There Is No Difference in IQ between Suicide and Non-Suicide Psychiatric Patients: A Retrospective Case-Control Study

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Objective The goal of this study was to examine the association between IQ and suicide in psychiatric patients.

Methods We conducted a nested case-control study using data obtained from psychiatric patients affiliated with a general hospital in Seoul, Korea. In a one-to-two ratio the psychiatric patients who died of suicide (Suicide Group; n=35) were matched to those who didn't (Non-suicide Group; n=70) by age, gender, psychiatric diagnosis and approximate time of first treatment. IQ was measured using the Korean version of the Wechsler Adult Intelligence Scale-Revised.

Results There were no significant differences in any type of IQ between suicide patients and non-suicide patients. Logistic regression showed no evidence of an association between IQ and suicide.

Conclusion These results do not support the existence of an association between IQ and suicide.

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Key Words IQ, Completed suicide, Case-control study, Intelligence.

INTRODUCTION

The relation between cognitive function, in particular general intelligence, and suicidal risk is understudied in suicidology. A few studies have examined the association between intelligence test scores and completed suicide, but there is conflicting evidence regarding this potential relation. Some studies have found positive associations, with high IQ being associated with increased suicide rates. In one geographical (ecological) study of the general population, a positive ecological correlation between regional intelligence and completed suicide rate was observed in seven geographical regions within Denmark.¹ A study of military conscripts in Israel showed that suicide completers had above-average intelligence ratings at conscription.² Similar results were observed in a prospective cohort study from the Terman Genetic Study of Genius,³

where the lifetime completed suicide rate for gifted individuals was 2.25%, which is roughly four times the suicide mortality rate of the general population.

However, other studies have reported that lower IQ is associated with increased risk of suicide. In a cohort study of Australian military conscripts, suicide completers had a lower mean score on the army general intelligence test than individuals who did not attempt suicide, and in a large record-linkage study of Swedish military conscripts the risk of suicide was two to three times higher among those with the lowest compared to the highest intelligence test scores.⁴ In a 40-year follow-up study of one Swedish cohort in the general population, low childhood IQ at the age of 3 years was related to an increased risk of suicide among men but not women.⁵ In a recent study of Swedish men conscripted in 1969–1970, lower IQ was associated with increased risk of both suicide and suicide attempt.⁶

In another prospective cohort study of British general population born in 1946, there was no relation between IQ and completed suicide; however, only 11 suicide cases were observed.⁷ Among people with psychotic illness, no increased risk between suicide attempt and lower IQ has been found.⁸

One problem with these studies is that most samples are

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military personnel and IQ was measured with brief instruments. Another issue is that most included only male subjects and did not control for education level, age, socio-economic status, or the existence of mental illness, all of which are closely related to intelligence.⁹ In the current study, we analyzed the association between IQ measured during psychiatric examinations with the Korean version of the Wechsler Adult Intelligence Scale-Revised (WAIS-R) intelligence test and subsequent completed suicide, while controlling for age, gender and psychiatric diagnosis.

METHODS

Subjects were selected from 29,986 patients who visited the psychiatric outpatient clinic or who were admitted for psychiatric disorders at a general hospital located in Seoul, Korea, during a 12-year period between January 1995 and December 2006. Information about whether the patients had completed suicide by December 31, 2009 was determined by linkage to the database of the National Statistical Office. Data from the National Statistical Office database were matched to hospital records using unique identification numbers assigned to all Korean citizens. A total of 904 subjects were identified to have died of suicide by December 31, 2009. Of these, 104 had completed the some psychological test during psychiatric examinations performed by a team of clinical psychologists and were considered for inclusion in the current study.

Three psychiatric residents reviewed the information that had been recorded in medical records. Psychiatric diagnosis was made according to DSM-IV by a consensus between one psychiatric resident and one board-certified psychiatrist after they had independently reviewed the medical records. From the 104 suicide patients, 35 had completed Korean WAIS-R (K-WAIS) and who had a diagnosis of schizophrenia (F20), schizoaffective disorder (F25), other psychotic disorder (F29), bipolar disorder (F31), or depressive disorder (F32). These patients formed the suicide patients (SP) group. Gender, age, education level and socio-economic level were obtained from the medical records.

Non-suicide patients (NSP group) were selected from patients who had completed the K-WAIS. For each patient in the SP group, three control patients were matched for age (within 3 years), gender, psychiatric diagnosis, and the time of first treatment (within 2 years).

IQ was assessed using the K-WAIS. The K-WAIS is a standardized Korean version of the United States WAIS-R and maintains the same basic framework as the original. The WAIS-R is the most widely used measure of psychometric intelligence in the world.¹⁰ It measures global intelligence and consists of two major divisions, verbal and performance in-

telligence, which are made up of several subcomponents.

All measures of IQ had a normal distribution for both the SP and NSP groups and a t-test was used for comparisons between groups. A t-test was also used to compare verbal and performance IQ within each group. FSIQ scores were divided into six categories and conditional logistic regression I was used to investigate associations between IQ and completed suicide. All statistical analyses were performed using SPSS (version 18.0; SPSS Inc., Chicago, IL, USA), and an α -level <0.05 was considered statistically significant. The K-WAIS consists of 11 subtests. The subtests that constitute verbal intelligence are Information, Digit Span, Vocabulary, Arithmetic, Comprehension, and Similarities. The subtests that constitute performance intelligence are Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Digit Symbol. Verbal and performance IQ are calculated by combining the scaled scores of the respective subtests and converting these scores to a standard score. The full scale intelligence score (FSIQ) is obtained by summing the verbal and performance intelligence scores and converting this sum to a standard score.

Table 1. Demographic characteristics and psychiatric diagnosis

	Suicide patients (N=35)		Non-suicide patients (N=105)	
	N	%	N	%
Gender				
Male	16	45.7	48	45.7
Female	19	54.3	57	54.3
Age (years)				
15–24	13	37.1	36	34.3
25–34	12	34.3	35	33.3
35–44	7	20.0	20	19.0
45–59	3	8.6	14	13.4
Years of education				
<10	4	11.4	9	8.6
10–12	15	42.9	43	40.9
>12	16	45.7	53	50.5
Socio-economic status				
High	6	20.0	16	17.2
Middle	14	46.7	45	48.4
Low	10	33.3	32	34.4
Missing	5		12	
Psychiatric diagnosis				
Schizophrenia	17	48.6	51	48.6
Schizoaffective disorder	2	5.7	6	5.7
Other psychotic disorder	3	8.6	9	8.6
Bipolar disorder	3	8.6	9	8.6
Depressive disorder	10	28.5	30	28.5

RESULTS

Table 1 shows the demographic characteristics and the psychiatric diagnosis for the SP and NSP groups at the time of the intake evaluation. The mean length of time from the intake interview to completed suicide was 4.25 years and the range was 6 weeks to 10 years. There is no difference in education level and SES between two groups ($\chi^2=0.829$, $p=0.661$ in education level, $\chi^2=0.121$, $p=0.941$ in SES).

Table 2 shows FSIQ, verbal and performance IQ, and the WAIS-R subtest scores for the SP and NSP groups. For the SP group the mean FSIQ was 105.3 (range, 71–131), the mean verbal IQ was 110.2 (range, 77–138), and the mean performance IQ was 102.2 (range, 56–122). The corresponding values for the NSP group were 106.7 (range, 72–134), 109.2 (range, 80–136), and 102.0 (range, 64–136) for FSIQ, verbal IQ and performance IQ respectively. There were no significant differences in any type of IQ between the SP and NSP groups (Table 2). Comparisons of verbal and performance IQ within each group showed that verbal IQ was significantly higher than performance IQ for both groups [$t(30)=3.275$, $p<0.01$ in the SP group, $t(94)=7.636$, $p<0.01$ in the NSP group]. The WAIS-R subtest with the highest score was Similarities in the SP group and Vocabulary in the NSP group (Table 2). The WAIS-R subtest with the lowest score was Picture Completion in both groups.

We divided FSIQ into six categories and examined the relation between IQ and completed suicide. We calculated the odds ratio of completed suicide using average IQ (90–109) as

the reference category and adjusting for socioeconomic status and years of education so that we could explore possible non-linear associations. There was no evidence of an association between IQ and completed suicide (Table 3). IQ was not associated with suicide.

DISCUSSION

The current study explored the relation between IQ and completed suicide in psychiatric patients. We found no evidence for a difference in IQ between suicide and non-suicide psychiatric patients. We did not find significant group differences in FSIQ, verbal IQ, performance IQ, or any K-WAIS subtest score, and there was no evidence of a relation between high IQ score and suicide. In both suicide and non-suicide patients verbal IQ was higher than performance IQ. This may be due to the fact that approximately half of the patients from each group were schizophrenic, and high verbal IQ is a characteristic of schizophrenic patients.¹¹ However, differences between verbal and performance IQ do not seem to be related to suicide.

Our results do not support previous studies that show that IQ is positively or negatively associated with completed suicide. To our knowledge, there is no theory that deals with the relation between general cognitive function and suicide. Although Baumeister stated that individuals who commit suicide become narrow minded due to cognitive destruction, are overly concrete, and are unable to consider distal goals with this “self-escape theory”, Baumeister concluded that cognitive

Table 2. Full scale, verbal, and performance IQ and K-WAIS subset test scores in suicide patients and non-suicide patients

	Suicide patients (N=35)	Non-suicide patients (N=105)	t	p
	Mean±SD	Mean±SD		
Full Scale IQ	105.3±14.1	106.7±12.8	-0.573	0.568
Verbal IQ	110.2±14.0	109.2±12.2	0.373	0.710
Performance IQ	102.2±14.4	102.0±14.5	0.079	0.938
K-WAIS subtests				
Information	12.6±2.4	12.6±2.7	-0.110	0.912
Digit span	12.7±3.2	12.0±2.7	1.209	0.229
Vocabulary	12.4±3.3	13.2±2.7	-1.476	0.142
Arithmetic	10.5±2.9	10.9±2.8	-0.707	0.481
Comprehension	11.6±3.1	11.4±2.7	0.379	0.706
Similarities	13.0±2.7	12.5±2.8	0.723	0.471
Picture completion	10.5±2.8	9.9±2.6	1.099	0.274
Picture arrangement	10.6±2.5	10.6±2.5	0.080	0.936
Block design	11.1±3.3	11.5±2.8	-0.707	0.481
Object assembly	11.0±2.9	10.1±3.1	1.311	0.192
Digit symbol	11.8±2.5	11.6±2.8	0.423	0.673

K-WAIS: the Korean version of the Wechsler Adult Intelligence Scale-Revised, SD: standard deviation

Table 3. Association between IQ and suicide after adjusting for socioeconomic status and years of education

FSIQ	Suicide patients (N=35)		Non-suicide patients (N=105)		OR (95% CI)
	N	%	N	%	
70–79	2	5.7	2	1.9	2.9 (0.4–22.5)
80–89	2	5.7	9	8.6	0.6 (0.1–3.4)
90–109	17	48.6	49	46.7	1.0 (reference)
110–119	9	25.7	30	28.5	0.9 (0.3–2.7)
120–129	4	11.4	11	10.5	1.8 (0.4–8.2)
≥130	1	2.9	4	3.8	0.4 (0.0–5.4)

FSIQ: full scale IQ, OR: odds ratio, CI: confidence interval

destruction is a suicidal state rather than a trait.¹² Additionally, although Voracek used Catanzaro's theory (1981) to argue that a minimum IQ threshold is needed for humans to contemplate suicide,¹³ this only explains suicide from the perspective of Catanzaro's evolutionary theory and does not directly deal with the causes of suicide. Despite the lack of theoretical underpinning, there are several confounding variables that could influence the relation between suicide and IQ. For example, mental illness (an established risk factor for suicide) is a confounding variable as well as a mediator¹⁴ and controlling for mental illness attenuates the association between IQ and suicidal behavior.¹⁵ In addition, socio-economic status in adulthood appears to confound the association between cognitive ability and suicide.¹⁶ Recent studies have made efforts to control for such confounding variables^{6,17} and we controlled for age, education level, socio-economic status, and psychiatric diagnosis in the current study. The current study makes an important contribution to the field because it is one of the few existing studies that take into account a wide range of confounding factors when exploring the relation between IQ and completed suicide. Thus, it represents an important addition to the literature on completed suicide.

In the current study, we presented several K-WAIS subtest scores in addition to FSIQ. It was suggested that specific aspects of intelligence were more strongly associated with suicide, but we found no evidence for that. An additional important merit of the current study is that more than half of the subjects who committed suicide were female, whereas previous studies predominantly examined male subjects.

This work needs to be considered in the context of some limitations. First, the low number of suicides might have limited the statistical power to detect significant group differences in IQ. Second, as this analysis was conducted on a restricted sample of psychiatric patients within a single general hospital, our findings may not be representative of all Korean psychiatric patients. Third, our study only dealt with patients with recorded K-WAIS test results; differences between patients without recorded WAIS-R scores were not investigated. However, we do not expect that there was a systematic selection

bias, as the K-WAIS was arbitrarily conducted during clinical practice. Fourth, although we adjusted for socioeconomic status and years of education in logistic regression, residual confounding is possible, and we recognize that job performance and alcohol abuse are markedly needed. Fifth, The majority of subjects were diagnosed as psychotic disorder or mood disorder, so it is difficult to examine the association between completed suicide and intelligence in certain categories of psychiatric disorders (substance abuse, borderline personality disorder, etc.).

In conclusion, we found no difference in IQ between suicide patients and non-suicide patients. Larger cohorts are required to assess whether the lack of an association between suicide and IQ can be replicated in future studies.

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