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Acculturation and suicide: a case–control psychological autopsy study

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ABSTRACT

Background. The relationships between acculturation and suicide were investigated in East Taiwan.

Methods. Psychological autopsy interviews were conducted for consecutive suicides from two native Taiwanese groups (Atayal and Ami) ($N = 30$ for each group); each of them was matched with two controls for age, sex and area of residence. The Taiwan Aboriginal Acculturation Scale was used to measure the extent of acculturation.

Results. A lower degree of social assimilation was significantly associated with a higher risk of suicide in the Atayal and the male groups. In multivariable regression analysis, a significant effect of low social assimilation on the risk of suicide was found in Atayal and in men, even after controlling for the effects of ICD-10 depressive episode and emotionally unstable personality disorder. Meanwhile, there was a significant trend across low, moderate and high social assimilation on suicide risk in Atayal and in men.

Conclusions. For the native Taiwanese, the stress from rapid acculturation into the main Chinese society is crucial to their mental health. It might be reduced through targeted social and educational programmes.

INTRODUCTION

One of the important sociocultural factors related to mental health among natives or immigrants in pluralistic societies is acculturation (Mavreas & Bebbington, 1990; Rogler *et al.* 1991; Neff & Hoppe, 1992; Liu & Cheng, 1998). The concept of acculturation was originally developed to describe the sociocultural changes that mainly took place in preliterate societies when they came in contact with modern cultures (Redfield *et al.* 1936; Linton, 1940). Sociocultural changes in this situation are more or less one-sided, with the less developed societies being assimilated into the more developed societies. This type of acculturation has typically been found among immigrants in Western societies and among native groups in some nations.

Acculturation and mental health

For immigrants, acculturation has historically been viewed as a protective factor against mental problems (Foliaki, 1997; Cheng & Chang, 1999). The effect of acculturation has been associated with various mental disorders across different ethnic groups (Fernandez-Pol *et al.* 1985; Vega *et al.* 1998; Chen *et al.* 1999; Cherpitel, 1999; Davis & Katzman, 1999; Liem *et al.* 2000). A higher level of acculturation was associated with a higher risk of alcohol use in Hispanic patients in the US (Cherpitel, 1999), illicit drug use in Mexican Americans (Vega *et al.* 1998) and eating disorders in Chinese students living in United States (Davis & Katzman, 1999). Other studies found a protective effect of acculturation

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on mental health. For instance, Mavreas & Bebbington (1990) found significantly lower levels of psychiatric morbidity assessed by the Present State Examination (Wing *et al*. 1974) in Greek Cypriot immigrants with a higher level of acculturation. Still other studies found an interaction between acculturation and other confounding factors, such as gender, generation, or social class, on the presence of mental disorders (Fernandez-Pol *et al*. 1985; Markides *et al*. 1988; Neff & Hoppe, 1992; Polednak, 1997; Chamorro & Flores-Ortiz, 2000). Finally, some studies found no significant association between acculturation and mental problems at all (Lessenger, 1997; Stark-Wroblewski, 1999).

The reasons for these inconsistent findings were multiple, involving differences in research strategy, the selection and assessment of the disorders of interest and the measure of acculturation. For example, 'internalization of Western beauty norms' was a better predictor of eating pathology than was acculturation itself (Stark-Wroblewski, 1999). Effects of mass media and commercial promotion on the popularity of alcohol and drugs in native and immigrant communities in recent decades could also explain the higher prevalence of substance use among more acculturated people who have more access to markets in the modern society. The lower rates of disorders among Mexican immigrants in the US were attributed to a positive migration, whereas the elevated rates of disorders among the more acculturated Mexican American natives were attributed to a more frustrating living experience (Burnam *et al*. 1987).

In summary, the association of acculturation and mental disorders would be better understood when the scope of acculturation, the types of mental disorders, the targeted population, and other possible confounding factors are carefully defined and systematically investigated.

Acculturation and suicide

Previous work have generally found high suicide rates among native groups comparing to their non-native counterparts, such as Maori populations in New Zealand (Skegg *et al*. 1995), native Australians (Clayer & Czechowicz, 1991), native Americans (Kettl & Bixler, 1991), and Manitoba's native Canadian (Malchy *et al*. 1997). The concept of 'anomie' proposed by Durkheim in 1897 to describe the phenomena of social disorganization and weakened social and cultural affiliation has been speculated to be one of the important contributors to the high suicide rates among natives in Australia, Alaska and Manitoba (Thorslund, 1990; Clayer & Czechowicz, 1991; Kettl & Bixler, 1991; Malchy *et al*. 1997).

The Suicide Study in East Taiwan

In 1989–1991, a case–control psychological autopsy study of suicide was conducted among two native groups and the Han Chinese in Taiwan. The age-standardized incidence rates of suicide were found to be 68·2, 15·6 and 18·0 per 100000 in the Atayal, the Ami, and the Han Chinese respectively (Cheng, 1995). In previous reports (Cheng, 1995; Cheng *et al*. 1997, 2000), suicidal victims were found to have suffered from high rates of mental illness (97–100%) before committing suicide, notably severe depression (83–89%) and ICD-10 emotionally unstable personality disorder (EUPD, including impulsive and borderline types) (27–57%) in all three ethnic groups. A number of psychosocial factors (unemployment, marital disruption, lower socio-economic status, living alone, recent migration, etc.) were found to be significantly associated with suicide risk. However, most of these factors were confounded by severe depression. In the present report, we further investigate the effect of acculturation on the risk of suicide in the two native Taiwanese groups.

The study groups

There are nine major native groups in Taiwan; all from Malayo-Polynesian stock. They can be distinguished by extensive differences in physiognomy, cultural traditions and social structure. For the most part, their contact with Han Chinese and other cultures started in the nineteenth century, gradually increasing during the Japanese occupation of Taiwan between 1895 and 1945. Since 1965, rapid industrialization has taken place in Taiwan, which has brought about a great increase of contacts between aboriginal groups and the Han Chinese. Differences in the extent of acculturation between the nine groups have been gradually decreasing (Hsu, 1991).

The Ami and the Atayal are the two native groups selected for this suicide study for three reasons. First, they are the two largest native

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groups enabling the recruitment of enough number of suicides. Secondly, historically they represent high and low acculturation groups. The Ami settle in the eastern plain area of Taiwan, and were the first among all the Taiwanese native groups to have contact with the Han Chinese and have undergone assimilation for over a century. In consequence, they are the most assimilated, generally better educated, with a higher proportion of skilled workers than other Taiwanese natives. The Atayal originally live in the central mountains of northern Taiwan. Geographical distance and their aggressive nature considerably delayed their contact with the Han Chinese until the 1960s, much later than several of the other groups. The Atayal therefore is one of the least assimilated native groups. They have subsequently migrated east- and west-bound. Thirdly, since they both reside in East Taiwan, it is convenient for the transportation of our research team to conduct the study.

METHOD

General strategy of the study

The subjects and methodology of this suicide study have been described in detail elsewhere (Cheng, 1995). In brief, the study was conducted in East Taiwan between July 1989 and December 1991, during which all consecutive suicides from Han Chinese ($N = 57$) and the Atayal and Ami ($N = 30$ for each group) were identified. Of all suicides, 113 (68 men and 45 women) were matched with two living controls for age (± 5 years), gender, ethnicity and area of residence during the last year before suicide. Controls were randomly selected from the census record for the relevant areas of residence.

Among the Atayal suicides, 18 were men and 12 were women, and the corresponding figures in the Ami were 16 and 14. The mean age was younger in the Atayal (36·6, S.D. = 15·9) than in the Ami (42·7, S.D. = 14·1).

Psychological autopsy interviews were conducted with key informants of suicides and their controls by a psychiatrist (A.T.A.C.) and two psychologists (one of them is a native Taiwanese) during a home visit approximately 1 month after the death occurred. Informed consent was obtained after the research team had expressed concern about the suicides' living family members and explained the purpose of the study. Confidentiality about interview records was assured (Cheng, 1995). The mean number of informants interviewed was six for suicides and five for controls. In over 90% of suicides and controls, the research team interviewed family members who had lived with them before the suicide or the interview. We were able to interview at least one key-informant for each of the suicides and controls.

The semi-structured psychological autopsy interview was modified from that used by Barraclough *et al.* (1974) to fulfil the requirements for current international diagnostic systems for mental disorder. Revisions also incorporated psycholinguistic equivalents and aboriginal idioms for major emotional symptoms in Han Chinese and natives, previously gathered in our epidemiological studies (Cheng, 1989; Cheng & Hsu, 1992, 1993). The interview covers suicidal behaviour, medical and psychiatric history and clinical conditions at the time of death, personality, family history of psychopathology and suicidal behaviour, and associated psychosocial factors. The ICD-10 version of the Standardized Assessment of Personality (SAP) (Mann *et al.* 1981), translated into Chinese and examined on its semantic validity through field trial and discussion with British SAP workers, was applied to assess personality disorders. Additional medical information about previous physical and mental health, and any suicide notes were collected from the family, medical doctors and coroners.

The inter-rater reliability on the interview items among the three interviewers was first examined in a pretest (kappa coefficients ranged from 0·78 to 1·0). Cheng, who was not blind to subjects' case/control status, made psychiatric diagnoses of suicides and controls according to Diagnostic and Statistical Manual, 3rd revision (American Psychiatric Association, 1987) and ICD-10. However, two *post hoc* reliability studies were conducted for personality disorder and other mental disorders. Cheng and one Taiwanese and one British senior psychiatrist (A. H. Mann) made independent diagnoses based on clinical data of several suicides ($N = 29$), accidental deaths ($N = 7$) and controls ($N = 37$) whose case/control status was unknown to them. Results of these studies were satisfactory with 100% agreement for depressive episode,

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substance use disorder, schizophrenia and organic mental disorder. Kappa values ranged from 0·89 to 1·0 for different categories of ICD-10 personality disorders (Cheng, 1995; Cheng *et al*. 1997).

Measurement of acculturation: the Taiwan Aboriginal Acculturation Scale

In this study, we applied the Taiwan Aboriginal Acculturation Scale (TAAS) to measure degrees of acculturation for the native Taiwanese suicides and their controls. The development of the TAAS has been described in detail elsewhere (Cheng & Hsu, 1995). In brief, a total of 54 original items were constructed according to Gordon's concept of assimilation (Gordon, 1964) with a Likert-type scoring system, ranging from 0 to 3. In order to assure the cross-cultural validity of these items, a two-stage translation with audiotape recording was carried out by several bilingual assistants. A pre-test was then administered by these bilingual assistants to 30 native Taiwanese representing four major groups (Ami, Atayal, Bunun and Paiwan).

Item analysis was then carried out with data from 144 randomly selected individuals from the four groups, stratified by age, sex and village/city residence. Eighteen items with item/total correlation coefficients greater than 0·6 were retained and further treated with factor analysis (accounting for 58·5% of the total variance). Three subscales or dimensions representing cultural assimilation, social assimilation, and social attitude (six items on each subscale with a range of scores between 0 and 18) were derived from the latter procedure. A validity test using education and age as external criteria and the split-half reliability and Cronbach's alpha coefficients for the TAAS were also found to be generally acceptable.

Since the present study only interviews key informants of suicides and controls, it was judged that only the first two subscales 'cultural assimilation' and 'social assimilation' could be enquired objectively, but not the subscale of 'social attitude'. The six items in the cultural assimilation subscale enquire the frequency of listening to the Chinese radio in childhood; frequency of watching TV in childhood, frequency of seeing Chinese movies in childhood; ability in understanding foreign languages; ability in speaking foreign languages; and ability in reading newspapers. The six items in the social assimilation subscale enquire the site of residence and employment style; the total length of stay in Han Chinese communities; ethnicity of neighbours; ethnicity of colleagues; ethnicity of people in need; and ethnicity of common friends (Cheng & Hsu, 1995). The mean scores for cultural assimilation in cases and controls were $9{\cdot}0 \pm 5{\cdot}5$ and $9{\cdot}1 \pm 5{\cdot}1$ in Atayal and $6{\cdot}9 \pm 4{\cdot}4$ and $7{\cdot}5 \pm 4{\cdot}9$ in Ami respectively. The mean scores for social assimilation in cases and controls were $6{\cdot}4 \pm 3{\cdot}9$ and $7{\cdot}8 \pm 4{\cdot}3$ in Atayal and $6{\cdot}2 \pm 4{\cdot}4$ and $7{\cdot}7 \pm 4{\cdot}8$ in Ami. There was no significant difference across ethnic and case/control groups. The higher scores in the Atayal suicides might be due to their younger age in average.

Data analysis

Univariate conditional logistic regression analysis (Kleinbaum *et al*. 1982) was first applied to assess the relationships between the risk of suicide and the extent of acculturation categorized into high (13–18), moderate (7–12) and low (0–6) groups, according to the scores of study subjects on the two subscales 'cultural assimilation' and 'social assimilation.'

The effect of acculturation on the risk of suicide was then controlled for mental disorders via multivariable conditional logistic regression analysis. Due to the limited number of suicides in each of the two groups, only depression (the most significant type of psychopathology contributing to suicide) and EUPD (the most significant type of personality disorders contributing to suicide) were included in this analysis.

RESULTS

No significant association between cultural assimilation and the risk of suicide was found in each of the two ethnic groups (Table 1). However, a significant effect of social assimilation on suicide risk was observed, especially more evident in the Atayal group and in the male subjects. The odds ratios (OR) of suicide for low social assimilation were 6·5 and 12·9 times that for high social assimilation in Atayal group and in male subjects, respectively (Table 2).

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Table 1. *Cultural assimilation and the risk of suicide by ethnicity and sex in native Taiwanese*†

Level of cultural assimilation	No. of suicide/control	OR (95% CI)[a]	OR (95% CI)[b]
Ethnicity			
Atayal			
High	9/16	1·0	1·0
Moderate	10/24	0·7 (0·2–2·7)	0·2 (0·01–2·3)
Low	11/20	1·0 (0·2–6·2)	0·3 (0·01–4·6)
Ami			
High	5/12	1·0	1·0
Moderate	8/19	1·2 (0·2–6·2)	0·7 (0·03–15·5)
Low	17/29	2·5 (0·4–15·2)	4·9 (0·2–112·6)
Sex			
Male			
High	6/14	1·0	1·0
Moderate	11/31	1·0 (0·3–3·5)	0·1 (0·005–2·7)
Low	17/23	3·4 (0·7–16·5)	2·9 (0·3–31·6)
Female			
High	8/14	1·0	1·0
Moderate	7/12	0·6 (0·09–4·3)	0·4 (0·003–55·9)
Low	11/26	0·2 (0·02–3·0)	0·1 (0·0002–13·1)

† Univariate conditional logistic regression.
[a] Before controlling for mental illness; [b] after controlling for mental illness, including ICD-10 depressive episode (F32–33) and emotionally unstable personality disorder (F60.3).
All of the odds ratios are non-significant.

Table 2. *Social assimilation and the risk of suicide by ethnicity and sex in native Taiwanese*†

Level of social assimilation	No. of suicide/control	OR (95% CI)[a]	OR (95% CI)[b]
Ethnicity			
Atayal			
High	2/12	1·0	1·0
Moderate	9/22	2·5 (0·5–12·9)	44·7 (0·4–5368)
Low	19/26	6·5 (1·1–37·7)*	115·4 (1·5–8895)*
Ami			
High	3/10	1·0	1·0
Moderate	9/25	1·5 (0·3–8·2)	1·8 (0·1–46·5)
Low	18/25	7·0 (0·9–56·5)*	9·6 (0·3–299·7)
Sex			
Male			
High	2/17	1·0	1·0
Moderate	11/29	2·7 (0·5–13·5)	14·5 (0·4–468·7)
Low	21/22	12·9 (2·2–76·3)**	57·4 (1·8–1879)*
Female			
High	3/5	1·0	1·0
Moderate	7/18	0·7 (0·09–5·3)	2·8 (0·05–163·7)
Low	16/29	1·1 (0·09–13·3)	19·3 (0·13–2789)

† Univariate conditional logistic regression.
[a] Before controlling for mental illness; [b] after controlling for mental illness, including ICD-10 depressive episode (F32–33) and emotionally unstable personality disorder (F60.3).
Test for trend: *$P < 0·05$; **$P < 0·01$.

Effects of cultural and social assimilation on the risk of suicide were then examined while controlling for the effects of ICD-10 depressive disorder and EUPD using multivariable conditional logistic regression. The increased risk of suicide for low social assimilation in Atayal group and in men remained statistically significant (Table 2). However, wide ranges of 95% confidence intervals were observed due to the limited number of subjects in this study, which might have lowered the statistical power. The test for trend across three categories of acculturation score (high, moderate, and low) is not significant for cultural assimilation, both before

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and after controlling for mental illness. However, the test for trend for social assimilation was significant in Atayal group and male subjects.

DISCUSSION

Methodological considerations

Validity of the psychological autopsy interview

Validity of the psychological autopsy is mainly related to the potential recall bias from key informants and to the reliability of the interview and psychiatric diagnosis. The likelihood of underreporting (because of unawareness) or overreporting (because of personal psychological reaction to the suicide) by informants of suicide victims is to some extent inevitable (Heikkinen *et al*. 1993). The inclusion of controls in some psychological autopsy studies attempts to overcome such potential information-biases. An improvement to this strategy is to interview informants for both suicides and controls as few studies (e.g. Gould *et al*. 1996) including the present one have done so. This strategy can largely overcome the systemic bias from under-reporting, but that of over-reporting is difficult to control. For example, those bereaved by suicide may reconstruct the lives of the suicide victims in a new light. However, the diagnostic validity of psychological autopsy against medical records has been reported to be satisfactory (Kelly & Mann, 1996). The comparatively large number of informants in this study, with a very high percentage of close family members interviewed, ensured the collection of more accurate and detailed information for suicides and controls. The satisfactory *ad hoc* and *post hoc* inter-rater reliability studies substantially reduce the possibility of a systematic bias from the interviewers.

Validity of assessment for acculturation

In the development of the TAAS, we applied Gordon's concept of assimilation (Gordon, 1964), which views acculturation as a continuing process starting from cultural assimilation, followed by social structure assimilation and ending in marital and identificational assimilation. The TAAS has acceptable validity and reliability among the study groups (Cheng & Hsu, 1995). The subscale 'social attitude' mainly involves subjective personal feelings and attitudes, including items about ethnic preference in marriage, feelings of ease in getting along with Han Chinese, attitude about the migration of Han Chinese into the native Taiwanese territory, and the degree of trust in Han Chinese people. Since informants instead of subjects were interviewed in this study, reporting of this subscale was very likely to be in low accuracy. We have, therefore, excluded it in the present study. On the other hand, the subscale 'cultural assimilation' and 'social assimilation' in TAAS mainly enquire about actual behaviour. Close family members and relatives would be able to provide valuable information objectively, which warrant the quality of the assessment related to the degree of individual's acculturation.

Acculturation and suicide in natives

This study has examined the effect of acculturation (including cultural assimilation and social assimilation) on the risk of suicide among two native groups in Taiwan using psychological autopsy and a standardized measurement of acculturation. A lower extent of acculturation was found to be associated with a significantly higher risk of suicide, especially among the lower acculturated group (Atayal) and in men, both before and after controlling for the effects of depression and EUPD.

In previous work, two hypotheses were often proposed to explain the effect of acculturation on mental disorders and suicide among natives. One emphasizes cultural confusion or identity difficulty between original and the dominant new culture leading to social disintegration, the other involves the social disadvantage to mainstream society. The former is based on a global and populational perspective and therefore is usually applied to describe the differences between natives and non-natives. The latter emphasizes the heterogeneity in the same population, and is often used to explain individual variability. Both conditions place natives at greater risk for mental disorders.

A number of previous studies proposed that social disintegration due to high industrialization or cultural confusion derived from rapid social, economical, and cultural changes was responsible for high suicide rates among natives in Australia, Alaska and Canada (Clayer & Czechowicz, 1991; Kettl & Bixler, 1991; Malchy *et al*. 1997). This observation takes a group-

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perspective and reflects the concept of 'anomie' proposed by Durkheim (1897). Van Winkle & May (1993) found that suicide rates in three groups of American Indian remained above US rates and the group with the lowest level of acculturation had the highest suicide rates. Similarly, Lester (1996) also reported that higher acculturation indicated by the lower percentage living on reservations might be associated with the lower risk of suicide in natives in British Columbia.

At the individual level, several studies have found that natives with low acculturation tended to be socially disadvantaged in the community. For example, there was an increased suicide rate among the young male Inuit in the North Canada (Thorslund, 1990), who were often in traditional occupations or unemployed, rarely married with children, and tended to be socially disadvantaged in the mainstream society. In a recent report, the greater risk of attempted suicide among the Hawaiian adolescents was speculated to be attributable to their lack of integration into the Hawaiian mainstream western society. These Hawaiian adolescents drifted into a socially disadvantaged status (Yuen *et al.* 2000). Such increased risk for suicide might be due to the increased cultural conflict and acculturative stress engendered by being marginal or disadvantaged in mainstream society. Natives with a lower degree of acculturation have a higher risk for suicide because they lack better socio-economic resources for living; and have less education and occupational preparation, resulting in higher psychosocial stress.

However, the relationship between acculturation and mental disorders in previous work was often descriptive and inferential, and the measure of acculturation was seldom empirical or comprehensive. Some studies only measured a single aspect of acculturation, such as language use or length of stay in dominant society (Neff & Hoppe, 1992; Polednak, 1997; Chen *et al.* 1999). Our study is the first to utilize a valid instrument to measure acculturation viewed as a process with different stages possibly contributing to different mental health outcomes.

Acculturation and suicide: a process perspective

This study found that less assimilation into the host Chinese society is associated with an increased risk for suicide in native Taiwanese, particularly in males. A similar observation of sex difference was reported on depression among the Greek Cypriot immigrants in the UK (Mavreas & Bebbington, 1990). It may be that with the increasing technological competence required in modern industrialized society in Taiwan, it is more and more stressful for the native Taiwanese men who are the principal family supporters to work in the Chinese society. On the other hand, the null effect of acculturation on suicide seen in their female counterparts could be partly due to the lack of statistical power as the number of female suicides was limited.

In this study, social assimilation rather than cultural assimilation is associated with a higher risk of suicide. In viewing acculturation as a process (Gordon, 1964), cultural assimilation is the first step, which refers to acculturative experience starting from childhood. Social assimilation is the second stage of acculturation, which usually begins in adolescence or adulthood. In Taiwan, rapid acculturation in ethnic-minority societies to the dominant Chinese culture took place over the past 30 years. Following an increased contact with the Chinese society, young native Taiwanese were absorbed by rapidly developing Taiwan industry to engage in various unskilled and semi-skilled jobs in the dominant society. In consequence, most native Taiwanese groups have already moved from cultural assimilation into social assimilation. Psychosocial stress from social assimilation is believed to be attributable to the high risk of alcoholism, depression, and suicide among native Taiwanese, especially in males (Cheng, 1995; Cheng & Chen, 1995; Liu & Cheng, 1998). Similar findings can be observed in other native groups (e.g. Van Winkle & May, 1986; Williams & Berry, 1991). This might explain the significant association between suicide and social assimilation among native Taiwanese men in this study. However, the possible association between cultural assimilation and the risk of suicide could not be totally ruled out as the statistical power in the study is limited due to the relatively small number of suicides.

Implications for suicide prevention

Results of this study suggest that the ability to cope with the stress from the rapid assimilation into the dominant society is important for the

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mental health of native people. Natives who are less assimilated into the dominant society may be less prepared to handle the stress of an imposed new lifestyle and are at greater risk for suicide. There is, therefore, a potential implication for the development of social and educational programmes for native people to reduce assimilation stress. These programmes should provide greater levels of targeted social and economic support and access to quality education in areas with large native Taiwanese populations, and should also couple with a culture-relevant mental health service system in their communities for the early detection and prevention of depression and other mental disorders.

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