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Positive Emotions as Predictors in the Management of Type II Diabetes

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Diabetes management is a major concern in the health sector as patients are unable to manage their diabetes despite all efforts from the patient to the practitioner. Positive Emotions have outnumbered health enhancing effects (Fredrickson, 2013) and have also been found to be related with better diabetes management (Miles, Khanbaty, Petersen, Naik & Cully, 2018). The aim of this cross sectional study was to explore gender differences in patients with Type II diabetes in the way they experience their positive emotions, find relation between positive emotions, compliance and diabetes management and to highlight predictors in the management of type II diabetes. Type II diabetes patients (N=341) with age ranged between 40-80 years (*M*=50.25, *SD*=7.93) were selected through a purposive sampling technique. Data were collected using the Positive Emotions Scale (Shamim & Muazzam, 2018), the Compliance to Diabetes Regimen Scale (Shamim & Sohail, 2011) and demographic sheet. The results indicated that male participants experienced more positive emotions than female participants. Results of regression analysis revealed that positive emotions and compliance predicted better diabetes management. The model accounted for 62% of variance explained in the prediction for diabetes management. Inspiration was the most significant predictor of diabetes management. Positive emotions were found to improve diabetes management. Enhancing positive emotions enhance diabetes management among patients with Type II diabetes.
Keywords: positive emotions, compliance, diabetes management, HbA1c.

Positive emotions are the emotions that produce a pleasing and a lasting effect on the individual. The broaden-and-build theory (Fredrickson, 2013) presents the framework for how positive emotions facilitate in developing our social, psychological, cognitive and physical resources. It has been discovered by Fredrickson (2001) that positive emotions have the ability to increase the cognitive capacity by expanding the thought and providing the individual with more options and solutions for solving any problem. In other words positive emotions increase the storehouse of the recourses available for the individual and open new opportunities for the individual to behave, deal and cope in a particular situation (Fredrickson & Branigan, 2005). As the result the individual is better able to deal not only with everyday life situations but also at difficult times by increasing his/her resilience (Tugade, Fredrickson & Feldman Barrett, 2004). When one is experiencing the positive emotions like joy, satisfaction and gratitude, he/she is relaxed and body is in the resting state. He/she is more able to think in a creative manner in such free and calm situation. Positive emotion provides one with situations and moments in one's life that are not interfered by the harmful effect of negative emotions (Fredrickson, 2003) and one can enjoy bounty of the emotion experienced, it opens more possibilities and provides more opportunities and options for the solution of the problem (Fredrickson, 2001).

Negative emotions have a negative effect on us. They have a tendency to narrow the individual's thought and also limit his/her actions by providing only a few set of possible actions on such situations. Positive emotions on the other hand have a lasting effect on the individual's mood, body, behaviour, thoughts, and health.

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When one feels good about something, one has a good feeling that calms one's body produces a relaxing effect and as a result the individual is able to perform better socially, physically, behaviourally and cognitively. This movement may escalate positivity leading to the upward spiral (Fredrickson, Cohn, Coffey, Pek & Finkel, 2008). As a result one positive emotion will lead to the next and it would start a chain of positive thoughts and emotions. Every positive emotion in turn would produce productive changes in the individual (Garland et al., 2010). Whereas, it has been seen that negative emotions like; depression, anger and hostility have a lingering and a long lasting negative effect on the individual. This may initiate a negative downward spiral. Positive emotions work to rectify, correct and fix the negative and harmful impact of negative emotions by reversing its harmful effect (Fredrickson, Mancuso, Braigan & Tugade, 2000; Friedrickson & Joiner, 2002).

Inculcating positive emotions can lead the individual to be successful in all fields of life as they increase individual's cognitive, social, intellectual, behavioural potential. It calms the body and brings it to a relaxing level. The individual is better able to think of solving problems and coming to conclusion as the body is free from all fears and threats of the fixed fight and flight response generated by negative emotions (Fredrickson & Branigan, 2005).

The harmful effects of negative emotions on health have been emphasised in the previous years (Lustman, Frank, & McGill, 1991) whereas, less development has been made on the profitable consequence of positive emotions (Seligman & Csikszentmihalyi, 2000). Psychology has emphasised on the study of negativity (i.e., stress, anxiety, hostility, aggression and depression and its repercussion) on the health of the individual (Bardone, Moffitt, Caspi, Dickson, & Silva, 1996; Carnethon, Kinder, Fair, Stafford & Fortmann, 2003; Chida & Steptoe, 2009). In the recent era, there is robust emphasis on the importance of Positive Emotions and the outnumbered benefits created by them (Fredrickson, 2013).

Positive Emotions play an important role in maintaining good physical and psychological health. As positive emotions increase, other resources and provide a storehouse of options and possibilities

for individual by broadening the thought and attention it also increases resources of health (Tugade, et al 2004).

Positive Emotions may create a strong positive effect on the physical health of the individual. Research evidence indicates that positive emotions have a favourable impact on physical health by means of its positive consequences on immune system and may also increase longevity (Cohen & Pressman, 2006; Diener, & Chan, 2011). As positive emotions trigger the spiral of positivity, it also has a ripple effect on the health of the individual. Positive emotions undo the harmful effect of negative emotions. The harmful effects are mostly related to health and appear and emerge in the form of poor immune system, poor hygienic condition and poor over all general health. When these are replaced by positive emotion, the harmful effects are eliminated (Fredrickson et al., 2000). A study conducted to find the impact of negative emotions like keeping grudges and positive emotion like forgiveness on the health of nurses, suggested strong link between negative emotions of keeping grudges with poor health while forgiveness was found to have an enhancing effect on individual's health (Witvliet, Ludwig, & Laan, 2001). Positive emotions also increase life span of individual by improving individual's health (Danner, Snowdon, & Friesen, 2001; Veenhoven & Hagerty, 2006). Happiness studies have also indicated that happier people have been seen to outlive unhappy individuals (Diener, & Chan, 2011).

Positive Emotions and Diabetes

It can be concluded from the above benefits of positive emotions that positive emotions may also have a significant effect in the management of diabetes. There is a direct link of stress and anxiety with diabetes. Reducing stress and improving positive emotion may create positive effect on the individual's management of diabetes. Incidence of diabetes has been linked to lower positive emotions (Carnethon et al., 2003). Studies with diabetes patients demonstrated that positive affect was associated with better self-management behaviour and negative affect was significantly associated with poor diet and exercise compliance (Robertson, Stanley, Cully, & Naik, 2012; Miles, Khambaty, Petersen, Naik, & Cully, 2018). In another study, negative emotions have been linked to poor diabetes management (Tran, Wiebe, Fortenberry, Butler, & Berg, 2011). Positive emotions have been associated with better diabetes management (Dirik & Goek-Yorulmaz, 2018; Lord, Rumburg & Jaser, 2015). Positive emotions have also been found to predict diabetes management, self-care and compliance in patients with diabetes (Miles et al., 2018; Moskowitz, Epel, & Acree, 2008).

Positive emotions is a new area in Pakistan. The effects of positive emotions on health have never been investigated in Pakistani Type II diabetes patients. Therefore this states a need to measure Pakistani Type II diabetes patients in their positive emotions and investigate its effects on diabetes management.

Diabetes is a condition with raised levels of glucose in the blood, because the body is either unable to produce insulin or is unable to utilize it. Type II diabetes is more common than any other type of diabetes. It accounted for 90% of the cases reported in 2017. It is characterised by increase in blood glucose (Hyperglycaemia) as a result of insufficient amount of insulin produced or the body's inability to utilize it (Ogurtsova et al, 2017).

Diabetes causes hazards in the life of the individual by dragging whole family into economic crises. Besides this, the catastrophe of diabetes is its related complications creating personal suffering, misery and leading to death. There is an estimate of an abrupt rise in 2017 in the prevalence of diabetes all over the world as compared to the previous years. According to recent estimate, 425 million people in the world are affected by diabetes. It has further been reported that it might double the incidence of diabetes in 2045 (Ogurtsova et al, 2017).

It comes with a host of complications if not treated or managed properly. These complications may include cardiovascular disease, retinopathy, hypertension, kidney failure, foot ulcers, fungal infections and amputation of a certain part of body (American Diabetes Association, 2018). Therefore there is a great need to manage diabetes especially, in Pakistan to prevent people from its severe complications and to improve the quality of life, health and wellbeing of Pakistani Type II diabetes patients.

The destructive and damaging complications of Type II diabetes can be managed by effective collaboration of the patient, caregiver and heath care provider. As diabetes is a disease that needs a lot of self-care therefore, there is a great need to educate the patients at the individual level to improve the self-care behaviour. Diabetes management involves daily blood glucose monitoring, foot care, and compliance to medication, inoculation of prescribed dose of insulin, regular exercise and diet control. Minor negligence on the part of the patients may affect the management of diabetes. These problems may become a challenge for the health care provider. The target goal is to achieve optimal blood glucose level. As the health care provider alone cannot help achieve this target, there is a great need to educate the patients and create awareness among them about diabetes management. Besides lot of efforts from the health care providers, there seem to be psychosocial and cultural factors that may or may not affect diabetes management. Therefore, there is a need to explore predictors of better diabetes management. Positive emotions play an important role in improving health. The relationship between positive emotion and diabetes management can be explored to find ways of managing it.

Compliance

Compliance generally means to act in accordance to the set standards or act as accepted by the authority. Compliance to health therefore means to follow the standards set by the health care provider to achieve a certain goal and follow the prescribed medical regimen. Compliance is an essential component in diabetes management. It can facilitate by improving glycemic control or can create obstacle in the way of diabetes management. Therefore in order to improve glycemic control of the patient it's essential to improve compliance as well. Compliance to diabetes simply means taking medicine regularly, inoculating insulin regularly as prescribed by the health care provider, changing sedentary life style into an active one, starting regular exercise and controlling diet that can cause an increase in blood glucose levels. Better compliance is related to better glycemic control and better management of diabetes (Schectman, Nadkarni & Voss, 2002).

Diabetes Management

Diabetes management is the term used to explain the condition of diabetes as under the personal and practitioner's control including all the efforts that are taken place at both ends. Diabetes management can be measured by taking blood glucose levels. If the blood glucose levels are under control and are consistent over a period of time then the condition is known as well managed if the glucose levels are not under control and exceed the normal limit it is known as poor diabetes management.

There are many ways of measuring blood glucose levels. The fasting plasma, oral glucose and random glucose test measure, the blood glucose level of the patient at the moment the blood sample was taken. These blood tests are subject to variation, as a result of minor changes in eating habits etc. Therefore these blood tests do not

give a complete picture of relatively persistent blood glucose levels of the patients. HbA1c measure the average blood glucose of the past three months, hence reducing the everyday ups and downs in blood glucose variation. Its values are expressed in percentages. It is therefore considered as the best way to measure diabetes management (Goldstein et al., 2004). For diabetes patients the recommended range of HbA1c is between 6%-7% (American Diabetes Association, 2018). If the HbA1c value is within the recommended range for diabetes a patient that is between 6%-7% then it is considered as better management while if it exceeds the limit and is above 7% then it is considered as poor management. It is essential for diabetes patients to manage their diabetes to avoid diabetes related complication and improve quality of life and wellbeing. The problems in diabetes management arise when patients are unable to comply with the prescribed diabetes regimen or are unable to maintain glycemic control (HbA1c) even after all efforts. Diabetes management involves efforts from the health care provider as well as the patients therefore it is important to understand the underlying psychological dynamics of the patients.

Significance

The present study was therefore designed to measure positive emotions and compliance of patients with Type II diabetes. It is further designed to explore positive emotions and compliance as predictors of diabetes management. The study can bring forth fruitful information regarding diabetes management and can work as a reform in providing ways to manage type II diabetes.

Objectives

The objectives of the present study are as follows:

- To find out relationship between positive emotions, compliance and Type II diabetes management.
- To find gender difference in the experience of positive emotions among type II diabetes patients.
- To explore positive emotions and compliance as predictors of type II diabetes management.

Method

Sample

Purposive sampling technique was used to select the sample of 341 patients (170 men & 171 women) with Type II diabetes. The sample (N=341) age ranged from 40-80 years (*M*=50.25, *SD*=7.93) was collected from the outdoor unit of private and government hospitals and special diabetes clinics. Patients having other endocrine disorders, Type I diabetes, and patients aged more than 80 years were not included. The age range of 40-80 years was selected because the onset of diabetes is usually at around 40 years and after 80 years other degenerative disorders make difficult dealing with patients. Patients with severe medical conditions and co-morbidities were also not included. Patients having at least one year of duration of illness were included. Patients having HbA1c levels drawn in the preceding 20 days of the test administration were selected as it was one of the main variables of interest. Cross sectional research design was used to study the role of positive emotion, compliance and other demographic variables in the management of Type II diabetes.

Variables and Measures

Positive emotions. Positive emotions are defined as the emotions that produce a pleasing affect on the individual. Positive emotions are known to enhance physical, social, cognitive and psychological resources and enhance the scope of attention (Fredrickson & Branigan, 2005). It has also been investigated that positive emotions undo the effect of negative emotions and events in the individual's life (Fredricson et al., 2000).

In the present study, the positive emotions were measured by using Positive Emotion Scale (PES) (Shamim & Muazzam, 2018). The PES is a 5 point Liket type scale that measures positive emotion by making respondents rate each statement from 1-5 where 1 is strongly disagree, 2 is disagree, 3 represents neither disagree nor agree, 4 reflects agree and 5 is strongly agree. It has 30 items that measure 10 main positive emotions i.e. joy (α=.80), hope (α=.81), gratitude (α=.91), gratitude towards God (α=.97), satisfaction (α=.92), compassion (α=.92), awe (α=.73), love (α=.83), humour (α=.80) and inspiration (α=.85). The scale has strong internal consistency and reliability with α = .97(Shamim & Muazzam, 2018). The higher scores on PES suggest high positive emotions and the low scores reflect low positive emotions.

Compliance. In the present study, compliance refers to adhere to a prescribed medical regimen. Compliance simply means to follow all the directions given by the medical practitioners or prescribed by the physician. It may include taking regular medicines. With reference to the present research, it means to follow all directions to take medicine, inoculate insulin injections, monitor blood sugar levels, start a regular exercise program and avoid food that my cause increase in blood glucose levels.

Compliance to the medical regimen was measured on a self reporting 5 point scale with 5= strongly agree to 1= strongly disagree, with alpha coefficient .76 (Shamim & Sohail, 2011). In which the respondents rated their compliance towards medical regiment in a week time duration. It is a 4 item scale including 4 domains of compliance namely compliance to diet, compliance to exercise, compliance to medicine and insulin and blood glucose monitoring. High score in compliance scale reflect better compliance to diabetes regimen and low score demonstrate poor compliance.

Diabetes management. Diabetes management is defined as keeping the glycemic index in the controlled range. Patients suffering from diabetes have specific levels of glucose in their blood. Keeping these levels in the normal range is the target of diabetes management (American Diabetes Association, 2018).

Diabetes management of the participants was measured by using the HbA1c levels. These levels are the average blood glucose levels of past three months of the individual. For the current study HbA1c levels were taken from the medical account of the patient. HbA1c was selected as a measure for the management of Type II diabetes as it gives the average of the last three months and is not affected by everyday ups and downs and minor negligence resulting in variation in blood glucose levels. It gives a general picture of how well the patient is maintaining his/her diabetes. The range for normal person for blood glucose over HbA1c test is from 5% - 6%, for diabetics the target HbA1c level is to maintain it between 6% - 7%. If the values exceed the normal limit for diabetics i.e. more than 7% it is considered as poor diabetes management and if the values are within the normal range (6% - 7%) then it is considered as good diabetes management (Ogurtsova et al, 2017).

Procedure

Permission for data collection was taken from the in charge and Medical Superintendent of the institute, clinic and hospital. After getting approval from the ethical board of the hospital the sample was selected. Informed consent was taken from the patients and they were intimated and briefed about the purpose of this research. All the research ethical standards were maintained. The Positive Emotion Scale, Compliance in medical regimen self-reporting questionnaire along with demographic sheet was presented to Type II diabetes patients. Their recent Hba1c levels were taken from their medical records and the data was collected.

Statistical Analysis

Correlation and t-test was run to find relationship between variables. Multiple regression analysis was conducted to find the relationship between variables and to predict management of Type II diabetes with positive emotions and compliance. SPSS 23 was used to calculate results.

Results

Table 1
Psychometric Properties of the Major Study Variables (N = 341)

Measures	*k*	*M*	*SD*	Range		*α*
				Actual	Possible	
Positive Emotions	30	103.99	19.75	32-150	30-150	.93
Joy	03	10.45	3.293	3-15	3-15	.89
Hope	03	10.30	3.500	3-15	3-15	.93
Gratitude	03	11.84	2.646	3-15	3-15	.89
Gratitude towards God	03	13.23	2.506	3-15	3-15	.94
Satisfaction	03	9.45	3.299	3-15	3-15	.92
Compassion	03	11.12	2.789	3-15	3-15	.90
Awe	03	8.71	3.332	3-15	3-15	.93
Love	03	9.14	3.312	3-15	3-15	.89
Humour	03	9.26	3.467	3-15	3-15	.92
Inspiration	03	10.49	3.460	3-15	3-15	.94
Compliance	04	12.85	3.50	4-20	4-20	.70

Table 1 shows the psychometric properties of the major variables used in the study. Reliability analysis showed that the positive emotions (.93) and its subscales i.e. joy (.89), hope (.93), gratitude (.89), gratitude towards God (.94), satisfaction (.92), compassion (.90), awe (.93), love (.89), humour (.92), and inspiration (.94) had a very good reliability. Compliance scale (.70) also showed good reliability

Table 2
Summary of Inter Correlation between Positive Emotions, Compliance and HbA1c (N=341)

Variables	1	2	3	4	5	6	7	8	9	10	11	12
HbA1c		-.45**	-.49**	-.43**	-.31**	-.54**	-.40**	-.43**	-.47**	-.45**	-.53**	-.28**
Joy			.42**	.44**	.35**	.32**	.36**	.34**	.31**	.32**	.35**	.007
Hope				.56**	.49**	.47**	.28**	.38**	.25**	.35**	.38**	.04
Gratitude					.73**	.43**	.38**	.23**	.31**	.26**	.32**	.02
GTG						.38**	.42**	.15**	.24**	.21**	.29**	.08
Satisfaction							.33**	.33**	.36**	.22**	.30**	.13
Compassion								.14*	.30**	.19**	.17**	.66
Awe									.29**	.30**	.25**	.06
Love										.31**	.21**	.05
Humor											.30**	.09
Inspiration												.02
compliance												

Note. HbA1c = Hemoglobin A1c; GTG = gratitude towards God. High scores on HbA1c depict poor diabetes management
*p<.05, **p<.01. Table 2 shows significant relationships among all study variables.

Table 3
Independent Sample t-test Indicating Mean Differences between Men and Women for Positive Emotions (N=341)

Variables							CI (95%)		
	Men (n=170)		Women (n=171)						
	M	*SD*	*M*	*SD*	*t* (339)	*p*	*LL*	*UL*	Cohen's *d*
Joy	10.84	3.35	10.06	3.19	2.20*	.02	.08	1.48	.24
Hope	10.46	3.57	10.13	3.43	.87	.38	-.41	1.07	.09
Gratitude	12.03	2.53	11.64	2.75	1.34	.17	-.17	.94	.15
Gratitude towards God	13.52	2.11	12.95	2.81	2.13*	.03	.04	1.10	.23
Satisfaction	9.62	3.43	9.29	3.16	.91	.36	-.37	1.02	.10
Compassion	11.30	2.85	10.94	2.71	1.18	.23	-.23	.95	.13
Awe	8.86	3.20	8.57	3.45	.80	.42	-.41	1.00	.09
Love	9.60	3.17	8.68	3.39	2.59**	.01	.22	1.62	.28
Humor	9.57	3.34	8.95	3.56	1.64	.10	-.11	1.35	.18
Inspiration	10.92	3.35	10.06	3.52	2.30*	.02	.12	1.59	.25

Note.* p<.05, **p≤ .01

In Table 3 of Independent sample t-test shows significant gender differences on joy, men participants scored high on joy (*M*=10.84, *SD*=3.35) than women participants (*M*=10.06, *SD*=3.19) at *t* (339) =2.20, *p*<.05. Significant gender differences are found on gratitude towards God, men participants got high on gratitude towards God (*M*= 13.52, *SD*= 2.11) than women participants (*M*= 12.95, *SD*=2.81) at *t* (339) = 2.13, *p*<.05. Significant gender differences are also found on love, men participants got high score on love (*M*= 9.60, *SD*= 3.17) than women participants (*M*= 8.68, *SD*=3.39) at *t* (339) = 2.59, *p*≤.01. There are also significant gender differences on inspiration, men participants got higher scores on inspiration (*M*= 10.92, *SD*= 3.35) than women participants (*M*= 10.06, *SD*=3.52) at *t* (339) = 2.30, *p*<.05, while no significant gender differences are found on hope, gratitude, satisfaction, compassion, awe and humour.

Table 4
Multiple Linear Regression for Positive Emotions and Compliance as Predictor of HbA1c (N = 341)

Model	*B*	*SE*	*β*
(Constant)	16.01	.41	
Joy	-.03	.02	-.06
Hope	-.07	.02	-.15**
Gratitude	-.05	.03	-.08
Gratitude towards God	.06	.03	.10*
Satisfaction	-.05	.02	-.09**
Compassion	-.09	.02	-.15***
Awe	-.06	.02	-.12**
Love	-.09	.02	-.19***
Humour	-.06	.02	-.12**
Inspiration	-.13	.02	-.28***
Compliance	-.11	.02	-.23***
R			.79
R^2			.62
ΔR^2			.61
F			48.53***

Note. *$p \leq .05$, **$p < .01$, *** $p < 0.001$

The results of multiple linear regression in Table 4 show that joy and gratitude are not significant predictors of HbA1c ($p > .05$) while hope ($p < .01$), gratitude towards God ($p \leq .05$), satisfaction ($p < .01$), compassion ($p < .001$), awe ($p < .01$), love ($p < .001$), humour ($p < .01$) and inspiration ($p < .001$) appears to be significant predictors of HbA1c ($p < 0.001$). Inspiration emerges as the most significant predictor with the highest Beta value.

Discussion

This inter disciplinary study connects positive psychology with health psychology. It is a preliminary study in the fields of positive psychology as it explored positive emotions in Pakistani type II diabetes patients. This area has been ignored previously in the evolution of modern psychology (Seligman, & Csikszentmihalyi, 2000). Especially with reference to Pakistan, it is unique study as it finds relationship between positive emotions and diabetes management. The results demonstrate strong negative correlation of all the subscales of positive emotions (i.e., joy, hope, gratitude, humour, gratitude towards God, hope, satisfaction, compassion, love, awe and inspiration) with HbA1c indicating that the scores on HbA1c are decreasing with the increasing scores of positive emotions, where low scores of HbA1c reflect good diabetes management. Therefore it was supported that positive emotions were related to better diabetes management. Other studies also suggest link between positive emotions and diabetes management (Lord et al., 2015; Robertson et al, 2012; Tran et al., 2011; Yin, et al., 2015). On the other hand, negative emotions have been related to poor diabetes management in literature (Gonzalez, Tanenbaum, & Commissariat, 2016; Hillard, Wu, Rauseh, Dolan & Hood, 2013).

Compliance was also found to be associated with good diabetes management. Patients who comply with their prescribed diabetes regimen (i.e., follow diet plan, exercise according to doctors advice, take insulin/medicine regularly and monitor blood glucose on regular basis) were found to have good diabetes management. Other studies have also shown strong link between positive emotion and better compliance (Miles et al., 2018; Peyrot et al., 2005; Yin et al., 2015).

Significant gender differences were found between men and women in the experience of positive emotions. Joy was found to be higher in men participants as compared to women participants. Gratitude towards God also seemed to be higher in men participants than women participants. There was also significant difference between men and women in the experience of love. Men participants were found to experience more love than women participants. Men participants were also found to report more inspiration than women participants. There was no significant difference between men and women in the experience of gratitude, hope, awe, humour compassion and satisfaction. These findings are supported by other studies (Fujita et al., 1991). Women are reported be more expressive in their emotions as compared to men specifically expressing negative affect more than positive affect (Biehl, et al., 1997; Fischer & Manstead, 2000). Women are suppressed in Pakistani society which might relate to their experience of low positive emotions. Most of the women in the Pakistan are house wives with lots of demands from house hold, society and culture which may affect their positive emotions (Ali et al., 2011).

Positive emotions and compliance proved to be the significant predictor in the management of Type II diabetes. The total regression model accounted for 62% of variance explained by positive emotions and compliance in the prediction of Type II diabetes. Hope, gratitude towards God, satisfaction, compassion, awe, love, humour and inspiration were found to be significant predictors of better management in Type II diabetes. Studies have reported relationship between positive affect and better health outcome (Lyubomirsky, King, & Diener, 2005; Veenhoven & Hagerty, 2006). Positive emotions have also been proved to predict low rates of mortality in diabetes patients (Moskowitz, Epel, & Acree, 2008). Many other studies have reported positive affect with better diabetes management (Brundisini et al., 2015; Dirik et al., 2018; Gonzalez et al., 2016; Peyrot et al., 2005; Richman et al., 2005; Robertson et al., 2012; Tran et al., 2011; Huffman et al., 2015; Lord et al., 2015; Miles et al., 2018; Yin et al., 2015). Joy and gratitude were not found to be significant predictors of management of Type II diabetes. Inspiration emerged to be the most significant predictor in Pakistani population. The positive emotions like compassion, gratitude towards god, inspiration and hope may have cultural or religious relevance. People in Pakistan take inspiration in the sense of intuition from the Devine. Compassion is emphasised in the religion, being Muslims, it is one of the obligation to show compassion towards the poor, needy people in the form of charity. Faith is considered incomplete with hope. People show a lot of gratitude towards God in Pakistani culture. Therefore, there seems a lot of importance of these positive emotions in Pakistani Type II diabetes patients. Positive emotions and compliance have proved to be important predictors in the

management of Type II diabetes. A change in positive emotion can bring about a change in the diabetes management of patients having Type II diabetes.

Limitations and Suggestions

The sample consisted of the hospitals of Lahore only. Therefore, the results cannot be generalized. Data should be generated from other cities to see the effect of positive emotions on diabetes management. There is a need to investigate the importance of other demographic variable in the management of type II diabetes patients. This study may be replicated with other health related problems to see positive emotion's impact on management of other diseases.

Implications

The study may prove to be useful in tailoring interventions to improve positive emotions to manage Type II diabetes (Huffman, DuBois, Millstein, Celano, & Wexler, 2015). It creates awareness and gives insight into the interplay of positive psychology with health psychology. The study provides guidelines to promote insight among type II diabetes patients in the management of their illness. It may also help to develop cost effective health strategies to manage diabetes and control or delay the hazardous complications of Type II diabetes.

Conclusion

Positive emotions and compliance predict better diabetes management. Enhancing diabetes patients' positive emotions and compliance can help improve diabetes management. Therefore inculcating positive emotions can help improve compliance and self-care and bring about a progressive change in the management of Type II diabetes.

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