

The 40th World Congress of the International Institute of Sociology

Delhi, 16-19 February 2012

Session: Psychosociological Work in Transcultural Contexts

Convener: Gwynyth Overland, gwyn.overland@sshf.no

Suicide behaviors and role of family characteristics, school difficulties, unhealthy behaviors, and mental health among multi-cultural students

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Keywords: *Suicide behaviours, European immigrants, non-European immigrants, family, socioeconomic status, school difficulties, mental health, health-related behaviors.*

Introduction

Worldwide, one million persons each year die from suicide which is the second leading cause of death for individuals aged 10-24 years and represented 1.8% of total burden of diseases in 1998 [1]. Generally the suicide rate is higher among older men, but the rate for youth has increased leading this population to be most at risk for one third of developed and developing countries [2]. In 2001, France ranked third among the 15 European Union countries [3]. It is estimated that 15%-23% of patients having consulted a physician for a suicide attempt relapse in the year [4] and that 5%-10% will die by suicide within the next five years [5].

Suicide risk patterns are complex and involve health status, mental disorders, alcoholism, but also socioeconomic issues, family, living conditions, substance uses, school difficulties (among students), and cultural factors [2, 6, 7-12]. School is a multi-cultural setting where students are trained for community participation, especially at adulthood. These risk factors affect French students and the roles of certain factors may be exacerbated among immigrant students because of lower socioeconomic status and lower living conditions as well as higher school difficulties. In an early adolescence context, this study assessed the risks for suicide behaviors among European and non-European immigrants and the mediating/moderating roles of family characteristics, school difficulties, unhealthy behaviors, and altered mental health.

Material and methods

The study population comprised all 1,666 students attending three middle schools chosen to reflect a social gradient in the Nancy urban area (410,000 inhabitants), the capital of Lorraine region (2,342,000 inhabitants) in north-eastern France. The investigation was approved by the Nancy-Metz regional education authority and the *Commission Nationale de l'Informatique et des Libertés* (national review board). Written informed consent was obtained from the respondents. The study protocol included: an application to participate transmitted to parents/guardians via the students (26 April 2010), and data collection undertaken (from 4 May to 17 June 2010) using an anonymous self-administered questionnaire in the course of a class period (1h), under the supervision of the research team and with the help of a teacher (when he wished, for surveillance with no influence on the survey). The completed questionnaire was put in a sealed envelope and then in a closed box by the subject.

The questionnaire included socioeconomic characteristics (age, gender, nationality, family structure, parents' education, occupation, and income), last-trimester-school performance, unhealthy behaviours (current alcohol, tobacco, cannabis, and other illicit drug uses, and lack of regular physical/sports activities), self-reported depressive mood (measured with the Kandel scale [6, 13, 14]), victim of violence, victim of sexual abuse, involvement in violence, and last-12-month suicide ideation (SI), and

lifetime suicide attempts (SA) [6, 15]. Socioeconomic status was measured using fathers' occupation. Seven occupational categories were considered following the international classification of occupation (ISCO): professionals/managers, craftsmen/tradesmen/heads of firms, associate professionals/technicians, service workers/clerks, manual workers, others, and inactive people. SI was addressed in the question 'During the last 12 months, did you ever think about suicide?' (Any vs. None), and SA in the question 'During the life course, how many times did you actually attempt suicide?' (Any vs. None) [6, 15].

Current tobacco use was assessed with the question 'During the last 30 days did you smoke cigarettes?' (None/1-4/5-9/10-19/20+ cigarettes/day), last-30 day alcohol use with the question 'During the last 30 days how many times have you had alcohol drinks (beer, cider, champagne, wine, aperitif, ...?' (None/1-5/6-9/10-29/30+), last-30 day cannabis use with that 'During the last 30 days how many occasions have you used any form of cannabis?' (None/1-5/6-9/10-29/30+), and last-30 day use of other illicit drugs with that 'During the last 30 days how many occasions have you used any form of other illicit drugs (mushrooms, ecstasy, LSD, etc.)?' (None/1-5/6-9/10-29/30+) [6, 15-17]. Lack of sports/physical activity was assessed with the question 'During the last 12 months, have you practised sports and physical activities?' (Rarely/Never versus Regularly/Sometimes).

Being victim of violence was measured using 5 questions for four places (in school, school neighbourhood, at home, and elsewhere) [6, 15]: 'During the last 12 months, have you been victim of ...?': knocks, stealing, racket, racial actions, and verbal violence (any vs. none). It was defined by the presence of at least one item. Sexual abuse was identified with the question: 'In the course of your life, have you been victim of a sexual abuse?' (Any vs. None) [6, 15].

Involvement in violence was defined by the presence of at least one of the following items [6, 15]: 'During the last 12 months, have you?', 'gotten mixed into a fight in school', 'taken part in a fight where a group of your friends were against another group', 'belonged to a group starting a fight against another group', 'been author of verbal violence', 'been author of racial actions', 'started a fight with another individual', 'taken something not belonging to you (in school, in the neighbourhood of school, at home, ...)', 'taken something from a shop without paying for it', 'set fire to somebody else's property on purpose', 'used any kind of weapon to get something from a person', or 'damaged public or private property on purpose' (any versus none).

The data were analysed using logistic models which yielded odds ratios (OR). To assess the mediating/moderating roles of covariates three logistic models were performed: a basic model (model 1) measuring the links of nationality with SI or SA after adjustment for gender and age, then father's occupation and family structure added to model 1 (model 2), and finally unhealthy behaviors, school difficulties, depressive symptoms, victim of violence or sexual abuse, and involvement in violence added to model 2 (model 3). The contribution of covariates to the explanation of the SI/SA-nationality associations was estimated by the change in the ORs after inclusion of the variables in the model, i.e. explained fraction calculated by the formula: $(OR_{\text{model 1}} - HR_{\text{extended model}})/(OR_{\text{model 1}} - 1)$ [18].

Results

Among the 1666 subjects included in the sample, 2 refused and 89 (5.3%) were absent when the data collection was carried out (for motive independent of the survey). In total 1,575 (94.5%) completed the questionnaire, 10 were of unknown gender or age, 6 not filled in appropriately, leaving 1559 (93.6%) questionnaires for statistical analysis.

SI affected more European and non-European immigrant students than their French counterparts (20.4% and 24.1% vs. 10.9%, $p=0.002$) and the same for SA (18.5% and 16.7% vs. 9.3%, $p=0.02$). Compared with their French counterparts, immigrant students had more non-intact families, lower father's occupations, higher school difficulties, higher uses of tobacco, cannabis, and other illicit drugs, and were more frequently victim of violence.

Table 1 shows that the higher risk for SI remained after adjustment for gender and age for European immigrants (gender-age-adjusted odds ratio OR_{ga} 2.06) and non-European immigrants (OR_{ga} 2.60) compared with French. Further adjustment for father's occupation and family structure reduced the odds ratios to 1.76 (contribution 28%) and 2.43 (contribution 11%) respectively. Further adjustment for unhealthy behaviors, school difficulties, depressive symptoms, being victim of violence, victim of sexual abuse, and involvement in violence reduced the odds ratios to 1.50 (contribution 53%) and 2.30 (contribution 19%) respectively.

The risk for SA was higher for European immigrants only (OR_{ga} 2.21). Further adjustment for father's occupation and family structure reduced the OR to 2.12 (contribution 7%), and further adjustment for other covariates reduced it to 1.59 (contribution 51%). It should be noted that the risks associated with various factors tended to be higher for immigrant students than for French students (Table 2). This suggests that the level of issues would be higher.

Table 1. Associations between suicidal behaviors and nationality, and roles of covariates ^a: OR and 95% CI

	Suicide ideation			Suicide attempts		
	OR	95% CI	%	OR	95% CI	%
Model 1: Gender-age-adjusted odds ratio OR _{ga}						
French	1.00			1.00		
European immigrants	2.06*	1.04-4.09	100	2.21*	1.08-4.52	100
Non-European immigrants	2.60**	1.36-4.99	100	1.87	0.89-3.94	100
Model 2: Further adjustment for father's occupation and family structure						
French	1.00			1.00		
European immigrants	1.76	0.87-3.56	28	2.12*	1.06-4.26	7
Non-European immigrants	2.43**	1.24-4.79	11	1.53	0.71-3.31	—
Model 3: Further adjustment for unhealthy behaviors, school difficulties, depressive symptoms, victim of violence or sexual abuse, and involvement in violence						
French	1.00			1.00		
European immigrants	1.50	0.66-3.42	53	1.59	0.66-3.83	51
Non-European immigrants	2.30*	1.02-5.15	19	1.07	0.41-2.76	—

*p<0.05, **p<0.01. ^a father's occupation and family structure, unhealthy behaviors, school difficulties, depressive symptoms, victim of violence or sexual abuse, and involvement in violence.

Discussion

The present study among adolescent students in north-eastern France demonstrates that European immigrants had a 2-fold higher risk for both suicide ideation and suicide attempts, and that non-European immigrants had a 2.6-fold higher risk for suicide ideation but the risk for suicide attempts was not significant (may be due to small number of subjects leaving a lack of power for statistical tests). That was a strong phenomenon as it has been revealed with a small number of immigrants.

The excess risks found among immigrants were expected because, compared with their French counterparts, immigrant students had more non-intact families, lower father's occupations, higher school difficulties, higher uses of tobacco, cannabis, and other illicit drugs, and were more frequently victim of violence. We also found that the risks associated with various factors were in overall higher for immigrant students than for French students. The level of issues would be higher which may result in higher physical and mental difficulties. Consequently, the effects of potential factors may be exacerbated among immigrants.

It should be noted that in overall French and immigrant students were exposed to similar enough risk factors. But there were some disparities. Having parents divorced/separated was associated with a higher risk for immigrants while in addition to this factor reconstructed family was also a risk factor for French students. Manual-worker-offspring was at risk among French but not among immigrants. This may be explained by small number of immigrants having fathers being managers/professionals (reference group).

An important finding is that father's occupation and family structure explained 28% of the risk for SI and 7% of that for SA among European immigrants whereas they explained 11% of the risk for SI among non-European immigrants. Our study also reveals that by including unhealthy behaviors, school difficulties, depressive symptoms, being victim of violence or sexual abuse, and involvement in violence, the contribution reached 50% for European immigrants and 19% for non-European immigrants. The knowledge of these risk patterns may be useful for appropriate prevention.

Table 2. Associations between suicide behaviours and various factors among French and immigrant students: gender-age-adjusted OR and 95% CI

	French students (N=1451)				Immigrant students (N=108)			
	Suicide ideation		Suicide attempts		Suicide ideation		Suicide attempts	
Boys	0.60**	0.42-0.83	0.56**	0.39-0.81	0.91	0.36-2.29	0.47	0.16-1.37
Age (yr)	1.03	0.91-1.17	1.13	0.98-1.29	1.06	0.78-1.45	1.28	0.90-1.82
Family structure								
Intact	1.00		1.00		1.00		1.00	
Reconstructed	3.50***	2.34-5.24	2.66***	1.68-4.23	1.23	0.33-4.54	2.11	0.57-7.79
Parents divorced or separated	1.75*	1.02-3.01	2.18**	1.26-3.80	5.21*	1.33-20.31	3.03	0.69-13.26
Single parent	1.36	0.68-2.75	2.92***	1.60-5.35	0.58	0.07-5.22	0.72	0.08-6.77
Others	1.44	0.66-3.12	2.10*	1.00-4.44	4.22	0.94-19.00	1.94	0.31-12.27
Father's occupation								
Managers and professionals	1.00		1.00		1.00		1.00	
Craftsmen, tradesmen, and firm heads	1.52	0.91-2.52	1.41	0.82-2.42	2.63	0.59-11.68	1.85	0.39-8.80
Intermediate professionals	1.21	0.63-2.33	1.11	0.55-2.24	1.28	0.10-16.53	—	
Service workers/clerks	1.54	0.81-2.94	1.58	0.81-3.09	0.51	0.04-5.82	—	
Manual workers	1.78*	1.07-2.98	1.53	0.89-2.66	1.00	0.20-4.93	0.89	0.18-4.45
Other occupations	2.03*	1.07-3.85	1.29	0.61-2.74	1.75	0.21-14.38	0.63	0.04-9.01
Inactive people	1.88	0.96-3.67	2.02*	1.02-3.99	0.94	0.16-5.56	0.82	0.13-5.02
School difficulties								
Repeating a school year	1.44	0.90-2.29	2.08**	1.31-3.29	1.18	0.38-3.66	2.11	0.65-6.53
Low school performance (<10/20)	2.46***	1.50-4.04	3.51***	2.06-5.70	4.25**	1.39-13.02	3.30	0.98-11.10
Quitting-school thinking at 16 years	5.51***	2.94-10.32	4.00***	2.00-8.00	24.48***	3.93-153	6.51*	1.28-33.01
Last-30-day substance use								
Tobacco	5.62***	3.74-8.43	9.97***	6.57-15.14	8.00***	2.70-23.69	6.88***	2.19-21.58
Alcohol	2.79***	1.96-3.96	3.85***	2.61-5.67	6.80***	2.41-19.22	6.66***	2.15-20.61
Cannabis	3.60***	2.06-6.30	5.33***	3.07-9.24	6.20**	1.66-23.12	9.12**	2.22-37.39
Other illicit drugs	7.08**	3.44-14.58	9.82***	7.75-20.29	13.64***	2.83-65.74	20.00***	3.79-105
Lack regular sports/physical activity	1.58*	1.00-2.51	1.75*	1.08-2.84	4.35**	1.38-13.72	1.72	0.50-5.96
Depressive mood	7.85***	5.38-11.45	5.27***	3.53-7.85	5.50**	1.73-17.47	3.21*	1.00-10.35
Victim of violence	2.31***	1.78-2.99	2.43***	1.84-3.21	1.08	0.56-2.05	1.40	0.69-2.86
Victim of sexual abuse	9.23***	5.12-16.65	11.99***	6.60-21.79	11.03**	1.92-63.37	1.51	0.24-9.58
Involvement in violence	3.03***	2.30-3.99	3.89***	2.87-5.27	4.86***	2.16-10.91	3.41**	1.52-7.64

* p<0.05, ** p<0.01, *** p<0.001. European and non-European were grouped because of small numbers of subjects. "—": non computable.

Some methodological aspects warrant comments. Our study was based on a self-administered anonymous questionnaire but it is widely used and arguably a good tool to study the living conditions, mental health, and behaviors of adolescents [6, 15, 16, 19]. A study among adolescents showed that self-reported data were corroborated by independent teacher reports [20]. Given the large number of statistical tests carried out, type I error may be a concern, but it has to be pointed out that most tests were significant at the 0.001 level, with very great OR estimates. Strengths of the study also deserve to be mentioned. The participation rate was high. The prevalence of a wide range of health/behaviour outcomes (substance use, sleep disorders, asthma, depressive symptoms, suicidal behaviours, victim of violence, and involvement in violence) measured using the same measures was similar with that of a survey on a representative sample of French adolescents [6, 14].

We concluded that immigrant students had a higher risk for suicidal behaviors depending on their origin. The risk was very highly mediated by family characteristics, school difficulties, unhealthy behaviors, and mental health. Public policy may focus on these issues. This should promote school achievement and community participation.

Acknowledgements: The authors would like to thank JC Vauthier, MJ Chau, E Aptel, I Armand, B Barraud, O Causin, M Verdin, C Richoux, Y Delacour, C Grangé, A Chatton, L Hiroux, L Collet, and the staff of the schools for their valuable help in the study.

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