly co-related towards the patients quality of life.

In general linear multiple regression model, PCS and MCS that represent the overall HRQOL in Table 6 and 7 were classified as dependent variable while illness perception domain (timeline, cyclical, consequences, personal, treatment, coherence and emotion) were classified as independent variables. Result revealed that some of the variables contributed significantly to the regression model whereby 17.1% of the variation contributed to PCS domain while 32.7% of the variation contributed to MCS domain of HRQOL. In both PCS and MCS domain, result shows that consequences and emotions item were significantly corelated and contributes towards the overall quality of life of the patients.

DISCUSSION

The main purpose of this study is to analyze the role of illness perception and personality towards quality of life of type 2 diabetes patients. Illness perception is one of the most widely used psychological approaches to evaluate the responses of a patient towards his/her illness or their own common sense belief or illness perception about their illnesses and also the treatment (Leventhal *et al*., 1984). Studies have shown that patients perceptions about their diabetes condition had been found to have an impact on his/her glycemic control (Griva *et al*., 2000) as well as their self-management behavior (Eiser *et al*., 2001; Hampson *et al*., 1995).

Findings of this study shows that employment status of the patients has a negative correlation with consequences score of illness perceptions while a positive correlation with coherence scores. This shows that if a patient have a good financial background they might able to buy medical kits or medication related to diabetes disease such as glucose test strip or glucometer which are expensive and beyond the means of most of the diabetic patients. It is because the patients have to buy the glucose test strip almost every month in order to monitor his/her glucose level at home. This is the reason why some the patients are unable to buy the glucose test strip due to financial burden that eventually caused a negative impact on glycemic control and increase the macro and micro complications of the disease.

Apart from the demographic status, overall sub-domain of illness perceptions has both positive and negative correlations towards quality of life of diabetic patient. Timeline scores domain were found to have a negative correlation towards general health, vitality and mental health of the patient. This indicate that as the duration of diabetes prolonged with a poor glycemic control, it will leads to a deterioration in terms of the patients general health and also their mental health. Studies found that cyclical scores also indicate a negative correlation with body pain, vitality, social functioning as well as the overall physical functions (PCS). This shows that as the duration of diabetes prolonged, some of the diabetic patients experience unpredictable symptoms of the diabetic disease that may cause most of the diabetic patient to have a poor physical and mental functions. This prolonged condition will eventually cause an effect on the

psychological aspect of the patient that might develop stress and leads to a poor glycemic control. This is in line with the findings of this studies that shows that the consequences scale has a negative correlation with most of HRQOL sub-domain. Therefore, it is clearly shows that as the duration of diabetic disease prolonged with unpredictable sign and symptoms of the disease may indirectly affects the overall quality of life of the patients in terms of his/her physical and mental functions.

Despite than consequences scale findings, this studies also found that coherence, treatment and personal scale are also highly correlated with most of the HRQOL subscale. Internal locus of control which reflects the personal degree of control over the illnesses and sufficient level of knowledge were one of the main prerequisites for attaining a high level of self-care and a good metabolic control (De Weerdt *et al*., 1990). This indicate that a good personal care and a proper treatment followed by a proper diabetic diet practice will leads to an improved or a better quality of life among diabetic patients. This findings is similar to Bradley studies shows that patient with a poor control of their diabetes were found to have distinctly different perceptions of their illness with better glycemic control, lower body weight and better psychological adjustment as compared to those who have a good glycemic control. In fact, Broadbent *et al*. (2006) also showed that a higher degree of perceived personal control over the disease was associated with better metabolic control (HbA1c). Besides than that studies by Cox *et al*. (1996) shows that a patient with a positive perceptions towards their condition has a good glycemic control (HbA1c<7) compared to the patient with a negative perceptions with poor glycemic control (HbA1c>7).

Finally, all of the sub-domain in HRQOL were negatively correlated with emotional score which indicate that patients who score higher value on emotions had low score in PCS and MCS. This findings shows that patients with negative perceptions towards their condition tend to have an impact on their psychological aspect which eventually may develop stress, suffering from more diabetes related symptoms and develop even more negative emotions in relation to their conditions. This findings is in line with studies by Kinner shows that patient with poor metabolic control were seen in those who are more deeply concerned about their illness which indirectly cause a stressful condition to them and also affects their metabolic control. Therefore, it is clearly shown that emotions and the metabolic outcome are inter-related and a better psychological approaches and a good relationship between patients and doctors also plays an important role in order to achievement a positive metabolic outcome and an improved quality of life.

Improved diabetes self-management which is critical to achieving metabolic control in most of the diabetic patients and reducing diabetic complications often leads to a better quality of life. Patients behaviors or personality does play an important role in determining a good metabolic control, reduce the diabetes complications as well as improved physical and mental functions of an individual with chronic diseases like diabetes. Studies found that although adherence to self-management regimen improves the patients quality of life, it also involves complex changes in lifestyle and many diabetic patients struggle with adherence behaviors (Ruggiero *et al*., 1997; Toljamo and Hentinen, 2001). Studies also found that patient who are perceived difficulty with adherence to self-management behavior is linked to poor blood glucose control and quality of life.

Findings of this study shows that openness, conscienousness, extraversion and agreableness score in Big Five personality domain were positively correlated with sub-domain of HRQOL except for physical function while neuroticism score has negatively correlated with most of the sub-domain of HRQOL. This indicate that as an individual with a good social-emotional support usually those who are extrovert, consciennousness and openness tend to have a positive outcome and overall health being as compared to an individual with poor socio-emotional support which usually seen in patient with neuroticism characteristics. This findings is similar with the studies by Westaway *et al*. (2005) that showed an improved socio-emotional support were associated with better well-being.

In fact, behaviors such as self-discipline, compliance with health-care appointment, medication procedures and a high levels of social support increased the acceptance of diabetes and lowered the perceived difficulty of adherence behaviors. This is consistent with the literature which shows that diabetic patients' outcome expectations, coping and mastery of skills, along with social factors which includes (family, friends and coworkers), physical factors such as availability of foods and the environment promotes an important lifestyle changes that improve the patients quality of life (Gallant, 2003).

Individuals with diabetes feel burdened by negative emotions by restrictions caused by the disease and the pressure of handling chronic diseases often leads to a poor metabolic control and poor quality of life. Findings of this studies indicate that neuroticism score has negatively correlated with most of the sub-domain of health-related quality of life. Studies found that depression may occur after type 2 diabetes disease were diagnosed and when more complex treatment is necessary or when the complications develop (Golden *et al*., 2008;

Pan *et al*., 2010; Engum *et al*., 2005; Brown *et al*., 2006). In fact, studies by Clark *et al*. (1994) and Ormel and Wohlfarth (1991) indicate that trait constructs related to depressive temperament such as neuroticism have also been found to be risk factors for the development of depression. It is known that individual with type 2 diabetes has a higher vulnerability to stress, a general tendency to experience intense episodes of distress and negative affects was not associated with poor glycemic control but depressive symptoms were (Gois *et al*., 2012). Besides that Ciechanowski *et al*. (2000) has highlighted the importance of the "dismissing type", an avoidant interpersonal style had been associated on poor adherence to treatment and unhealthy life styles which leads to a poor prognosis/outcome of the patients medical condition.

CONCLUSION

As more and more novel pharmacological anti-diabetic agents come into the market to control diabetes and prevent its complications yet the number of diabetes diagnosis increases every year. It is because most of the clinician and professional practitioners are unaware that the cornerstone for diabetes control remains lifestyle modifications through improved psychological functioning which will leads to a consequent benefit on diabetes control. Hence, it is clearly shows that people with diabetes have identified the need for increasing access to psychological support as an issue for priority action in order to achieve a better quality of life. Furthermore, this study findings also raises the possibility that type 2 diabetes patients need psychological approaches towards a positive personality, coping behavior guidance, handling stressful situations and also positive perceptions towards chronic illnesses. In a nutshell, both psychological approaches and diabetic treatment plays an equal role in achieving a good glycemic control and improved quality of life among elderly type 2 diabetes patient.

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REFERENCES

Broadbent, E., K.J. Petrie, J. Main and J. Weinman, 2006. The brief illness perception questionnaire. J. Psychosomatic Res., 60: 631-637.

Brown, L.C., S.R. Majumdar, S.C. Newman and J.A. Johnson, 2006. Type 2 diabetes does not increase risk of depression. Can. Med. Assoc. J., 175: 42-46.

Christensen, A.J., P.J. Moran and J.S. Wiebe, 1999. Assessment of irrational health beliefs: Relation to health practices and medical regimen adherence. Health Psychol., 18: 169-176.

Ciechanowski, P.S., W.J. Katon and J.E. Russo, 2000. Depression and diabetes: Impact of depressive symptoms on adherence, function and costs. Arch. Internal Med., 160: 3278-3285.

Clark, L.A., D. Watson and S. Mineka, 1994. Temperament, personality and the mood and anxiety disorders. J. Abnormal Psychol., 103: 103-116.

Cox, W.M., J.P. Blount, P.A. Crowe and S.P. Singh, 1996. Diabetic patient's alcohol use and quality of life: Relationships with prescribed treatment compliance among older males. Alcoholism Clin. Exp. Res., 20: 327-331.

De Groot, M., R. Anderson, K.E. Freedland, R.E. Clouse and P.J. Lustman, 2001. Association of depression and diabetes complications: A meta-analysis. Psychosomatic Med., 63: 619-630.

De Weerdt, I., A.P. Visser, G. Kok and E.A. Van der Veen, 1990. Determinants of active self-care behaviour of insulin treated patients with diabetes: Implications for diabetes education. Social Sci. Med., 30: 605-615.

Digman, J.M., 1990. Personality structure: Emergence of the five-factor model. Annu. Rev. Psychol., 41: 417-440.

Eiser, J.R., A. Riazi, C. Eiser, S. Hammersley and J.E. Tooke, 2001. Predictors of psychological well-being in types 1 and 2 diabetes. Psychol. Health, 16: 99-110.

Engum, A., A. Mykletun, K. Midthjell, A. Holen and A.A. Dahl, 2005. Depression and diabetes a large population-based study of sociodemographic, lifestyle and clinical factors associated with depression in type 1 and type 2 diabetes. Diabetes Care, 28: 1904-1909.

Gallant, M.P., 2003. The influence of social support on chronic illness self-management: A review and directions for research. Health Educ. Behav., 30: 170-195.

Gois, C., V.V. Dias, J.F. Raposo, I. Do Carmo and A. Barbosa, 2012. Vulnerability to stress, anxiety and depressive symptoms and metabolic control in type 2 diabetes. BMC Res. Notes, 5: 1-271.

Golden, S.H., M. Lazo, M. Carnethon, A.G. Bertoni and P.J. Schreiner *et al*., 2008. Examining a bidirectional association between depressive symptoms and diabetes. Jama, 299: 2751-2759.

Griva, K., L.B. Myers and S. Newman, 2000. Illness perceptions and self efficacy beliefs in adolescents and young adults with insulin dependent diabetes mellitus. Psychol. Health, 15: 733-750.

Hampson, S.E., R.E. Glasgow and L.S. Foster, 1995. Personal models of diabetes among older adults: Relationship to self-management and other variables. The Diabetes Educ., 21: 300-307.

Hepburn, D.A., S.J. Langan, I.J. Deary, K.M. Macleod and B.M. Frier, 1994. Psychological and demographic correlates of glycaemic control in adult patients with type 1 diabetes. Diabetic Med., 11: 578-582.

Leventhal, H., D. Nerenz and D. Steele, 1984. Illness Representations and Coping with Health Threats. In: A Handbook of Psychology and Health, Baum, A. and J. Singer (Eds.)., Lawrence Erlbaum Associates, Hillsdale, New Jersey, pp: 219-252.

McCare, R.R. and P.T. Costa, 1987. Validation of the five-factor model of personality across instruments and observers. J. Pers. Soc. Psychol., 52: 81-90.

Moss-Morris, R., J. Weinman, K. Petrie, R. Horne, L. Cameron and D. Buick, 2002. The revised Illness Perception Questionnaire (IPQ-R). Psychol. Health, 17: 1-16.

Ormel, J. and T. Wohlfarth, 1991. How neuroticism, long-term difficulties and life situation change influence psychological distress: A longitudinal model. J. Personality Social Psychol., 60: 744-755.

Pan, A., M. Lucas, Q. Sun, R.M. Van Dam and O.H. Franco *et al*., 2010. Bidirectional association between depression and type 2 diabetes mellitus in women. Arch. Internal Med., 170: 1884-1891.

Ruggiero, L., R. Glasgow, J.M. Dryfoos, J.S. Rossi and J.O. Prochaska *et al*., 1997. Diabetes self-management: Self-reported recommendations and patterns in a large population. Diabetes Care, 20: 568-576.

Toljamo, M. and M. Hentinen, 2001. Adherence to self-care and glycaemic control among people with insulin-dependent diabetes mellitus. J. Adv. Nursing, 34: 780-786.

Westaway, M.S., J.R. Seager, P. Rheeder and D.G. Van Zyl, 2005. The effects of social support on health, well-being and management of diabetes mellitus: A black South African perspective. Ethnicity Health, 10: 73-89.

Wiebe, J.S. and A.J. Christensen, 1997. Health beliefs, personality and adherence in hemodialysis patients: An interactional perspective. Ann. Behav. Med., 19: 30-35.