Personality Traits And Adherence To Medication Among Individuals With Type 2 Diabetes Mellitus

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Abstract: Diabetes Mellitus is a serious problem and self-management is effective factor for diabetes control. In diabetes self-management personality is one of the important factors. Limited research exists exploring the relationship of personality traits on adherence behaviour. Since non-adherence is a major obstacle in treating diabetes, the aim of this study was to determine whether personality traits are associated with adherence to medication in individuals with type 2 diabetes mellitus. In this cross sectional study, data were collected from a purposive sample of 500 type 2 diabetic patients, using self-management and Big five personality Scales. For data analysis Pearson's Correlation Coefficient and Multiple linear regression methods were used. Statistical analyses resulted in a negative relationship between Neuroticism and medication adherence ($P<0.001$), while as Extraversion ($P<0.001$), Agreeableness ($P=0.001$) and Conscientiousness ($P<0.001$) were positively related to medication adherence. Openness to experience did not show any significant correlation with medication adherence. Among the four personality traits (Neuroticism, Extraversion, Agreeableness and Conscientiousness) only Neuroticism and Conscientiousness significantly predicted adherence to medication in individuals with type 2 diabetes mellitus. This study demonstrated that multiple personality traits are of significant importance for adherence behaviour in individuals with chronic diseases like diabetes. The findings suggest that several personality traits may interact in influencing adherence behaviour. Personality traits could putatively be used to focus efforts to educate and support patients with high risk of low medication adherence.

Keywords: Personality Traits, Adherence to Medication, Diabetes Mellitus

1. Introduction

Diabetes mellitus (DM) has become a major public health problem worldwide and one of the most challenging health problems in the 21st century (International Diabetes Federation, 2005) Diabetes mellitus is a chronic metabolic disorder in which a person has high blood glucose, either the body does not produce sufficient insulin or the cells do not respond to the insulin that is produced. Diabetes mellitus is one of the biggest disease burdens of the modern age and in this age health is profoundly influenced by personality, a relationship most established with the five factor model (FFM) of personality. "Personality refers to those relatively stable and enduring aspects of the individual which distinguish him from other people, and at the same time, form the basis of our predictions concerning his future behaviour" (Wright, et al., 1970). FFM– Neuroticism, Extraversion, Openness to experience, Agreeableness, and Conscientiousness are empirically derived clusters of dispositional tendencies that parsimoniously capture the major axis of psychological and behavioural variation in humans. Personality traits are significant psychological predictors of health (Hampson, 2012). Association between personality and health has been recognized across decades. Childhood personality traits have been shown to predict self-rated health in middle age (Hampson, Golderg, Vogt, & Dubanoski, 2007). Moreover, these findings extend beyond self-reports of general health to objective markers of health such as physician-rated health (Chapman, Lyness, & Duberstein, 2007) and biomarkers of health (Hampson, Edmonds, Goldberg, Dubanoski, & Hillier, 2013). Medication adherence is defined as the extent to which taking medication corresponds with the recommendations by a health care provider. There is currently no well-confined way for healthcare professionals treating type 2 diabetes to predict which individuals will adhere to their dietary, pharmaceutical and medical scheduling protocols. Because personality can affect behaviour, identification of a person's personality has potential to help in

predicting medical compliance and outcomes before treatment is initiated. That is why this quantitative correlational study was carried out to determine if traits of normal personality are associated with medication adherence in individuals with type 2 diabetes.

2. Objectives of the present study

- To assess personality traits (Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness) among individuals with type 2 diabetes.
- To assess level of medication adherence among individuals with type 2 diabetes.
- To study the relationship of personality traits (Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness) with medication adherence among individuals with type 2 diabetes.

3. Methodology

3.1: Research Setting:

The research setting for the study includes two hospitals of district Srinagar-

- Shri Maharaja Hari Singh Hospital (SMHS), Government Medical College and Associated Hospitals, Karan Nagar, Srinagar.
- Jawahar Lal Nehru Memorial Hospital (JLNM), Rainawari, Srinagar.

The study was conducted at the Outpatient Department of Medicine (Endocrinology unit) of SMHS hospital and Outpatient Department of the Medicine Unit of JLNM hospital.

3.2: Sample:

Present study is based on a sample of 500 type 2 diabetic patients selected purposively from Department of Medicine (Endocrinology unit), Shri Maharaja Hari Singh Hospital (SMHS), Government Medical College and Associated Hospitals, Karan Nagar, Srinagar and Department of Medicine, Jawahar Lal Nehru Memorial Hospital (JLNM), Rainawari, Srinagar.

The inclusion and exclusion criteria for sample group were as under:

3.2.1: Inclusion Criteria:

- Must have received a diagnosis of type 2 diabetes mellitus.
- Are aged 21 or over.
- Are taking medication for their diabetes (e.g. oral medications, insulin, or both) for at least six months.
- Are willing to participate in the study.

3.2.2: Exclusion Criteria:

- Patients diagnosed with type 1 diabetes mellitus.
- Patients from inpatient-department with acute diabetes-related complications or other psychological problems were excluded from the study.
- Lack of patient's consent to participate in the study was another exclusion criterion.

3.3: Study Instruments

3.3.1: Personality traits were measured by the **NEO-Five Factor Inventory** (Costa and McCrae, 1992), which is based on the fve factor model of personality and measures the personality domains of: Neuroticism, Extraversion, Openness to experience, Agreeableness, Conscientiousness

3.3.2: The Summary of Diabetes Self-care Activities Measure (SDSCA) (Toobert, Hampson, & Glasgow, 2000). The SDSCA is a 25-item self-report measure of the frequency of performing diabetes self-management tasks over the preceding 7 days. It includes items assessing the following aspects of the diabetes regimen: general diet, specific diet, exercise, medication, blood-glucose testing, foot-care, and smoking. For the present study among the core subscales only medication adherence scale was included as per the requirement.

3.4: Procedure

In the present study purposive sampling was used. Type 2 diabetic patients were approached personally at a out-patient departments of the already mentioned hospitals. Informed consent was taken from these patients in order to seek their voluntary participation and necessary instructions were given. Only those patients were included who agreed to take part in study.

3.5: Statistical Analysis

Obtained data were recorded on the prepared sheets. At first, the collected data were entered to SPSS version-20. The frequencies of quantitative data of personality traits and medication adherence were calculated. The data was also subjected to Pearson's Product Moment method of correlations. Further, Multiple Regression Analysis was used to examine the associations of personality traits (Neuroticism, Extraversion, Openness to experience, Agreeableness and Conscientiousness) with medication adherence among individuals with type 2 diabetes.

4. Results and interpretation

Table 4.1: Frequency distribution of type 2 diabetic adults on different levels of personality traits (N=500)

Levels	Low		Average		High	
Personality Traits	f	%	F	%	f	%
Neuroticism	81	16.2	320	64.0	99	19.8
Extraversion	90	18.0	319	63.8	91	18.2
Openness to experience	82	16.4	349	69.8	69	13.8
Agreeableness	81	16.2	333	66.6	86	17.2
Conscientiousness	70	14.0	393	78.6	37	7.4

Table 4.1 reveals that 16.2% of the type 2 diabetic mellitus patients fall in the low level of neuroticism, 64% of them fall in the average level of neuroticism, and the remaining 19.8% fall in the high level of neuroticism.

It was also found that 18% of the type 2 diabetic mellitus patients fall in the low level of extraversion, 64% of them fall in the average level of extraversion, and the remaining 19.8% fall in the high level of extraversion.

16.4% of the type 2 diabetic mellitus patients fall in the low level of openness to experience, 69.8% of them fall in the average level of openness to experience, and the remaining 13.8% fall in the high level of openness to experience.

16.2% of the type 2 diabetic mellitus patients fall in the low level of agreeableness, 66.6% of them fall in the average level of agreeableness, and the remaining 17.2% fall in the high level of agreeableness.

14% of the type 2 diabetic mellitus patients fall in the low level of conscientiousness, 78.6% of them fall in the average level of conscientiousness, and the remaining 7.4% fall in the high level of conscientiousness.

Table 4.2: Frequency distribution of type 2 diabetic adults on different levels of Medication adherence (N=500)

Levels	Low		Average		High	
	f	%	F	%	f	%
Medication adherence	31	6.2	131	26.2	338	67.6

Table 4.2 reveals that 6.2% of the type 2 diabetic mellitus patients fall in the low level of medication adherence, 26.2% of them fall in the average level of medication adherence, and the remaining 67.6% fall in the high level of medication adherence.

Table 4.3: Showing correlation between personality traits and medication adherence amng type 2 diabetic adults

Variables	*Pearson's Coefficient*				
	Neuroticism	Extraversion	Openness to experience	Agreeableness	Conscientiousness
Medication adherence	r = -0.318** (p < .001)	r = 0.243** (p < .001)	r = 0.080^{NS} (p = .073)	r = 0.143** (p = .001)	r = 0.332** (p < .001)

** $p \leq 0.01$ level of significance; NS=Insignificant

Results revealed that there is significant negative correlation between neuroticism and medication adherence (r = -0.318) indicating that more the neuroticism less will be adherence to medication. Again it was found that there is positive correlation between extraversion (r = 0.243), agreeableness (r = 0.143) and conscientiousness (r = 0.332) and medication adherence indicating that more the extraversion, agreeableness

and conscientiousness more will be adherence to medication. Further insignificant relationship was found between openness to experience and medication adherence among diabetic adults.

Table 4.4: Table showing Multiple regression analysis (ANOVA Summary)

	Sum of Squares	df	Mean Squares	F
Regression	28.497	4	7.124	
Residual	190.595	495	0.385	18.502** (p < .001)
Total	219.092	499		

a. **Predictors:** (Constant), Conscientiousness, Agreeableness, Neuroticism and Extraversion
b. **Dependent Variable:** Medication adherence

R Square = .130

Table 4.5: Table showing Multiple regression analysis (Summary of Predictor Variables)

Model	*Unstandardized Coefficients*		*Standardized Coefficients*	*T*
	B	*Std. Error*	*Beta*	
(Constant)	5.676	0.327		17.383
Neuroticism	-.013	.004	-.179	-3.093**
Extraversion	-.001	.005	-.010	-0.166[NS]
Agreeableness	.006	.006	.048	1.101[NS]
Conscientiousness	.023	.007	.206	3.189**

a. Dependent Variable: Medication adherence   **p≤0.01**

Results also present regression analysis of medication adherence and neuroticism, extraversion, agreeableness and conscientiousness. The significance of the F-value (F = 18.502) indicates that certainly there are variables which emerge as significant predictors of medication adherence. As R Square value (R = .130) indicates that 13% variance in medication adherence is attributed to above selected variables. Further results also show the significance of predictors of medication adherence. The results reveal that neuroticism, (t = -3.09) and conscientiousness (t = 3.18) emerged as significant predictors of medication adherence. The negative sign of beta value of neuroticism indicates that increase in neuroticism will lead to decrease in medication adherence and the positive sign of conscientiousness indicates that increase in conscientiousness will lead to increase in medication adherence.

5. Conclusion and Discussion

Results revealed that there is significant negative correlation between neuroticism and medication adherence indicating that more the neuroticism less will be adherence to medication. Again it was found that there is positive correlation between extraversion, agreeableness and conscientiousness and medication adherence. In the regression model it was found that only neuroticism and conscientiousness significantly predicted adherence to medication among type 2 diabetic adults.

Previous studies support these findings. Noroozi, Tahmasebi, and Shaybani (2014) also demonstrated that among five personality traits, the most helpful trait in adherence to medication was conscientiousness. Conscientiousness was found to be a significant predictor of adherence to medication (Piette, Schillinger, Potter, & Heisler, 2003). Findings of the study done by Skinner, Bruce, Davis, and Davis (2013) also revealed that type 2 diabetic patients with higher conscientiousness are more likely to take their recommended medications. The reason is that Conscientious individuals are more likely to avoid negative things which might affect their self-management (Goldberg & Strycker, 2002; O'Connor, Conner, Jones, McMillan, & Ferguson, 2009; Raynor & Levine, 2009). These individuals also have additional awareness and control (restraint) regarding their adherence to self-management behaviours (Elfhag & Morey, 2008; Konttinen, Haukkala, Sarlio-Lahteenkorva, Silventoinen, & Jousilahti, 2009).

As far as relationship of neuroticism and self-management is concerned, its dimensions (anxiety, anger and aggression, depression, impulsivity and vulnerability) have been accompanied with negative emotions which predispose these individuals to negative outcomes. Depression, anxiety and anger can increase blood sugar levels physiologically and at the same time, it can have adverse effects on self-management behaviours in patients and thus diminish their treatment motivations and adherence to the medical regimen. Jerant, Chapman, Duberstein, Robbins, and Franks (2011) observed that neuroticism was the chief personality factor associated with medication adherence among diabetic adults. Impulsivity leads

to vulnerability in these individuals and reduces their tolerance of difficult situations, especially complicated diabetes treatment regimens, and increases their risk of treatment termination following any problems that may arise.

6. Implications of the present study

Reliable associations between personality and health behavior have important implications for personality concepts and for health behaviour models.

One implication is that health behaviours may be specific manifestations of general personality traits. For example, the behaviours and qualities that comprise conscientiousness (e.g., self-discipline, deliberation) may be manifested in a variety of ways, including self-management behaviours. To the extent that this is true, it is appropriate to shift much of health behaviour research away from traditional conceptualizations of health behaviours as motivated specifically by health concerns, independent of other aspects of motivation and behaviour.

While this traditional view probably is appropriate for many behaviours (e.g., compliance with medical regimens), regarding health-related behaviors as elements of overall behaviour patterns influenced by a variety of factors seems more appropriate for many behaviours. Behaviors which can be treated from this broader perspective are important, because they include factors such as diet, smoking and other behavioral health problems facing society today.

A connection between personality and lifestyle may be the basis for purported associations between personality and disease. If so, it is important to determine the conceptual status of self-management behaviours relative to personality.

7. Acknowledgments

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