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The Relationship Between Attributional Style and General Health in Diabetic Patients with Good and Poor Metabolic Control of Diabetes

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Faramarz Sohrabi[1]
Saloomeh Sartipzadeh Dizaji[*2]

Abstract

Diabetes is one of the common diseases which is increasingly rising in most countries and has wide a range of complications ranging from physical to psychological problems. Given the importance of this disease, this study aims to investigate the relationship between attributional style and general health in diabetic patients with good and poor metabolic control of diabetes. The main research question was that "Is there a relationship between attributional style and general health in diabetic patients with good and poor metabolic control of diabetes?". The statistical population of the study included all diabetic patients who referred to the medical centers of type 2 diabetes in Tehran. From this population, 82 patients were selected through availability sampling. The research instruments were the General Health Questionnaire (GHQ-28) and the Attributional Style Questionnaire (ASQ). Data was determined based on gender, metabolic control of diabetes, level of education, and frequency. The correlation coefficient and multivariate analysis of variance (MANOVA) were used to analyze the data. The results of the correlation coefficient indicated that attributional style, as an internal dimension, had a significant relationship with general health in the good metabolic control group while the stable dimension in the poor metabolic control group had a significant correlation with general health (r = 0.341, p = 0.05). In addition, men had better general health than women but no difference in attributional style was found between men and women. Based on this research, changes in attributional style of patients can improve general health of them.

1. Professor in Clinical Psychology, Allameh Tabataba'i University, Tehran, Iran.
2. *M.A. in Personality Psychology, Islamic Azad University, Science and Research Branch, Tehran, Iran. ssartip2010@yahoo.com

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Introduction

Diabetes mellitus (DM) refers to a group of common glycemic disorders that share the phenotype of hyperglycemia. Several distinct types of DM are caused by a complex interaction of genetics and environmental factors. Depending on the etiology of DM, factors contributing to hyperglycemia include reduced insulin secretion, decreased glucose utilization, and increased glucose production. The glycemic dysregulation, associated with DM, causes secondary pathophysiologic changes in multiple organ systems that impose a tremendous burden on the individuals with diabetes and on the health care system (Harrison, 2018).

In addition, based on the evidence, it has been found that diabetes is one of the most common chronic diseases in human societies. The number of people with the disease is over 300 million, and it is expected that this number goes up to 500 million within the next 30 years (Badka, 2010). Also, the increase in the rate of diabetes across the global brings with it an increase in issues related to diabetes management as lack of education, limited access to care or undiagnosed conditions, and diabetes complications are real problems faced by people in most countries of the globe (IDF, International Diabetes Federation, 2020). Therefore, improving the general health of this expanding population should be a great concern of today's societies.

According to the World Health Organization, the number of patients with diabetes in 2000 was 171 million. If not using the appropriate strategies for prevention and treatment, the number will increase up to 366 million in 2030 (Heidari, 2011). In addition, many new cases of diabetes exist in the developing world. It seems the Middle East will have the highest rate of increase in the prevalence of diabetes in 2030 (Mehrabi, 2011).

As a result, maintaining general health of this growing population can be one of the most important and significant goals of current societies. Then, it is needed to investigate this issue in chronic diseases with high incidence, such as diabetes which is able to affect many aspects of people’s life. One aspect that has remarkable effects on general health is mental health. Mental health depends on the person’s way of thinking, feeling and doing. In general, people who have good

mental health have positive attitudes towards life, and they are ready to deal with problems of the life. They have good feelings about themselves and others. Also, they are responsible for their relationships in the workplace. When people have good mental health, they expect the best things in life because they are ready to deal with any event. We can achieve a balanced and joyful spirit by learning the characteristics of people with good mental health (Rahiminia, 2005).

Other variable in this study is attribution style. The term attribution has two predominant meanings. The first one refers to explanation of behavior and the second one refers to inferences. Attributional styles, related to failure or negative events, are correlated more with mental states than attributional styles related to success or positive events and can explain the changes (Seligman, Abramson, Semmel, & Von Baeyer, 1979). Peterson and Seligman (1984) found that people consistently bring certain reasons for good and bad events which are sometimes conflicting attributions. In other words, attribution of negative events is stable and generally due to internal causes. Attribution of positive events is unstable and related to external causes. Attributional styles can be maladaptive. Maladaptive attributional style is associated with psychological and physical problems.

Following these researches, Weiner (1985) proposed controllability (controllable-uncontrollable) as the other dimension of attribution. This dimension represents the level of control over a cause in the future by a person. According to Weiner (1985), the causal structure begins with the dimension of space (inner-outer). Among internal and external causes, some are unstable while others are relatively stable over time (stability). Some causes, such as fatigue and effort, are internal and unstable, but distinguishable. One can increase or decrease the effort by the voluntary control, but fatigue is uncontrollable. Hence, Weiner (1985) proposed the dimension of controllability. Having control over the existing conditions of the disease can largely ensure mental health.

The most important issue is that the factors affecting diabetes include cognitive, behavioral, social and emotional ones playing a significant role in regulation and control of diabetes (Kahalokola, 2012). Thus, individuals living with type 1 or type 2 diabetes are at a high risk of depression, anxiety, and eating disorder diagnoses. Mental health comorbidities of diabetes compromise of adherence to treatment and thus increase the risk of serious short- and long-term complications, which can result in blindness, amputations, stroke, cognitive decline,

lower quality of life, and premature death. When mental health comorbidities of diabetes are not diagnosed and treated, the financial cost to society and health care systems is substantial, as are the morbidity and health consequences for patients. There is a consensus that because of the devastating consequences of type 1 diabetes and comorbid depression, anxiety disorders, and eating disorders, new paradigms of diabetes care in which mental health care is an integral part of regular diabetes medical care, are needed (Louis, Philipson, Barbara, & Anderson, 2014).

Failure to cure the disease and its deadly complications cause the disease to be considered important. On the other hand, diabetes is one of the most important risk factors that cause cardiovascular disease, and the most common cause of amputation is the chronic kidney failure. All of these cases affect the quality of life for patients with diabetes (Masoudi Alavi, & Ghofranipour, 2004). In another recent study, individuals with serious mental illnesses, particularly those with depressive symptoms or syndromes, and people with diabetes shared reciprocal susceptibility and a high degree of comorbidity (Robinson, Coons, Haensel, Vallis, & Jean-François, 2018).

The other factor considered in this study is gender. According to a research in Oxford University, gender differences in adherence may be attributed, in part, to gender differences in externalizing symptoms in young people with poor metabolic control. Accordingly, boys had more externalizing symptoms, whereas girls had more anxiety (Naar-king et al., 2006).

Based on these studies, the diabetic patients with the blood glucose control can bring the situation under control, and in turn this leads to better general health. On the other hand, having diabetes complications along with disturbing symptoms and negative views of the society which is associated with labeling a person can threaten the identity of the person and increase negative emotions (Abduli, Ashktorab, Ahmadi, & Tabrizi, 2011). Nichols and Brown (2004) illustrated that diabetic patients in comparison to non-diabetic ones had lower levels of mental health. Also, Jamson in 1998 found out that patients who had high internal control attribution engaged a lot in self-caring activities.

Therefore, the necessity of assessment through attribution style and general health questionnaires can uncover more information about different aspects of patients' mental health. In addition, so far, no study has been conducted to investigate the relationship between attributional

style and general health in diabetic patients with good and poor metabolic control of diabetes. Given the importance of diabetes control and the potential impact of attribution style and its impact on the general health of the people involved or the possibility of labeling patients with diabetes that can affect a person's psychological problems, the necessity for this study based on the components of good and poor metabolic control of diabetes is completely obvious.

Considering the mentioned issues, the aim of this study is to investigate the attribution style of people with diabetes as one of the factors affecting mental health. This is study is done with the hope that perhaps an effective solution can be found to further improve psychological health. In this study, two groups of main and secondary questions are answered. The main questions are about the main themes of the research, and the secondary questions address the relationship between attribution style and general health in patients with blood glucose control in terms of gender.

Main Questions

1- Is there a relationship between attribution style and general health of diabetic patients with good blood glucose control?

2- Is there a relationship between attribution style and general health of diabetic patients with poor blood glucose control?

Secondary Questions

1- Is there a difference in the attribution style of diabetic patients with good blood glucose control in terms of the gender?

2- Is there a difference in general health of diabetic patients with good blood glucose control in terms of the gender?

3- Is there a difference in the attribution style of diabetic patients with poor blood glucose control in terms of the gender?

4- Is there a difference in general health of diabetic patients with poor blood glucose control in terms of the gender?

Method

The statistical population of the study included all the diabetic patients referring to medical centers of type 2 diabetes in Tehran. The sample consisted of 82 diabetic patients referring to Taleghani Hospital and Tajrish Martyrs Hospital. The availability sampling method was used in this research.

The research instruments were the General Health Questionnaire (GHQ-28), including 28 questions, and the Attributional Style Questionnaire (ASQ).

The General Health Questionnaire (GHQ) is a measure of current mental states such as anxiety symptoms, sleep disorders, social functioning, depression symptoms, and also physical symptoms. Since its development by Goldberg in the 1970s, it has been extensively used in different settings and different cultures. The questionnaire was originally developed as a 60-item instrument but at present, a range of shortened versions of the questionnaire including the GHQ-30, the GHQ-28, the GHQ-20, and the GHQ-12 version is available. The reliability coefficients were calculated through three different methods: test-retest, split-half, and Cronbach alpha, which were 70, 93, and 90, respectively. The concurrent validity of the questionnaire was 55 ($p <$ 0001) (Taghavi, 2002).

The Attributional Style Questionnaire (ASQ) measures individual differences in attributional style. According to the reformulated learned helplessness model, depressive symptoms are associated with an attributional style in which uncontrollable, bad events are attributed to internal (versus external), stable (versus unstable), and global (versus specific) causes.

ASQ is a 48-items questionnaire that measures an individual's explanatory style (positive versus negative). The questionnaire is made up of 12 hypothetical events (6 good and 6 bad), each followed by 4 questions: (1) a free-response question about the cause of the hypothetical event, (2) a question about whether the event has an internal or external cause (i.e., how much respondents believe that they themselves are responsible for the event) (3) a question about whether the event has a stable or unstable cause (i.e., how much respondents believe that the cause of the event is present over time), (4) a question about whether the event has a global or specific cause (i.e., how much the respondents believe that the cause of the event occurs across varying conditions). The first question is not scored and is used to prepare the respondents to answer questions 2-4. Questions 2-4 are answered on a 7-point Likert scale. The Cronbach alpha for this questionnaire was reported to be .80 (Bridges, 2001). In another study, Soleimani reported it to be .74 in 2014 (Rostamoghli, 2015).

Data were determined based on gender and metabolic control of diabetes. The correlation coefficient and multivariate analysis of variance (MANOVA) were used to analyze the data.

Results

The statistical population of this study included all diabetic patients who referred to medical centers of type 2 diabetes in Tehran among which 82 patients were selected by the availability sampling method. This sample included 47.7% men and 52.4 women the average age of whom was 59.67 years old with the standard deviation of 9.4, and 28.7% of them had diploma. The research instruments were the General Health Questionnaire (GHQ-28) and the Attributional Style Questionnaire (ASQ). Data was determined based on gender, metabolic control of diabetes, level of education, and frequency. The correlation coefficient and multivariate analysis of variance (MANOVA) were used to analyze the data.

Table 1 shows the results related to the first main question which is; "Is there a relationship between attribution style and general health of diabetic patients with good blood glucose control?"

Table 1. Results of Pearson Correlation Coefficients for the Relationship Between Attribution Style and General Health of Diabetic Patients with Good Blood Glucose Control

Attribution styles	Statistical index	General health				
		Physical symptoms	Anxiety symptoms and sleep disorders	Social function	Depression symptoms	Total
Negative internal attribution	correlation coefficient	0.027	0.341*	-0.004	-0.102	0.075
	Significance level	0.871	0.036	0.983	0.547	0.660
Positive internal attribution	correlation coefficient	0.050	-0.155	-0.115	0.168	-0.060
	Significance level	0.767	0.352	0.490	0.321	0.722
Negative stable attribution	correlation coefficient	0.139	0.128	0.153	-0.062	0.090
	Significance level	0.405	0.444	0.360	0.714	0.597
Positive stable attribution	correlation coefficient	-0.88	-0.241	-0.206	-0.031	-0.214
	Significance level	0.600	0.145	0.216	0.853	0.202

Negative general attribution	correlation coefficient	0.102	0.041	0.181	0.013	0.061
	Significance level	0.540	0.806	0.278	0.940	0.720
Positive general attribution	correlation coefficient	0.007	-0.211	-0.142	0.037	-0.136
	Significance level	0.968	0.203	0.396	0.828	0.423

**significance level (0.05)*

According to the data in Table 1, the *r* value is not significant at the level of 0.05 ($p > 0.05$) for the relationship between attribution style and general health of diabetic patients with good blood glucose control. Hence, there is no relationship between attribution style and general health of diabetic patients with poor blood glucose control.

Only the relationship between negative internal attribution with anxiety symptoms and sleep disorders is significant ($r = 0.341$, $p = 0.05$). This relationship is positive and direct. In other words, the negative internal attribution causes the general health to be unfavorable for those patients with anxiety symptoms and sleep disorders. According to the method of scoring the General Health Questionnaire (GHQ), low scores mean that the general health status is desirable and vice versa.

Table 2. Results of Pearson Correlation Coefficients for the Relationship between Attribution Style and General Health of Diabetic Patients with Poor Blood Glucose Control

Attribution styles		General health				
		Physical symptoms	Anxiety symptoms and sleep disorders	Social function	Depression symptoms	Total
Negative internal attribution	correlation coefficient	-0.161	-0.036	-0.036	0.097	-0.043
	Significance level	0.307	0.820	0.820	0.540	0.789
Positive internal attribution	correlation coefficient	-0.292	-0.315 *	-0.315 *	-0.238	-0.318 *
	Significance level	0.060	0.042	0.042	0.129	0.040
Negative stable attribution	correlation coefficient	-0.203	-0.138	-0.138	.020	-0.093
	Significance level	0.197	0.382	0.382	0.902	0.558
	correlation coefficient	-0.077	-0.161	-0.161	-0.305 *	-0.283

Positive stable attribution	Significance level	0.629	0.309	0.309	0.050	0.070
Negative general attribution	correlation coefficient	0.103	0.082	0.082	0.177	0.189
	Significance level	0.518	0.604	0.604	0.263	0.230
Positive general attribution	correlation coefficient	-0.140	-0.324 *	-0.324 *	-0.282	-0.354 *
	Significance level	0.376	0.036	0.036	0.070	0.022

**significance level (0.05)*

As shown in Table 2, the *r* value is significant at the level of 0.05 ($p > 0.05$) for positive internal attribution in the subscale of anxiety symptoms and sleep disorders (-0.315); the total score of general health (-0.318); positive stable attribution in the subscale of depression symptoms (-0.305); positive general attribution in the subscale of social function (-0.324); and the total score of general health (-0.354). Hence, there is a significantly negative and inverse relationship between attribution style and general health of diabetic patients with poor blood glucose control for the mentioned components. Higher levels of attribution styles are associated with higher general health for diabetic patients with poor blood glucose control and vice versa.

Table 3 shows the results for the first secondary question which asks; "Is there a difference in the attribution style of diabetic patients with good blood glucose control in terms of gender?"

Table 3. Results of Multivariate Analysis of Variance about Comparing Attribution Style in Patients with Good Blood Glucose Control in Terms of Gender

Index of changes		Total squares	Degrees of freedom	Mean squares	F	Significance level
Effect of gender	Negative internal attribution	0.808	1	0.808	0.603	0.442
	Positive internal attribution	1.891	1	1.891	1.867	1.80
	Negative stable attribution	0.219	1	0.219	0.229	0.635
	Positive stable attribution	0.093	1	0.093	0.074	0.787
	Negative general attribution	0.277	1	0.277	0.230	0.634

	positive general attribution	1.963	1	1.963	1.267	0.268
Error	Negative internal attribution	48.175	36	1.338		
	Positive internal attribution	36.472	36	1.013		
	Negative stable attribution	34.486	36	0.958		
	Positive stable attribution	45.113	36	1.253		
	Negative general attribution	43.363	36	1.205		
	positive general attribution	55.769	36	1.549		
Total	Negative internal attribution	748.167	38			
	Positive internal attribution	963.528	38			
	Negative stable attribution	671.028	38			
	Positive stable attribution	783.528	38			
	Negative general attribution	594.389	38			
	positive general attribution	764.083	38			

As shown in Table 3, the F value with the degree of freedom (1 and 36) is not significant at the level of 0.05 ($p > 0.05$) for negative internal attribution (0.630); positive internal attribution (1.867); negative stable attribution (0.229); positive stable attribution (0.074); negative general attribution (0.230); and positive general attribution (1.267). Hence, it is concluded that there is no difference in the attribution style of diabetic patients with good blood glucose control in terms of gender.

Table 4 shows the results of the second secondary question asking; "Is there a difference in general health of diabetic patients with good blood glucose control in terms of gender?"

Table 4. Results of Multivariate Analysis of Variance about Comparing General Health in Patients with Good Blood Glucose Control in Terms of Gender

Index of changes		Total squares	Degrees of freedom	Mean squares	F	Significance level
Effect of gender	Physical symptoms	4.206	1	4.206	0.703	0.407
	Anxiety symptoms and sleep disorders	1.780	1	1.780	0.673	0.417
	Social function	0.198	1	0.198	0.139	0.711
	Depression symptoms	12.484	1	12.484	4.737	0.036
	Total	41.907	1	41.907	1.673	0.204
Error	Physical symptoms	221.230	37	5.979		
	Anxiety symptoms and sleep disorders	97.810	37	2.644		
	Social function	52.571	37	1.421		
	Depression symptoms	97.516	37	2.636		
	Total	927.016	37	25.054		
Total	Physical symptoms	6232.000	39			
	Anxiety symptoms and sleep disorders	6587.000	39			
	Social function	6566.000	39			
	Depression symptoms	3269.000	39			
	Total	87968.000	39			

As shown in Table 3, the F value with the degree of freedom (1 and 36) is not significant at the level of 0.05 ($p > 0.05$) for physical symptoms (0.703); anxiety symptoms and sleep disorders (0.673); social function (0.139); and total mental health (0.204). Hence, it is concluded that there is no difference in the general health of diabetic patients with good blood glucose control in terms of gender.

The F value for depression symptoms is 4.737; hence, it is significant at the level of 0.05. It is concluded that there is a difference in the general health of diabetic patients with good blood glucose control in terms of gender. Comparison of the two groups shows that general health of men is better than that of women.

Table 5 shows the results for the third secondary question asking; "Is there a difference in the attribution style of diabetic patients with poor blood glucose control in terms of gender?"

Table 5. Results of Multivariate Analysis of Variance about Comparing Attribution Style in Patients with Poor Blood Glucose Control in Terms of Gender

Index of changes		Total squares	Degrees of freedom	Mean squares	F	Significance level
Effect of gender	Negative internal attribution	0.556	1	0.556	0.377	0.543
	Positive internal attribution	0.265	1	0.265	0.215	0.646
	Negative stable attribution	2.001	1	2.001	2.026	0.162
	Positive stable attribution	0.413	1	0.413	0.379	0.542
	Negative general attribution	0.001	1	0 .001	0.001	0.981
	positive general attribution	0.556	1	0.556	0.471	0.497
Error	Negative internal attribution	59.050	40	1.476		
	Positive internal attribution	49.307	40	1.233		
	Negative stable attribution	39.503	40	0.988		
	Positive stable attribution	43.653	40	1.091		
	Negative general attribution	46.995	40	1.175		
	positive general attribution	47.272	40	1.182		
Total	Negative internal attribution	740.972	42			

	Positive internal attribution	882.167	42			
	Negative stable attribution	698.917	42			
	Positive stable attribution	825.528	42			
	Negative general attribution	569.694	42			
	positive general attribution	673.972	42			

As shown in Table 5, the F value with the degree of freedom (1 and 40) is not significant at the level of 0.05 ($p > 0.05$) for negative internal attribution (0.377); positive internal attribution (0.215); negative stable attribution (2.026); positive stable attribution (0.379); negative general attribution (0.001); and positive general attribution (0.471). Hence, it is concluded that there is no difference in the attribution style of diabetic patients with poor blood glucose control in terms of gender.

Table 6 shows the results for the fourth secondary question asking; "Is there a difference in general health of diabetic patients with poor blood glucose control in terms of gender?"

Table 6. Results of Multivariate Analysis of Variance about Comparing General Health in Patients with Poor Blood Glucose Control in Terms of Gender

Index of changes		Total squares	Degrees of freedom	Mean squares	F	Significance level
Effect of gender	Physical symptoms	6.881	1	6.881	2.481	0.123
	Anxiety symptoms and sleep disorders	17.357	1	17.357	3.161	0.083
	Social function	18.667	1	18.667	3.784	0.059
	Depression symptoms	24.381	1	24.381	3.677	0.062
	Total	257.524	1	257.524	5.616	0.023
Error	Physical symptoms	110.952	40	2.774		

	Anxiety symptoms and sleep disorders	219.619	40	5.490
	Social function	197.333	40	4.933
	Depression symptoms	265.238	40	6.631
	Total	1834.095	40	45.852
Total	Physical symptoms	12495.000	42	
	Anxiety symptoms and sleep disorders	13381.000	42	
	Social function	12354.000	42	
	Depression symptoms	6242.000	42	
	Total	172846.000	42	

As shown in Table 6, the F value with the degree of freedom (1 and 40) is not significant at the level of 0.05 ($p > 0.05$) for physical symptoms (2.481); anxiety symptoms and sleep disorders (3.161); social function (3.784); depression symptoms (3.677); and the total score of general health (0.204). Hence, it is concluded that there is no difference in the general health of diabetic patients with poor blood glucose control in terms of gender.

The F value for the total score of general health is 5.616; hence, it is significant at the level of 0.05. It is concluded that there is a difference in the general health of diabetic patients with good blood glucose control in terms of gender. Comparison of the two groups shows that the general health of men is better than women.

There is no significant difference for attribution styles of patients with poor blood glucose control in terms of the gender, but there is a significant difference for the total score of general health in terms of the gender, in a way that the comparison of two groups shows that general health of men is better than that of women.

Discussion

This study tried to answer two main questions: whether there is a relationship between attribution style and general health of diabetic

patients with good blood glucose control and, if there is a relationship between attribution style and general health of diabetic patients with poor blood glucose control.

The results of correlation coefficient indicated that in attribution style, the internal dimension was a strong predictor of general health in good metabolic control group while the stable dimension in poor metabolic control group was a strong predictor of general health. The relationship of negative internal attribution with anxiety symptoms and sleep disorders was significant ($r = 0.341$, $p = 0.05$). This relationship was positive and direct. In other words, the negative internal attribution caused general health of the patients to be unfavorable for anxiety symptoms and sleep disorders. Also, there was a significantly negative relationship between attribution style and general health of diabetic patients with poor blood glucose control for the mentioned components. High level of using attribution styles was associated with the desirability of general health for diabetic patients with poor blood glucose control and vice versa.

In terms of gender, there was no difference in the attribution style of diabetic patients with good blood glucose control. In addition, The F value for depression symptoms was 4.737; hence, it was significant at the level of 0.05. Therefore, it can be concluded that there was a difference in general health of diabetic patients with good blood glucose control in terms of gender. Comparing the two groups showed that general health of men is better than that of women. This finding is consistent with the results of the studies conducted by Noorbala, Bagheri, and Yazdi (1998) and Roca (1999). The evidence showed that high prevalence of mental disorders in women was related to their gender and marital roles (Lazarus, 1984). Anderson et al. (2001), in their study, concluded that depression in women with diabetes is more than depression in men with diabetes. The reason can be that most of women's roles are limited to a major social role, i.e. housekeeping. Even if they are employed, they are still responsible for the daily routine of housekeeping. In addition, women are under higher levels of tension and pressure in comparison to men. It should be noted that psychological and physical problems and ailments of women are more than those of men.

Overall, general health for patients with poor blood glucose control was lower than that of patients with good blood glucose control. This issue can be explained by mentioning that awareness of lacking blood

glucose control in patients can lead to anxiety and threaten a person's general health. In a research study, it was highlighted that diabetic patients with blood glucose control can bring the situation under their control, and in turn this leads to more general health. On the other hand, having diabetes complications with disturbing symptoms and holding negative views toward the society that is associated with labeling a person can threaten the identity of the person and increase the experience of negative emotions (Abduli, Ashktorab, Ahmadi, & Parvizi, 2009).

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