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Original article

Youth at Risk: Suicidal Thoughts and Attempts in Vietnam, China, and Taiwan

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A B S T R A C T

Purpose: Despite increasing rates of suicide among youth in Asian cultures, there is a lack of suicide data among 15–24 year-olds, and little is known about the risk and protective factors for suicidality. This study examines the prevalence of suicidal ideation and attempts among 15–24 year-olds and identifies the sociodemographic correlates of suicidality in Hanoi, Shanghai, and Taipei.
Methods: A cross-sectional survey of 17,016 youth aged 15–24 years was conducted in rural and urban areas of Hanoi, Vietnam; Shanghai, China; and Taipei, Taiwan in 2006. Logistic regression was used to analyze correlates of suicidal ideation and attempt across cities.
Results: The 12-month prevalence of suicidal ideation and attempt was 8.4% and 2.5% across all three cities, respectively. Suicidal ideation was highest in Taipei (17.0%), Shanghai (8.1%), and lowest in Hanoi (2.3%); similar trends were found for suicidal attempts. Younger age cohorts (15–19 year-olds) and females were more likely to report suicidal ideation and suicidal attempts compared with 20–24 year-olds and males. In multivariate logistic regression results, across the three cities, female gender, younger age, family structure, parental support, family history of suicide, migration status, and substance use were associated with suicidal ideation. Factors associated with suicidal attempt included female gender, family history of suicide, parental support, and substance use.
Discussion: Suicidality is common among Asian youth, with highest levels reported in more industrialized cities.

In the latter half of the 20th century, cities in Asia experienced unparalleled social and economic transformations. Rapid social and economic change has been associated with a loss of social stability, and with it a rise of depression and suicidality (suicidal thoughts, attempts, and completions) [1–5]. For example, Diekstra [6,7] has shown a strong association between social change and the rates of suicide. Specifically, when analyzing secular trends for suicide by country throughout 20th century Europe, Diekstra [6] found the following to be associated with increases in suicidality: urbanization, social disruption, secularization of society, rapid economic transitions, and loss of traditional values. Because suicide is one of the top five leading causes of death among young people worldwide [8], mental health remains one of the most pressing issues among youth today.

In this article, we compare suicidal ideation and attempts across Taipei, Shanghai, and Hanoi. Existing literature suggests that suicides are increasingly common among Asian youth. For example, before 1990, China reported a suicide prevalence of less than 10 per 100,000 [3]. Only over the past 15 years have more accurate data emerged; and with that emergence what has become clear is not only the high prevalence of suicide (23 per 100,000), but its disproportionate preponderance among young, rural females [1,3]. Moreover, in China, suicide is the leading cause of death for 15–24-year-olds and is the fifth leading cause of death for the general public [4].

Compared with China, Vietnam's suicide rate is remarkably low. In 1998, the Ministry of Health estimated the national prevalence to

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be .98 per 100,000 [9]. Tran Thi Thanh et al [9] hypothesize that the low rate is due to the relative influence of Buddhism and that those who follow the Buddhist religion and culture are less likely than nonadherents to experience suicidality.

In Taiwan, prevalence rates appear to fall between those of Vietnam and China. Specifically, among youth, the Department of Health reported that in 2004, there were 6.2 suicides per 100,000 youth between the ages of 15 and 24 years [10]. Contrary to what Phillips et al [1] have hypothesized for mainland China, in Taiwan, there appears to be a strong association between psychopathology and suicide attempts [11]. Several studies have documented the risk and protective factors for depression among adolescents in the Asian context. A study of a representative sample of 10,233 adolescents in southern Taiwan identified individual, family, peer, and school factors associated with suicide. Risk factors for youth suicide included female gender, low self-esteem, weekly alcohol use, illicit drug use, depression, high family conflict, low maternal education level, poor family function, low connectedness to school, and dropping out of school [12].

Taipei, Shanghai, and Hanoi are experiencing different stages of economic and social transitions, with Taipei the most industrialized city, followed by Shanghai and Hanoi. Since 1965, Taiwan has been a major economic powerhouse in the Asian region, with an economy based on foreign investment and trade. Economic growth has continued over the past half century, where today in the urban centers of Taiwan, possession of household goods such as computers, cell phones, and cars parallels that of industrialized countries [13]. By contrast, the social and economic transformation of China is more recent. Specifically, economic reforms began with *The Four Modernizations* instituted by Deng Xiaoping in the late 1970s. Shanghai, in particular, has become the economic epicenter of China's modernization; and for each of the past 11 years, the city has sustained double digit economic growth [14]. Vietnam's economic transformation began a decade after China's, when in 1986 the Vietnamese leadership instituted economic reforms (*doi moi*) that resulted in dramatic foreign investments in industry and infrastructure development. The past decade has seen explosive economic growth at between 5% and 9% per annum. Coupled with this economic growth has been an influx of foreign influences that has challenged traditional values.

The present study presents a unique opportunity to explore the influence of social change on the rates of adolescent suicide in three cities of South Asia: Shanghai, Hanoi, and Taipei. What makes this unique is that while each of the three cities are rooted in Confucian values, each city is currently experiencing social and economic changes, with likely profound effects on young people. However, there are few studies that make comparisons of suicidality across different Asian cultures. Although we anticipate differences in the rates of suicidal thoughts and attempts among these three cities, prior research suggests that the factors that predispose to suicidality and those that protect young people are relatively universal [6]. Thus, we hypothesize few differences in the risk and protective factors identified with suicidality in each of the three cities.

The study was guided by an ecological model of risk and protective factors [15], accounting for influences on adolescent behaviors predisposing to or moderating risk at the individual, family, and school levels. Specifically, independent of geography, young people grow up nested within family, peer, school, community, and national contexts. The relative risk to which those contexts predispose a young person or the protection they may afford is determined by a wide set of factors—some universal and some culturally specific.

With increasing suicide rates, epidemiological data on risk and protective factors among youth in Asia will be key to developing effective intervention strategies. The objectives of this study are as follows: (1) determine the 12-month prevalence of suicidal ideation and suicidal attempts among 15–24-year-olds in Hanoi, Vietnam; Shanghai, China; and Taipei, Taiwan; (2) identify sociodemographic correlates of suicidality and how these risk and protective factors vary across city and gender; (3) explore help-seeking for suicidal behaviors by city and gender.

Methods

The study

The present study was conducted in Taipei, Shanghai, and Hanoi by collaborators from the Johns Hopkins Bloomberg School of Public Health, the Population and Health Research Center in Taiwan's Bureau of Health Promotion, the Shanghai Institute for Planned Parenthood Research, and the Hanoi Institute for Family and Gender Studies. It was funded by the Bill and Melinda Gates Institute of Population and Reproductive Health at the Johns Hopkins Bloomberg School of Public Health, with additional support from the Taiwan Ministry of Health for the Taipei portion of the study. Data were collected in 2006 from 17,016 youth 15 to 24 years of age residing in both urban and rural districts proximal to the three cities.

The sample

The sampling methodology has been described in detail in "Levels of Change in Adolescent Sexual Behavior in Three Asian Cities" [16]. Multistage sampling methods were used to ensure representativeness within each city. In Hanoi and Shanghai, both private residences and group living facilities were sampled. In Taipei students were interviewed in school, with a small nonstudent subsample interviewed at their private residences and group living facilities. The survey was developed by the research team, translated, back-translated, and pilot tested in each site. Interviewers received extensive training. Most of the interview was conducted face-to-face, except that computer-assisted self-interview was used for sensitive questions. All aspects of this study received approval from the Committee on Human Research at the Johns Hopkins University as well as the collaborating local organizations.

Measures

Suicidality. The questionnaire included two questions concerning suicidality. One question assessed suicidal ideation, "During the past 12 months, have you ever thought about hurting yourself physically or killing yourself?" One question assessed suicidal attempt, "During the past 12 months, did you ever attempt suicide?"

Demographic characteristics. The questionnaire included a wide variety of demographic characteristics including age, gender, education level (primary or lower, junior secondary, senior secondary, college/graduate school), family structure (live with parents, alone, relatives/others, friends), marital status, employment/education status (neither in school nor employed, both in school

and employed, in school only, or employed only), type of work (professional, nonprofessional, other), migrant status (urban native, rural native, rural-to-urban migrant, urban-to-urban migrant), cigarette use in past month (yes, no), and alcohol use in past month (yes, no).

Family characteristics. Scales were constructed to measure family characteristics. Mother and father relationship construct consisted of seven items each measuring aspects of parent–child relationships, including parental support and monitoring. Participants were asked how often (never, sometimes, often, always) their primary female or male caretaker had exhibited certain parental behaviors when they were 13–14 years old (i.e., showed you that she/he loved you, interested in how you were doing, expected you to do your best, etc.). A composite score was obtained by summing the items, with higher scores reflecting higher parental support and monitoring. The Chronbach's alpha (a measure of internal consistency among items of a scale) for the mother relationship scale was .66, .74, .66, and .69 for Hanoi, Shanghai, Taipei, and all three cities, respectively; and the Chronbach's alpha for father relationship was .71, .76, .71, and .73 for Hanoi, Shanghai, Taipei, and all three cities, respectively.

Household wealth index scores were calculated using principal components analysis of household assets and housing conditions [17]. Households are ranked based on asset scores and were categorized into wealth quintiles by city from highest to lowest. This is a relative rather than absolute measure of wealth. Family history of suicide was measured by the question, "Has anyone else in your family ever tried to kill themselves?" (yes/no).

Mental health-seeking behaviors. Help-seeking behaviors were assessed with the following question: "Who do you think you would talk to if you felt like killing yourself?" Participants are able to select more than one response.

Statistical analysis

All analyses were performed using Stata 11MP [18]. Three sets of analyses were performed. First, descriptive analyses were conducted to describe the distribution of key variables including means, standard errors, frequency distributions, and frequency of missing data across all three cities. Significant associations were assessed using Pearson chi-square tests for categorical variables and *t* tests for continuous variables. Second, bivariate logistic regression was used to assess associations between demographic characteristics and suicidal ideation and attempt. Next, multivariate analyses were performed using key demographic characteristics that were significant at $p < .1$ levels, stratified by city. All analyses are weighted and use robust standard errors to account for the clustered sampling design of the survey [19].

Results

Characteristics of study population

Weighted descriptive results of the study participants by city are presented in Table 1. In total, 17,109 youth aged 15–24 years participated in the study, with 6,191 Vietnamese, 6,212 Chinese, and 4,706 Taiwanese youth. Participants were evenly split by

Table 1
Characteristics of the study population, by city

Characteristics	Hanoi n = 6,191	Shanghai n = 6,212	Taipei n = 4,706	Total n = 17,108
Age (years), % (n)				
15–19	47.64 (2,949)	56.9 (3,535)	49.17 (2,314)	51.43 (8,798)
20–24	52.36 (3,241)	43.1 (2,677)	50.83 (2,392)	48.57 (8,310)
Gender, % (n)				
Male	52.51 (3,251)	49.51 (3,075)	50.96 (2,398)	50.99 (8,724)
Female	47.49 (2,940)	50.49 (3,136)	49.04 (2,308)	49.01 (8,384)
Highest educational level, % (n)				
Primary or lower	7.74 (479)	4.66 (290)	2.13 (100)	5.08 (870)
Junior secondary	29.46 (1824)	43.37 (2,694)	38.8 (1826)	37.08 (6,344)
Senior secondary	57.39 (3,553)	39.91 (2,479)	44.64 (2101)	47.54 (8,132)
College/university/graduate	5.41 (335)	12.06 (749)	14.43 (679)	10.3 (1763)
Family structure, % (n)				
Parents	74.14 (4,590)	67.07 (4,166)	73.28 (3,448)	71.34 (12,204)
Alone	1.05 (65)	1.55 (96)	5.6 (264)	2.48 (425)
Other relatives	6.13 (380)	4.45 (277)	4.71 (222)	5.13 (878)
Friends/dormitory	18.68 (1,156)	26.93 (1673)	16.4 (772)	21.05 (3,601)
Married, % (n)	.83 (51)	3.37 (209)	.88 (41)	1.77 (302)
Currently in job/school, % (n)				
Neither job nor school	7.33 (454)	7.29 (453)	4.89 (230)	6.65 (1,137)
Both job and school	10.51 (650)	6.67 (414)	28.17 (1326)	13.97 (2,390)
In school but no job	55.22 (3,418)	58.36 (3,625)	54.47 (2,563)	56.15 (9,607)
Job but no school	26.95 (1668)	27.69 (1720)	12.47 (587)	23.23 (3,975)
Type of work, % (n)				
Professional	24.78 (801)	26.39 (845)	13 (464)	21.09 (2110)
Nonprofessional	73.88 (2,388)	70.84 (2,268)	85.08 (3,035)	76.9 (7,691)
Other: artist, writer, athlete, military	1.34 (43)	2.77 (89)	1.92 (68)	2 (200)
Migrant status, % (n)				
Urban native	43.9 (2,718)	60.41 (3,752)	66.58 (3,133)	56.13 (9,603)
Rural native	28.07 (1738)	25.02 (1554)	7.73 (364)	21.37 (3,656)
Rural-to-urban migrant	18.35 (1,136)	6.87 (427)	6.44 (303)	10.91 (1866)
Urban-to-urban migrant	9.68 (599)	7.7 (479)	19.25 (906)	11.59 (1984)

gender. Most students were in school and not working (56.2%), with 6.7% neither in school nor employed, 14.0% having both a job and in school, and 23.2% having a job but are not in school. Of youth who had jobs, 76.9% are in nonprofessional sectors including service, clerical, vendor, mechanic/construction, farmer, or unskilled work, whereas 21.1% had professional work including managerial or technical work. Only 2% worked in other sectors including art, writing, and military. Most of the study participants (over 56%) were born and lived in urban areas, 21.4% were born and lived in rural areas, and 23.5% of the population was migrant.

Prevalence of suicidal ideation and attempt across cities and gender

The overall prevalence of suicidal ideation in the last 12 months among 15–24–year-olds was 8.4% in all three cities, lowest in Hanoi (2.3%), Shanghai (8.1%), and highest in Taipei (17.0%) ($p \leq .01$). Similar trends were observed in 12-month prevalence of suicidal attempts with <1% of youth in Hanoi reporting suicidal attempts, 1.3% in Shanghai, and 6.9% in Taipei ($p \leq .01$). The overall prevalence of suicide attempt in the three cities was 2.5%.

Stratified by gender, females were more likely to report suicidal ideation and attempt. Of those reporting suicidal ideation, females reported 61.3%, 56.4%, and 59.2% in Hanoi, Shanghai, and Taipei; of those reporting suicidal attempts, 72.5%, 51.9%, and 60.3% were females, respectively.

Across all three cities, younger age cohorts (ages 15–19 years) were more likely to report suicidal ideation and suicidal attempts compared with those aged 20–24 years. In Taipei, among 15–19-year-olds, 27.4% of females and 16.9% of males reported suicidal ideation in the past 12 months, compared with 13.8% and 10.5% of 20–24-year-old females and males, respectively. Similar trends are found for the other two cities. In Taipei, 8.5% and 5.4% of 15–19-year-old females and males, respectively, reported suicidal attempt compared with 7.5% and 3.9% of 20–24-year-old females and males, respectively. Similar trends are found across the other two cities (tables and graphs of prevalence data are available from authors).

Multivariate results: Sociodemographic correlates of suicidality across all three cities

Multivariate results suggest that there were a number of common risk and protective factors of suicidal ideation across all three cities including younger age, female gender, migration status, family structure, parental support, family history of suicide, and substance use (Table 2). Those in the 15–19-year-old cohort were 37% more likely to report suicidal ideation compared with older youth with a peak at 18 years old (not shown). Females were almost twice as likely (odds ratio [OR] 1.99, $p \leq .01$) to have suicidal ideation compared with males. Moreover, youth in rural areas who never migrate reported a lower likelihood of suicidal ideation compared with urban natives (OR = .45, $p \leq .01$). Urban-to-urban migrants, by contrast, were more than 1.28 times as likely to report suicidal ideation compared with urban natives (OR = 1.28, $p \leq .05$). Individuals who report cigarette use and alcohol use were also more likely to report suicidal ideation. Those who smoked cigarettes in the past month were 1.85 times as likely to report suicidal ideation, and those who drank alcohol in the past month were 1.49 times as likely as those who did not. A number of family-level factors were also associated with suicidal ideation. Those living outside of parent's home, including living with other relatives, were less likely to experience suicidal ideation compared with those living with their parents (OR = .45, $p \leq .01$). A family history of suicide was a strong predictor of suicidal ideation. Individuals with a family history of suicidal attempt were 2.41 times as likely to report suicidal ideation compared with those without a family history of suicide. Moreover, higher mother and father relationship scores were associated with 5% lower likelihood of suicidal ideation ($p \leq .01$ for each).

Similar to suicidal ideation, factors that were associated with suicidal attempts in the previous 12 months included female gender, family history of suicide, parental support, and substance use. Females were over 2.19 times more likely to attempt suicide compared with males ($p \leq .01$). Surprisingly, those living with friends were 39% less likely to report suicidal attempts compared with those living with parents (OR = .61, $p \leq .05$). Family history of suicidal attempt was also a strong predictor of participant's likelihood of suicidal attempt, with those with a family history of suicidality 2.57 times more likely to report a suicidal attempt ($p \leq .01$).

Hanoi

Based on multivariate results, younger age-groups, females, family structure, migrant status, family history of suicide, relationships with mother and father, and alcohol use were all associated with suicidal ideation. Younger age cohorts (ages 15–19 years) were 44% more likely to report suicidal ideation compared with older age cohorts. Females were 2.81 times as likely to report suicidal ideation compared with males in the Hanoi sample ($p \leq .01$). Migrants were particularly at risk in Hanoi, with rural-to-urban migrants reporting 1.95 times the likelihood of suicidal ideation compared with their urban native peers ($p \leq .05$); urban-to-urban migrants were more than twice as likely to report suicidal ideation compared with urban natives (OR = 2.27, $p \leq .05$). Moreover, while alcohol use was associated with 1.82 times the likelihood of suicidal ideation ($p \leq .01$), cigarette use was not predictive. Family factors were also important in predicting suicidal ideation including family history of suicide and relationships with mother and father.

Urban-to-urban migrants and relationship with mothers were associated with reporting attempting suicide in the past 12 months in Hanoi. Urban-to-urban migrants were 6.45 times as likely to report suicidal attempts compared with urban natives ($p \leq .01$). Rural-to-urban migrants were over 2.5 times as likely to attempt suicide as urban natives, although this relationship was not statistically significant ($p \leq .05$). Higher maternal relationship scores were protective for youth in Hanoi (OR = .87, $p \leq .01$). Multivariate results for suicidal ideation and suicidal attempts for Hanoi are presented in Table 2.

Shanghai

In Shanghai, being female (OR = 1.64, $p \leq .01$), having a family history of suicide (OR = 2.27, $p \leq .01$), cigarette use (OR = 1.70, $p \leq .01$), and alcohol use (OR = 1.36, $p \leq .05$) were all associated with suicidal ideation compared with being male, having no family history of suicide, and no substance use. By contrast, higher relationship scores with mothers and fathers were pro-

Table 2
Multivariate logistic regression reported odds ratios and confidence intervals for correlates of suicidal ideation across three cities

Characteristics	Suicidal ideation				Suicidal attempt			
	Hanoi (n = 6,221)	Shanghai (n = 6,207)	Taipei (n = 4,141)	Total (n = 16,569)	Hanoi (n = 6,221)	Shanghai (n = 6,207)	Taipei (n = 4,141)	Total (n = 16,569)
Age category (Ref: 15–19 yrs)								
20–24 yrs	.56[a] (.39–.81)	.77[b] (.59–1.00)	.60[a] (.47–.78)	.63[a] (.53–.75)	1.27 (.27–6.06)	1.10 (.58–2.08)	.83 (.54–1.28)	.89 (.64–1.22)
Gender (Ref: male)								
Female	2.81[a] (1.44–5.49)	1.63[a] (1.20–2.23)	1.97[a] (1.59–2.43)	1.99[a] (1.61–2.46)	3.12 (.70–14.01)	1.66 (.82–3.36)	1.99[a] (1.45–2.74)	2.19[a] (1.54–3.12)
Wealth quintile (Ref: 1st quintile)								
2nd quintile	1.47 (.83–2.62)	.93 (.69–1.26)	.97 (.74–1.29)	1.02 (.85–1.23)	13.74[c] (1.49–126.89)	.28[a] (.12–.66)	.99 (.62–1.59)	.90 (.62–1.30)
3rd quintile	1.14 (.57–2.29)	1.35 (.90–2.02)	.98 (.74–1.31)	1.04 (.83–1.32)	6.22 (.54–72.15)	1.33 (.57–3.09)	.96 (.59–1.56)	.91 (.59–1.39)
4th quintile	1.25 (.55–2.84)	1.45[b] (.98–2.16)	.86 (.66–1.12)	1.03 (.81–1.30)	9.17[b] (.78–107.40)	1.84 (.79–4.27)	.81 (.54–1.21)	.89 (.60–1.30)
5th quintile	1.83 (.77–4.35)	1.54 (.84–2.81)	.68[c] (.46–.99)	.79 (.55–1.13)	9.88[b] (.75–130.19)	1.95 (0.68–5.62)	.81 (.41–1.59)	.71 (.39–1.28)
Highest education level (Ref: primary or lower)								
Junior secondary	1.30 (.67–2.53)	1.06 (.54–2.07)	.97 (.59–1.59)	1.41[b] (.94–2.11)	1.55 (.24–9.96)	.73 (.22–2.43)	1.54 (.50–4.76)	2.03[b] (.97–4.24)
Senior secondary	1.27 (.69–2.35)	.88 (.42–1.83)	.63[b] (.37–1.07)	.95 (.63–1.42)	.60 (.10–3.52)	1.08 (.29–4.03)	1.00 (.32–3.13)	1.36 (.67–2.76)
College/graduate	.45 (.17–1.22)	1.31 (.58–2.97)	.56[b] (.29–1.10)	1.33 (.84–2.11)	.31 (.02–3.96)	.56 (.10–3.12)	.58 (.17–2.04)	1.07 (.47–2.45)
Family structure (Ref: Parent)								
Alone	.33 (.04–3.01)	1.63 (.73–3.67)	.91 (.54–1.53)	1.28 (.78–2.11)	–	.54 (.06–4.81)	.89 (.38–2.10)	1.06 (.47–2.37)
Relatives/others	.19[a] (.08–.49)	.50 (.21–1.21)	.55[b] (.28–1.07)	.45[a] (.27–.75)	.59 (.13–2.73)	.47 (.11–2.03)	.94 (.45–1.96)	.78 (.42–1.44)
Friends	.62 (.24–1.64)	1.13 (.84–1.54)	.66[a] (.53–.83)	.85 (.66–1.08)	.46 (.08–2.79)	1.08 (.58–2.05)	.70[b] (.48–1.01)	.61[c] (.39–.94)
Employment/education status (Ref: neither school/job)								
Both	1.43 (.34–6.03)	1.57 (.91–2.72)	.95 (.51–1.77)	1.47[b] (.97–2.20)	.92 (.10–8.35)	1.25 (.35–4.49)	1.07 (.40–2.85)	1.62 (.81–3.24)
Only school	1.11 (.31–3.98)	1.51[b] (.94–2.44)	1.12 (.61–2.06)	1.35 (.94–1.95)	.63 (.16–2.50)	1.17 (.40–3.39)	1.06 (.41–2.78)	1.17 (.61–2.24)
Only job	1.17 (.32–4.32)	1.09 (.65–1.82)	1.16 (.60–2.24)	1.01 (.70–1.44)	.63 (.08–4.93)	1.06 (.40–2.79)	1.55 (.54–4.44)	1.03 (.54–1.99)
Migrant status (Ref: urban native)								
Rural native	.47[c] (.24–.90)	.76 (.54–1.07)	.73 (.50–1.08)	.45[a] (.31–.65)	.53 (.09–3.19)	2.04[c] (1.06–3.93)	1.11 (.61–2.03)	.60[b] (.34–1.07)
Rural-to-urban migrant	1.95[c] (1.06–3.59)	.75 (.41–1.37)	1.70[a] (1.16–2.49)	.85 (.59–1.23)	2.51 (.25–25.07)	1.64 (.58–4.63)	1.40 (.81–2.43)	.87 (.49–1.56)
Urban-to-urban migrant	2.27[c] (1.18–4.37)	1.24 (.79–1.95)	1.29[c] (1.02–1.62)	1.28[c] (1.01–1.63)	6.45[a] (1.66–25.06)	1.89 (.62–5.74)	1.12 (.79–1.59)	1.39[b] (.99–1.96)
Family history of suicide (Ref: No)								
Yes	2.12[a] (1.23–3.66)	2.27[a] (1.38–3.74)	1.77[a] (1.40–2.24)	2.41[a] (1.98–2.93)	2.07 (.71–6.06)	2.70[a] (1.46–5.01)	1.68[c] (1.12–2.52)	2.57[a] (1.84–3.61)
Mother relationship	.91[a] (.87–.95)	.97[a] (.94–.99)	.99 (.96–1.02)	.95[a] (.94–.97)	.87[a] (.81–.94)	.94[c] (.88–1.00)	1.00 (.97–1.03)	.96[a] (.93–.98)
Father relationship	.95[a] (.93–.97)	.93[a] (.91–.95)	.97[a] (.96–.99)	.95[a] (.94–.97)	.95 (.88–1.01)	.92[a] (.88–.95)	.98[c] (.96–1.00)	.95[a] (.94–.97)
Cigarette use in past month (Ref: No)								
Yes	1.63 (.54–4.89)	1.70[a] (1.24–2.33)	1.70[a] (1.27–2.29)	1.85[a] (1.47–2.33)	.79 (.09–6.59)	1.74 (.71–4.25)	1.88[a] (1.30–2.70)	2.22[a] (1.56–3.16)
Alcohol use in past month (Ref: No)								
Yes	1.82[a] (1.21–2.74)	1.36[c] (1.00–1.84)	1.54[a] (1.26–1.88)	1.49[a] (1.25–1.77)	1.58 (.39–6.41)	1.97[c] (1.09–3.56)	1.50[c] (1.04–2.17)	1.64[a] (1.19–2.24)
Constant	.07[a] (.01–.42)	.14[a] (.05–.43)	.20[a] (.08–.50)	.12[a] (.06–.24)	.01[a] (.00–.24)	.03[a] (.00–.28)	.03[a] (.01–.17)	.02[a] (.01–.07)

95% Confidence intervals in parenthesis. Ref = reference group.
[a] $p \leq .01$, [b] $p \leq .1$, [c] $p \leq .05$.

Table 3
Percentages of help-seeking behavior for suicidal ideation in Hanoi, Shanghai, and Taipei among individuals who reported suicidal ideation or suicidal attempt—Who do you think you would talk to if you felt like killing yourself?

Adults/peers from whom help is sought*	Hanoi (n = 158)	Shanghai (n = 501)	Taipei (n = 713)	Total (n = 1372)
Parent	4.80	21.67	20.85	19.58
Partner	5.85	26.72	6.62	13.53
Other family members	3.23	5.72	17.83	12.20
Peer	36.43	50.25	63.73	56.39
Teacher	1.84	3.37	11.04	7.48
Health professional	4.34	15.99	18.00	15.97
Others	1.69	5.76	3.22	3.95
No one	48.08	30.02	23.93	28.40

* Participants are able to indicate more than one category, except for category "no one."

tective against suicidal ideation (OR = .97, $p \leq .01$ and OR = .93, $p \leq .01$, respectively).

Individuals who lived in rural areas who never migrated (OR = 2.04, $p \leq .05$), had a family history of suicide (OR = 2.70, $p \leq .01$), and used alcohol in the past month (OR = 1.97, $p \leq .05$) were more likely to report suicidal attempts compared with urban natives, had no family history of suicide, and did not drink alcohol in the past month. Higher scores on mother and father relationship, by contrast, were protective against suicidal attempts.

Taipei

In Taipei, individuals who were younger, female, had a family history of suicide, smoked cigarettes, and drank alcohol in the past month were more likely to report suicidal ideation. Rural-to-urban migration (OR = 1.70, $p \leq .01$) and urban-to-urban migration (OR = 1.29, $p \leq .05$) were both associated with higher likelihood of reporting suicidal ideation. Surprisingly, those who lived outside of their parents' homes (i.e., living with other relatives or friends) were less likely to report suicidal ideation compared with those who lived with their parents. Having a higher score on father relationship was similarly protective (OR = .97, $p \leq .01$).

Individuals who were female, smoked cigarettes, or drank alcohol in the past month were more likely to report suicidal attempts. Multivariate results for suicidal ideation and suicidal attempts for the three cities are presented in Table 2.

Mental health-seeking behaviors across cities and by gender

Study participants who reported experiencing either suicidal ideation or suicidal attempt identified peers (56.4%), parents (19.6%), and health professionals (16.0%) as the three most likely sources of support if they experienced suicidal thoughts (Table 3). Moreover, 28.4% of youth who had suicidal thoughts or attempted suicide indicated that they would talk to no one if they thought about killing themselves.

Youth in Hanoi were least likely to go to anyone if they were to experience suicidal thoughts. Across different cities, 48.1% of youth in Hanoi indicated they would discuss with no one, followed by 30.0% of youth in Shanghai, and 23.9% in Taipei. In Hanoi and Shanghai, youth are most likely to turn to peers, partners, and then parents. In Taipei, youth are most likely to turn to peers, parents, and health professionals.

When stratifying by gender, males were less likely to seek help compared with females (Table 4) as 32.4% of males and 25.6% of females reported turning to no one if they were to experience suicidal thoughts. However, males were more likely to turn to parents compared with females. Females were more likely to turn to peers (60.6%) and health professionals (17.2%), whereas males were most likely to turn to peers (50.5%) and parents (23.2%) for sources of support.

Discussion

To our knowledge, this is the first study to report the prevalence of suicidal ideation and attempt among 15–24-year-olds across Hanoi, Shanghai, and Taipei, as well as to examine sociodemographic correlates of suicidality. Results from this study presented site-specific individual and family-level factors that predisposed youth to suicidal ideation and attempt. Moreover, there are a number of risk and protective factors universal across study sites.

Data from this study indicate that 8.4% of youth reported suicidal ideation in the past 12 months, with a wide range across the three cities. Suicidal ideation and attempt were lowest in Hanoi (2.3% and <1%, respectively), Shanghai (8.1% and 1.3%, respectively), and highest in Taipei (17.0% and 6.9%, respectively). Although existing literature suggests that overall youth in China experience higher rates of suicide compared with youth in Taipei and Hanoi [8,20], in this study, youth from Taipei reported the highest prevalence of suicidal thoughts and attempt. A possible explanation for this finding is the different meaning of suicide across contexts. Until recently, suicide has not been included in Chinese psychiatric texts; rather, it has been viewed as the last act of a free will [3]. As such, it has not been considered to be the end point of psychopathology but rather the response to social stress, as opposed to Taiwan, where it has been strongly associated with psychopathology [21]. This perception poten-

Table 4
Percentages of help-seeking behavior for suicidal ideation, by gender

Adults/peers from whom help is sought*	Hanoi		Shanghai		Taipei		Total	
	Females (n = 103)	Males (n = 55)	Females (n = 283)	Males (n = 218)	Females (n = 427)	Males (n = 286)	Females (n = 813)	Males (n = 559)
Parent	2.97	7.69	17.75	26.73	19.10	23.39	17.00	23.19
Partner	5.50	6.41	24.52	29.56	7.65	5.13	13.09	14.16
Other family members	3.34	3.07	6.94	4.14	19.41	15.55	13.59	10.26
Peer	40.70	29.68	53.08	46.60	68.63	56.62	60.56	50.53
Teacher	2.29	1.13	2.49	4.50	10.55	11.75	7.00	8.14
Health professional	6.71	.60	18.16	13.19	18.50	17.28	17.18	14.28
Others	1.55	1.91	6.31	5.05	3.18	3.28	4.07	3.80
No one	42.19	57.38	28.84	31.55	20.6	28.76	25.56	32.37

* Participants are able to indicate more than one category, except for category "no one."

tially influenced the reporting of suicides and the associated low prevalence of suicidal ideation and attempt in this study.

The reported prevalence of suicidal ideation and attempt in this study is comparable with other published studies [9]. For example, in a community survey conducted in urban Hanoi among people aged 14 to >65 years, prevalence rates for lifetime suicidal ideation and attempt were 1.1% and .4%, respectively [9]. Although suicide rates are lower in Vietnam compared with China and Taiwan, youth are still disproportionately represented in Vietnamese suicides [22]. Based on medical records of 509 suicide patients, almost half (48.7%) were between the ages of 15 and 24 years [22].

Existing studies on suicidality among youth in China report a wide range of prevalence rates. For example, studies have reported suicidal ideation prevalence ranging from 2.4% to 17.4% and suicide attempt rates ranging from 3.2% to 9% [21,23–25]. The reported prevalence of suicidal ideation and attempt in the Shanghai sample of the data falls within the range of extant literature. Most of the literature on youth suicides focuses on parental reports of youth suicidal behaviors [23] and school-based samples [21,23–25], which may not be representative of general youth in China, where labor migration is increasing among young people [26]. The present study includes self-reported behaviors of both in-school and out-of-school youth.

Moreover, few studies exist on suicidal behaviors among youth in Taiwan. One school-based sample in Taiwan found that 9.1% of students reported suicidal attempt in the past 12 months. This is higher than the 6.9% of Taiwanese youth in this study who reported suicidal attempt in the past 12 months. The lower prevalence rate found in this study among Taiwanese youth may be because of the inclusion of in-school and out-of-school youth. In school-based studies that found higher prevalence of suicidal ideation and attempts, many school-related factors were leading causes including academic stress, dissatisfaction with school, failures in exam, boarding in school, and low school connectedness were risk factors for suicidal ideation and attempt [12,24,25], whereas having helpful student peers was a protective factor [25].

There are a number of factors associated with suicidal ideation and attempt that were universal across all three cities. As corroborated by other studies, females were more likely to report suicidal ideation and attempt in all three cities [3,4,9,12,21,24,25]. In fact, more than 72% of youth who reported attempted suicide in Vietnam were females. Higher suicide rates among females in China challenge trends in Western nations that suggest males have higher completed suicide rates because they use methods that are more lethal [21,27–29]. Moreover, some theorize that young female's (aged 15–34 years) high suicide rate (30.5/100,000) may be a response to societal stress rather than an association with mental/psychiatric disorders [4]. To date, there is no consensus as to why young females experience higher rates of suicide, although China's social and political context may play a role.

One clue, however, may lie in two counter-intuitive findings of the present study. Specifically, we see that those who lived outside the home with relatives were significantly less likely to have suicidal thoughts than those living with parents. The same was seen among those living with friends. This suggests that while we generally view parents as a source of support reducing the risk of suicidality [30], such may not be the case especially for females in Asia. This warrants further evaluation.

A number of youth risk factors were also associated with suicidality. For example, youth who smoked cigarettes in the past month were 1.85 times as likely to report suicidal ideation, and those who drank alcohol in the past month were 1.49 times as likely to report suicidal ideation compared with individuals who did not. In a study among 454 males in China that analyzed data taken from a national psychological autopsy study, those with alcohol use disorder were more likely to have previously attempted suicide compared with individuals without alcohol use disorder [31]. Although the study was not conducted among adolescents, it demonstrates the need for tailored intervention strategies among substance users, particularly because youth are experimenting with drugs and alcohol for the first time in their lives.

Participants who had experienced suicidal ideation or attempt were most likely to indicate peers, parents, and health professionals as the three most likely sources of support. More than 28% reported that they would not seek help from anyone—almost half of 15–24-year-olds in Hanoi indicated that they would not seek help. This is surprisingly high given this question was asked of those who had previously thought of committing suicide or attempted suicide in the past 12 months. This suggests that there is an unmet need of mental health services for young people in all three cities. In addition, males are less likely to seek mental help compared with females, and sources of support differ across gender: males are more likely to turn to parents and peers, whereas females are more likely to talk to peers and health professionals.

There are several potential limitations to the study. First, suicidal behaviors were self-reported. Because stigma associated with mental health disorders continues to persist in Asian cultures, youth may underreport these behaviors. However, because data on suicidal thoughts and attempts are severely limited, especially among Asian youth, self-reported measures are an important source of information. Moreover, use of computer-assisted interview software is likely to help with biased reports, as other studies have demonstrated more honest reporting of other risk behaviors among similar populations [32,33]. Second, the study is cross-sectional, which limits our ability to establish causality. Longitudinal studies, particularly concerning psychosocial factors beginning in early adolescence, are necessary for future research. Finally, the study was conducted in three cities in Asia—Hanoi, Shanghai, and Taipei. Therefore, the extent to which these results may be generalized to other areas of those countries or to other parts of Asia is unknown.

Conclusion

Despite these limitations, there are a number of mental health program implications from this exploratory study. First, understanding risk and protective factors from a social–ecological perspective may help inform intervention programs. Using Bronfenbrenner's ecological framework allows public health practitioners and mental health workers to develop multilevel approaches as well as to target discrete factors that contribute to this complex public health issue of youth [15]. The present data suggest that individual-level strategies should be targeted toward younger females, and using a systems-level approach, multiple sources of support should be integrated. So too, attention needs to be paid to the role of families as a potential stressor in the lives of young people. Whether this is a function of expecta-

tions, academic pressures to excel, or evolving and conflicting social roles and expectations remain to be seen.

Although there appear to be universal risk and protective factors, understanding unique factors specific for each community allows for tailored strategies. With increasing suicide rates and mental health disorders, public health campaigns and services are especially important to better serve young people's needs. The pace of social change, rising expectations for academic performance, urbanization, and changing gender roles and family relationships all suggest that unless we are attentive to the issues and pressures facing Asian youth, suicide trends will only escalate.

Appendix. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.jadohealth.2011.12.006.

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