Role of the Big Five Personality Traits in Chemical Suicide Attempt

Seyyed Vali-allah Mousavi [1], Negar Sheakhli [2], Sajjad Rezaei [3*]

1. Department of Psychology, Faculty of Literature and Humanities, University of Guilan, Rasht, Iran.
2. Department of Clinical Psychology, Islamic Azad University, Guilan Science and Research Branch, Rasht, Iran.
3. Department of Psychology, Faculty of Psychology and Educational Sciences, University of Isfahan, Isfahan, Iran.

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ABSTRACT

Objective: Suicide is a major public health problem with little information about the role of personality characteristics of people who chemically commit suicide. The present study aimed to investigate the role of personality traits in the chemical suicide attempters.

Methods: In a case-control study, 100 patients with attempted suicide selected by convenience sampling were compared to 100 normal subjects as a control group selected by consecutive sampling in terms of personality traits using short form 5-factor questionnaire of NEO.

Results: Suicide attempters got significantly higher scores in neuroticism and also lower scores in extroversion, openness, agreeableness, and conscientiousness ($P<0.01$) compared to normal individuals. Interaction effects of group membership by sex revealed that male suicide attempters had always higher neuroticism levels and lower extraversion and openness ($P<0.05$) compared to the other sex group.

Conclusion: The findings accurately identified the basic personality dimensions influencing the antisocial phenomenon and provided approaches for prevention and treatment of suicide attempters.

1. Introduction

Poisoning is defined as being harmed or killed by a poison. Poison is a substance which can cause death, damage, or organ impairment through chemical reaction (Hawton et al., 2003). Poisoning is classified into two categories: Intentional and accidental. Intentional poisoning includes a high percentage of suicide cases which not only cause mortality, but also entail high hospital expenses (Bernardes, Turini, & Matsuo, 2010). Suicide is a social problem which is on the rise as interactions in most societies become more complicated. There is a growing concern among various social groups and classes in today's societies regarding the rise of suicide (Murray & Wright, 2006). Schneidman defines suicide as "a conscious act of self-induced annihilation, best understood as a multidimensional malaise in a needful individual who defines an issue for which suicide is perceived as the best solution". Thus, suicide is not a meaningless or accidental act. On the contrary, it is a release from stress factors and psychological pressure one is inevitably suffering from (Levi-Belz, 2014).

Today, suicidal behavior is a serious problem in public health (Henry et al., 1993). Some believe that suicide and its attempt rates are the most important mental health indicators in a society (Conner et al., 2001). In Western countries, drug and chemical poisoning resulting from attempting suicide accounts for 15% to 20% of emergency poisoning cases (Awton et al., 2003). According to the latest official report released by Iran's Ministry of Health, Treatment and Medical Education, the daily rate of suicide in Iran is 13 case and the average age of sui-

*** Corresponding Author:**
Sajjad Rezaei, PhD
Address: *Department of Psychology, Faculty of Psychology and Educational Sciences, University of Isfahan, Isfahan, Iran.*
Tel: *+98 (911) 3390785*
E-mail: *rezaei_psy@hotmail.com*

cide is 29 years. Although Iran has a lower rate of suicide than that of other countries, this rate has increased from 1.3 per 100000 in 1984 to 6.4 per 100000 in 2003 (Malakouti et al., 2015).

Regarding the rising trend of this regrettable phenomenon, preventive measures would require exact identification of its underlying causes. The fundamental underlying factors for suicide include psychological disorders, sociopsychological, and biological factors (Levi-Belz, 2014). Personality traits are psychological variables which can be related to suicide issue from theoretical and research perspectives. According to the Five Big Personality Trait Model, personality traits can be classified in 5 main categories, namely; neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness. This model presents a comprehensive description of personality structure (Digman, 1990).

Personality traits are among the most important factors in suicide.Various studies have described the existence of significant relationships between personality traits and suicidal behavior in normal and clinical populations (Calati et al., 2008). Studies on personality traits of individuals who attempted suicide shows that personality traits, and in particular neuroticism, influence the experience and reporting of thoughts as well as suicide attempts (Gladstone et al., 2004; Useda et al., 2004). In fact, neuroticism is the underlying factor for clinical and nonclinical depression, and depression is effective in suicidal tendencies (Akbari et al., 2009). In their study, Chioqueta and Stiles (2005) concluded that depression symptoms had a positive relationship with neuroticism and openness, and also negative relationship with extroversion. In addition, hopelessness had a positive relationship with neuroticism and negatively related to extroversion. Furthermore, they found that suicidal thoughts are predicted directly by neuroticism, and indirectly by conscientiousness.

Duberstein et al. (2000) used the 5 personality traits to study the relationship between personality traits and suicidal behavior. They found that neuroticism had a positive relationship with extroversion and agreeableness had a negative relationship with suicide, and that patients with suicidal thoughts would obtain high scores in openness to experience. Velting (1999) on his study on undergraduate students found that high scores in the neuroticism subscale have a direct relationship with suicidal thoughts. This study showed that the relationship between personality traits and suicide was different in the two sexes. In other words, suicidal ideation in women was positively correlated with neuroticism and negatively with conscientiousness, whereas in men, only conscientiousness was significantly (negatively) related to suicidal ideation. Overall, studies in the field of personality characteristics influencing on suicidal thoughts or its attempts, showed that factors such as neuroticism, extraversion, novelty seeking, low levels of harm avoidance hold the most promises in relation to suicide thoughts or suicidal behaviors (Brezo, Paris, & Turecki, 2006; Calati et al., 2008).

The studies conducted on high prevalence of poisoning show that, unfortunately, the major part of these cases is the result of intentional poisoning aimed at suicide, and that various chemicals and poisons are the most frequently used means for intentional poisoning (Hawton et al., 1995). Moreover, easy access to these chemicals and poisons also contributes to attempting suicide by using these materials. Because of agricultural lands in northern Iran, pesticides such as organophosphates can be accessed more easily. Therefore, studying the desire to commit suicide in northern Iran (particularly via intentional poisoning with chemicals) can help identify the problems in this regard and pave the way for health planning aimed at protecting public health.

Therefore, the present study aimed to compare the 5 personality traits in individuals who attempted suicide with normal individuals and to investigate the interactive effect of group membership (normal or suicidal) and sex on 5 personality traits. Providing answers to these problems would pave the way for recognizing the main psychological factors such as personality traits in suicide attempts. Also, the clinical applications of the results of this research would guarantee the implementation thereof. Thus, the present study investigated the effect of the 5 personality traits on chemical suicide attempts.

2. Methods

This was a Casual–Comparative study in which the possible relationships between variables were investigated mainly through observing the results obtained from the patient and normal groups. The statistical population comprised all individuals who had attempted suicide in a 3-month period between August 20 and October 20, 2014 and consequently were hospitalized in the emergency ward at Razi Educational Hospital in Rasht, Iran. These patients had attempted suicide through taking chemical drugs. As direct member selection from this population was not possible, and there was no complete list of the studied population members, we could not use random sampling methods and had to select the patients through the convenience sampling method. The sample size was calculated as 100 for each group from

the Machin et al. sample size tables (Machin et al., 1997) by considering a type 1 error probability (alpha) of 0.05, a power of 0.80, and an expected effect size between two equivalent groups of 0.40. To study the effect of sex, 50 men and 50 women were included in both normal and suicide groups. Control group were selected from the relatives of patients and healthy people who were admitted to hospital.

The survey method was used to gather data and questionnaires were distributed among the suicidal patients and the members of the normal group. Before personality evaluations, the reasons for conducting the study and the research method were explained to participants, and they were assured of their confidentiality. Then, they were reminded that their refusal to take part in the study would have no effect on their treatment process. Thus, the evaluation would start only after the patients expressed their willingness to take part in the study (by informed consent). Upon a brief explanation about the questionnaire and the method of completing it, the questionnaires were distributed to the participants. A clinical psychologist was responsible for evaluating the mental health problems such as psychiatric illness, substance, or alcohol dependence and abuse based on the DSM-IV-TR criteria.

The condition of entrance to study was: Hospitalization in emergency ward of Razi educational-therapeutic center with diagnosis of suicide determined by related physician at the time of study implementation. Exclusion criteria were: 1) Acute situation of the patient in which there was no capacity for replication to questionnaire; 2) Children and vey young people; 3) People who their poisoning was unintentional and unconsciously.

The short version of the NEO Five-Factor Inventory (NEO FFI) was used to collect the required data. This questionnaire is a personality gauge based on the Likert-type scale with 60 five-point questions scored as: "I quite disagree", "I disagree", "I have no opinion", "I agree", and "I quite agree". This inventory evaluates the 5 basic personality traits, i.e. neuroticism (N), extraversion (E), openness (O), agreeableness (A), and conscientiousness (C). The validity of this inventory has been confirmed by Costa and McCrae (1992) and its reliability coefficients were reported in their study as 0.90 for N, 0.87 for E, 0.76 for O, 0.86 for A, and 0.90 for C. This inventory was translated into Persian by Garrousi-e-farshi (2001) and subsequently normalized. This questionnaire has been successfully used for studying young populations in Iran (Hoseininasab, Moheb, & Bakhshvar, 2009).

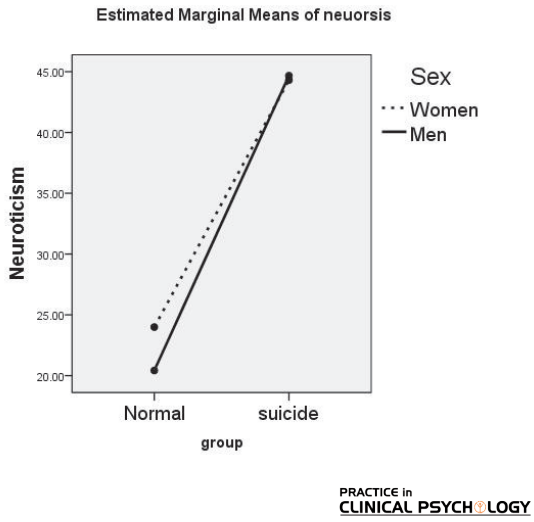

Figure 1. Interactive effects of group membership and sex on the "neuroticism" personality trait.

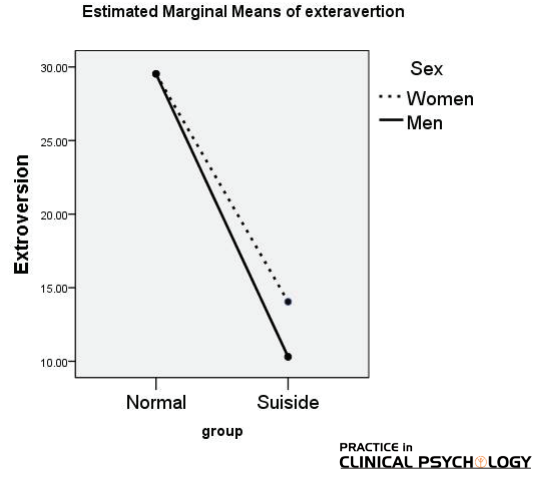

Figure 2. Interactive effects of group membership and sex on the "extroversion" personality trait.

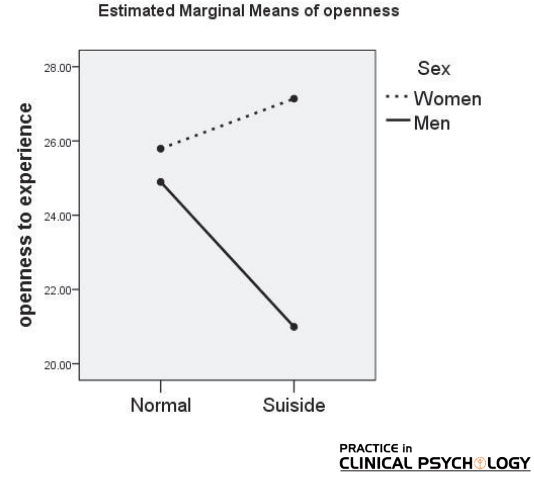

Figure 3. Interactive effects of group membership and sex on the "openness to experience" personality trait.

The data were analyzed by SPSS16, and to investigate the difference between the normal and the suicidal groups and obtaining the confounding demographic variables, independent t test and Chi-square methods were used. Ultimately, the multivariate analysis of covariance (MANCOVA) was implemented to study the effects of the main and the interactive effects of the groups (normal and suicidal) and gender (male and female) on personality traits upon controlling the confounding variables.

3. Results

Overall, 100 persons from the suicide attempt group (50 men and 50 women) and 100 normal persons participated in the study. The suicide attempt group and normal group had a mean age of 31.1±11.59 years (age range: 15-67 year) and 33.3±9.46 years (age range: 19-65 year), respectively with no significant difference (P>0.05). The mean of education years for suicide attempt group was obtained 9.89±3.74 years and for normal group as14.18±3.24 years. The independent t test showed that there was a significant difference between these groups in this regard (P<0.0001, t=8.65, df=198), and suicide group had lower levels of education. Regarding suicidal record, 70% of the suicidal group had no prior record. The percentage and frequency of the chemicals used for suicide attempts were as follows: Rice tablet, 20 (20%) persons; Raticide, 11 (11%) persons; Detergents, 1 (1%) person; Pesticides, 6 (6%) persons; Drugs including codeine, sleeping pills, and psychiatric tablets, 62 (62%) persons. Table 1 shows the demographic traits of the test subjects in 2 studied groups.

According to Table 1, the suicide group showed a significantly higher frequency of divorce, rural residence, unemployment, psychiatric disorders, drug abuse and dependence, and alcohol dependence (P<0.0001 for all). The significant demographic variables obtained from the comparisons between the suicide and normal groups were used as control variables in the analysis of variance for the personality traits of these groups. Table 2 shows the statistical characteristics (including mean and standard deviation values) for the normal and suicide groups in terms of personality traits and sex, as well as MANCOVA results for the effects of between group (suicide and normal) membership variables and the interactive effects (group×sex).

Table 1. Demographic traits of the test subjects in the suicide attempt and normal groups.

Variables	Normal group n=100		Suicide group n=100		df	X^2	P-value
	(n)	(%)	(n)	(%)			
Marital status							
Single	28	28	35	35			
Married	66	66	41	41	3	22.90	0.0001
Divorced	4	4	24	24			
Widow	2	2	0	0			
Residential status							
Urban	95	95	75	75	1	15.68	0.0001
Rural	5	5	25	25			
Occupational status							
Employed	71	71	31	31	2	32.72	0.0001
Unemployed	29	29	67	67			
Psychiatric illness							
No	94	94	58	58	1	35.59	0.0001
Yes	6	6	41	41			
Substance abuse							
No	89	89	68	68	1	13.06	0.0001
Yes	11	11	32	32			
Substance dependency							
No	90	90	67	67	1	15.67	0.0001
Yes	10	10	33	33			
Alcohol abuse							
No	91	91	84	84	1	2.24	0.13
Yes	9	9	16	16			
Alcohol dependency							
No	100	100	88	88	1	12.76	0.0001
Yes	0	0	12	12			

Table 2. Means, standard deviations of personality traits and MANCOVA results for the group and sex effects.

Variables	Group		Men		Women		MANCOVA F-value†	
	Normal M±SD	Suicide M±SD	Normal M±SD	Suicide M±SD	Normal M±SD	Suicide M±SD	Group	Group×sex
Neuroticism	21.70±7.63	44.99±4.65	19.94±6.18	45.12±4.81	23.46±8.55	44.86±5.54	418.96**	4.91*
Extroversion	30.37±5.74	11.34±7.34	30.34±5.85	9.64±5.79	30.40±5.69	13.04±8.33	239.87**	4.19*
Openness	25.90±4.71	23.51±6.09	25.40±4.84	20.46±5.09	26.40±4.58	26.56±5.48	2.22	4.19*
Agreeableness	30.45±5.51	19.34±6.31	30.28±5.38	18.25±6.31	30.62±5.69	20.16±6.26	81.12**	1.17
Conscientiousness	34.90±6.34	18.37±7.83	33.36±7.15	16±6.90	36.44±5.04	20.74±8.06	135.42**	1.70

† df=1, * P< 0.05, ** P<0.0001.

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Before implementing MANCOVA for the personality trait scores, the Box's M test had demonstrated a significant difference regarding the homogeneity assumption for the variance-covariance matrices obtained for the two groups (P=0.0001, Box's M=137.768). In this situation, the Pillai's trace (V) test could be used to determine the significance level of the multivariate effects (Meyers, Gamst, & Guarino, 2006). To determine the significance of the mean difference between groups, the scores obtained for the 5 personality traits from the NEO-FFI were simultaneously subjected to the multivariate variance analysis. The Pillai's trace test results showed that the group membership variable had a significant effect on the linear combination of the dependent variables (V=0.72, $F_{5.188}$=99.26, P<0.000) and such significant effects were also observed for the sex variable (V=0.218, $F_{5.188}$=10.508, P<0.0001), and for "group×sex interaction" (V=0.09, $F_{5.188}$=3.75, P=0.003).

MANCOVA results in Table 2 show that the "group membership" as a main effect was significant on neuroticism, extroversion, agreeableness, and conscientiousness (P<0.0001). Based on these results, the suicide group subjects obtained higher scores in neuroticism compared to those in the normal group. However, the normal group members scored significantly higher in the 3 traits of extroversion, agreeableness, and conscientiousness. The openness to experience was the only trait that showed no significant difference between the normal and the suicide groups. In the mean time, the interactive effect of "group×sex" was significant on the scores obtained for neuroticism ($F_{1.192}$=4.91, P=0.02, $\acute{\eta}^2$=0.02), extroversion ($F_{1.192}$=4.19, P=0.04, $\acute{\eta}^2$=0.02), and openness ($F_{1.192}$=14.12, P<0.04, $\acute{\eta}^2$=0.06). This shows that there is a difference among the 3 traits of neuroticism, extroversion, and openness in terms of the interactions effect of membership and sex factors. Thus, the mean values in Table 2 show that unlike the women in the suicide group and the normal persons, the men with attempted suicide obtained higher neuroticism scores (Figure 1). In terms of extroversion, the men and women in the suicide group earned lower scores compared to those in the normal group. Moreover, the extroversion scores of the suicide group men were the lowest among their counterparts in the other group (Figure 2). Regarding openness to experience, the suicide group men also obtained lower scores compared to other group (Figure 3).

4. Discussion

The present study aimed to investigate the role of the big 5 personality traits on chemical suicide attempt. The results showed that there was a significant difference between personality traits in individuals attempting suicide and those of normal individuals (Table 2), so that the former group would exhibit more neuroticism and less extroversion, agreeableness, and conscientiousness than the latter one. No significant difference was observed between the groups in terms of openness.

Based on the obtained results, those who attempted suicide exhibited higher neuroticism (N) compared to normal individuals. Negative feelings such as fear, sadness, irritation, anger, guilt, and persistent and pervasive frustration form the basis of the trait N (Table 2). In general, the specific characteristics of neurotic people, including negative emotions and emotional fragility seems to prevent them from growing accustomed to social norms, so that, at times, they turn to suicide to escape such negative emotions. Another interpretation refers to the way of thinking and coping styles practiced by neurotic people. In fact, studies show that individuals with high N levels are illogical and cannot control their impulses. They use emotional and avoidance methods rather than problem solving ones to cope with stress, and they are basically weak in dealing with stressful situations (Leventhal & Brooks-Gunn, 2004). Neurotic individuals may attempt

suicide to avoid stress instead of taking a decisive attitude to solve their problems.

Extroversion (E), on the other hand is a personality trait characterized with being cheerful and sociable. This trait is the best predictor of joyfulness and has a relationship with assertiveness, self-confidence, and positive experiences. Those attempting suicide have lower E scores since lack of this trait leads to reduced social support, and lower social support is related to suicidal behaviors (Eisner, 2010). Like extroversion, agreeableness (A) is also an interpersonal tendency. A pleasant person is basically an altruist who has compassion for and is willing to help others, believing that others can help him/her in return. In contrast, a non-agreeable person is aggressive, self-centered, and suspicious, preferring to compete rather than cooperate. Apparently such traits are not compatible with persons who attempt suicide.

Low contentiousness (C) scores can also prepare the ground for attempting suicide since the main feature of this trait is the power to control impulse. In fact, people scoring low in C are unable to observe norms and mostly driven by their own impulses. It seems that the "rapid transition to action" characteristic, i.e. the tendency to act before thinking, inability to resist failure, and delaying the pleasures of life can push a person toward risky behaviors such as attempting suicide (Hoyle, Fejfar, & Miller, 2000). The above results are in good agreement with those obtained in the literature (Bergin, Masters, & Richards, 1987; Rostami, Hashemi, & Aliloo, 2014; Goul & Kramer, 2001).

The results obtained in this study regarding the interactive effect of group membership and sex on personality trends showed that there was a difference in this regard in the following personality traits: neuroticism, extroversion, and openness (Table 2), so that neurotic men in the suicide group obtained higher N scores. A similar trend was observed for the E trait, i.e., men in the suicide group had lower E scores. Regarding the openness trait, men in the suicide group obtained lower O scores as compared with other individuals.

The results obtained in the present study regarding higher N scores by neurotic men are in good agreement with those obtained in other studies (Gladstone et al., 2004; Chioqueta & Stiles, 2005; Duberstein et al., 2000; Kendler & Gatz, 2006; Fergusson, Beautrais, & Horwood, 2003). Research in the field shows neuroticism as the most prominent trait affecting the emergence of a wide spectrum of suicidal behaviors. The fact that men had higher N scores in this study may be due to more stressful situations (economic and occupational problems) men experience which lead to higher levels of aggressive behaviors as well as neuroticism (as compared to women). This difference between the genders can be the result of deprivation, greater social and cultural pressure on men which drive them towards feelings of frustration and helplessness. However, as women seek social support when confronting emotional problems, they exhibit less neuroticism as compared to men. However, the biological and hormonal differences between men and women must be considered since they can play a role in the formation of different personality traits in the two sexes (Chapman et al., 2007). Therefore, the higher neuroticism in men due to anxiety and depression (which cause them to exhibit more extreme reactions to their problems and tolerate greater stress) can account for their higher rate of suicide attempt.

The results obtained in the present study regarding lower extroversion scores obtained by men in the suicide group are in good agreement with other research (Leventhal & Brooks-Gunn, 2004; Chapman et al., 2007; Brezo, Paris, & Turecki, 2006; Novaković, Ille, & Marić-Tiosavljević, 2006; Allen et al., 2005; DeShong et al., 2015). Extroversion has a significant and negative relation with depression, hopelessness, and suicidal thoughts. Thus, men who attempt suicide and obtain low E scores may not experience such positive emotions as pleasure, joy, and excitement and prefer to be alone and exercise cautious interpersonal relations. Such individuals obtain less emotional reward from their social relations and activities, and are therefore more prone to suicidal behaviors. Overall, as compared with men, women are more inclined to interpersonal relations and sociability, and even define themselves based on their interpersonal relations. In this regard, they are more extrovert than men.

Our findings regarding lower O (openness) scores among men in the suicide group as compared to other groups are in agreement with other research (Abdulkarim, Zamzuri, & Muhamadnor, 2009; Tsoh et al., 2005). The continuum from openness to experience stretches from investing, to moderate, and conservative types, so that obtaining a high score in this subscale can indicate the person's tendency towards being imaginative, his or her deep aesthetic and artistic tendencies, and openness to feelings and emotions. The men who attempt suicide usually suppress many of their feelings and needs due to their negative experiences as well as the stress and pressure they have had to endure. This status turns them into disinterested, passive, and impulsive persons who lack enthusiasm, a trait which prepares the ground for suicidal tendencies. Recent social changes regarding

women's position in society have apparently improved the qualities of independence and subjective curiosity (classified as openness traits) in women as compared to the past, and the present social culture allows and encourages such traits in women. This can account for the higher scores obtained by women in these traits as compared with men. However, the optimal condition for both men and women is having moderate levels of openness.

Due to increased chemical suicide cases in northern Iran and the insufficiency of conducted studies in this regard, we recommend that the future studies address correlated factors in this manner of committing suicide. For example, researchers showed among people who have self harmed, emotion regulation skills is weaker and it may ascending suicide probability (Khanipour, Borjali, Hashemi Azar, & HossainKhanzadeh, 2014). The limitations observed in the present study included the following issues. Due to the cross-sectional nature of this study, long-term follow up of the sample population was not possible. Therefore, it is recommended that the future studies include long-term follow up of the cases. Moreover, the results obtained in this study are related to chemical suicide at the emergency room in Razi Hospital in Rasht and cannot be generalized to other forms of suicides, such as hanging and so on. It is necessary to better generalizability of results is investigated other forms of suicide. In addition, the role of the culture and prevailing economic conditions on the obtained results must be considered and sufficient care must be exerted when generalizing these results to other cultures or to other time periods. Due to the difference between personality traits observed in members of the suicide group compared to normal people, we recommend that educational workshops be held for such patients for the purpose of improving these risky personality traits.

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