



# HHS Public Access

Author manuscript

*J Affect Disord.* Author manuscript; available in PMC 2016 November 01.

Published in final edited form as:

*J Affect Disord.* 2015 November 1; 186: 198–202. doi:10.1016/j.jad.2015.06.025.

## Associations between the timing of childhood adversity and adulthood suicidal behavior: A nationally-representative cohort

Hyoungh Yoon Chang<sup>a,b,c</sup>, Yeonseung Chung<sup>d</sup>, Katherine M. Keyes<sup>e</sup>, Sun Jae Jung<sup>f</sup>, and Seung-Sup Kim<sup>g,\*</sup>

<sup>a</sup>Department of Psychiatry, College of Medicine, Ajou University, Gyeonggi-do, Republic of Korea

<sup>b</sup>Sunflower Center of Southern Gyeonggi for Women and Children Victims of Violence, Suwon, Republic of Korea

<sup>c</sup>Center for Traumatic Stress, Ajou University Medical Center, Suwon, Republic of Korea

<sup>d</sup>Department of Mathematical Sciences, Korea Advanced Institute of Science and Technology, Daejeon, Republic of Korea

<sup>e</sup>Department of Epidemiology, Columbia University Mailman School of Public Health, New York, US

<sup>f</sup>Department of Preventive Medicine, Seoul National University College of Medicine, Seoul, Republic of Korea

<sup>g</sup>Department of Public Health Sciences, Korea University, Seoul, Republic of Korea

### Abstract

**Background**—Although childhood adversities (CAs) are known to be associated with later suicidal behavior, it is uncertain whether the timing of specific CAs may influence this association.

**Methods**—We analyzed nationally representative data for 9205 participants from the Korean Welfare Panel Study. Four different CAs (parental death, parental divorce, suspension of school education and being raised in a relative's house due to financial strain) were assessed and were categorized as early childhood and adolescent onset. Lifetime experiences of suicidal behaviors along with the age of the first time experience were recorded. Cox regression was used.

**Results**—After adjusting for age, sex, and childhood socioeconomic status, parental death before the age of 12 was associated with adulthood suicidal behavior (ideation HR 1.35, 95% CI 1.13,

\*Correspondence to: 368 Hana Science Hall B, Anam-dong 5-ga, Seongbuk-gu, Seoul 136-713, Republic of Korea. Fax: +82 2 940 2877. ssk3@korea.ac.kr. .

#### Declaration of interest

There was no financial support for this research.

#### Conflict of interest

None to declare.

#### Author disclosure

Hyoungh Yoon Chang and Seung-Sup Kim designed the study and HY Chang wrote the draft of the paper. Yeonseung Chung conducted the statistical analysis and validation process. Sun Jae Jung and Katherine M. Keyes provided critical comments. SS Kim oversaw the whole process.

1.61; attempt HR 1.60, 95% CI 1.02, 2.52), while suspension of school due to financial strain was associated with suicidal behavior when it occurred at adolescence (ideation HR 1.48, 95% CI 1.22, 1.79; plan HR 1.69, 95% CI 1.16, 2.48). When we also adjusted for adulthood SES, which is a potential mediator, there was no significant change except that the association between early parental death and suicidal attempt became non-significant (HR: 1.43, 95% CI: 0.92, 2.26).

**Limitations**—Experience of CA was assessed retrospectively, and the assessment of suicidal attempt was not specifically defined. There could be selection bias due to loss to the follow-up.

**Conclusions**—There may be a critical period for the effect of CA on later suicidal behavior depending on the characteristics of CA.

## Keywords

Childhood adversity; Suicidal ideation; Attempted suicide; Epidemiology; Republic of Korea

## 1. Introduction

Suicide is a serious public health problem worldwide, exhibiting a 60% increase over the last 45 years (WHO, 2011). In South Korea the suicide rate is the highest among Organization for Economic Cooperation and Development (OECD) countries and is rapidly increasing (Organization for Economic Cooperation and Development, 2007). Suicide attempt, which is estimated to be approximately 25 times for every 1 completed suicide (Substance Abuse and Mental Health services Administration, 2014), yields morbidity to attempters themselves (Goldman-Mellor et al., 2014) and to those close to them (Geulayov et al., 2014). A growing body of studies reported that childhood adversity, such as experience of parental divorce, abuse, or neglect, could be a central antecedent factor in the development of adulthood suicidal behavior (Bruffaerts et al., 2010). In a recent study based on a nationwide community sample of Korea, paternal and maternal death during before the age of 18 was significantly associated with lifetime suicide attempt (Jeon et al., 2013).

Several limitations exist in previous studies. Few studies have examined the association between specific periods of adversity occurrence and later suicidal behaviors. The effect of childhood adversities may be different based on the timing of such events, which can provide insight on when to intervene and on the impact of adversity on the individual. Second, childhood adversities related to financial strain were not considered in these studies, although a growing body of literature suggests that there is an association between economic troubles and suicidal behaviors in Asia (Chang et al., 2009). Furthermore, past studies did not control for childhood socioeconomic status, which is an important confounder that could influence both the experience of childhood adversity and later suicidal behaviors (Strand and Kunst, 2006). Finally, studies on the relationship between childhood adversities and suicidal behavior in Asian countries are scarce. It is not clear whether prior findings could be generalized to explain suicidal behaviors in Asian countries.

In this study, we assessed four types of adversities (parental death, parental divorce, suspension of school education due to financial strain, and being raised in a relative's house due to financial strain) and classified each adversity into two categories based on the timing

of occurrence: early childhood (0–12 years old) or adolescence (13–17 years old). Then, the association between each CA and lifetime experiences of three kinds of suicidal behaviors (ideation, plan, and attempt) was examined, after adjusting for potential confounders, using a nationally-representative dataset in South Korea. Further, the change in the association was investigated after additional adjustment for adulthood SES, which is a potential mediator (Harper et al., 2002). We hypothesized that, while all four kinds of childhood adversities will be associated with increased adulthood suicidal behavior (Kim et al., 2013), adversities related to attachment (parental death or divorce) will show higher effect when occurring during early childhood and adversities related to financial difficulties (suspension of school education due to financial strain or being raised in a relative's house due to financial strain) will exhibit stronger influence when occurring during adolescence.

## 2. Methods

We analyzed data from the Korea Welfare Panel Study (KOWEPS), a nationally representative longitudinal survey. Participants were recruited by a two-stage stratified cluster sampling, and the annual survey was conducted by the Korean Institute of Social and Health Affairs with the Social Welfare Research Institute of Seoul National University. To date, data from the 1st through 9th waves of KOWEPS have been publicly released, and the datasets with the user guide can be downloaded from the website ([www.koweps.re.kr](http://www.koweps.re.kr)). This study received Institutional Review Board exemption from the Office of Human Research Administration at the Korea University because the study comprised archival data.

At the 1st wave (2006), four questions were asked concerning the experience of childhood adversities: “During your childhood (0–17 years), did you ever experience (1) divorce of parents, (2) death of parents, (3) being raised in a relative's house due to financial strain in your family, and (4) suspension of school education due to financial strain in your family?” Response options were binary (yes/no). For each adversity, people who answered ‘Yes’ were required to report the ages of the first time experience of the event. The CAs were categorized as early childhood (before 13 years of age) and adolescent onset (after 13 years old). At the 6th wave (2011), three questions on lifetime suicidal behaviors were asked: “Have you ever (1) thought about committing suicide thoroughly (ideation), (2) planned to commit suicide concretely (plan), (3) tried to commit suicide (attempt)?” Those who responded ‘Yes’ for any suicidal behavior were required to report the age of first suicidal behavior occurrence. Age, sex, income, education, and four kinds of childhood SES variables (i.e., education and occupation of each parent) were expected to be associated with both CAs and lifetime suicidal behaviors, so they were considered as potential confounders in accordance with previous literature (Gilman et al., 2002; Harper et al., 2002). We also examined how the association changed when we additionally adjusted for adulthood SES.

Chi-square tests were used to assess the distributions of population characteristics. *P*-value of less than 0.05 was considered significant. Cox proportional hazard regressions were used to examine the relationships between early childhood- and adolescent-onset CA and each lifetime suicidal behavior, adjusting for potential confounders. The reference group was those not experiencing the CAs. For people who experienced a lifetime suicidal behavior, the age of the first experience was recorded as a time to event. Meanwhile, people not

experiencing a lifetime suicidal behavior were considered as censored observations, and the age at the 6th wave of the KOWEPS was recorded as a censoring time. In the survival analysis, we excluded one person who experienced a CA after the occurrence of the lifetime suicidal behavior to guarantee temporal order between CA and suicidal behaviors. The proportional hazard assumption was checked before reporting the results. Data are reported as hazard ratios (HR) with 95% confidence intervals (CI). All analyses were performed using R statistical software.

### 3. Results

Among the 18,856 participants at baseline, 68.5% (12,925) were retained at the 6th wave. We excluded 1950 who were less than 18 years old and 1770 with missing data. Among 9205 participants included in our analysis, 2840 (30.9%) reported at least one CA experience.

Table 1 presents the distribution of the study population and the prevalence of three types of lifetime suicidal behaviors by sex, age, and each of the childhood SES variables (i.e., education and occupation of each parent). Based on a chi-square test, the prevalences of all three lifetime suicidal behaviors were significantly higher for females, older persons, and people with less-educated mothers.

Parental death during early childhood was significantly associated with lifetime suicidal ideation (HR 1.35, 95% CI: 1.13, 1.61) and attempt (HR 1.60, 95% CI: 1.02, 2.52) but not parental death during adolescence. In contrast, suspension of school due to financial strain was associated with suicidal behaviors if it occurred during adolescence (ideation HR 1.48, 95% CI: 1.22, 1.79) but not if it happened in early childhood. The associations remained significant after additionally adjusting for adulthood SES (i.e., education and income of the respondents) except that the association between early parental death and suicidal attempt was attenuated (HR: 1.43, 95% CI: 0.92, 2.26). Parental divorce and being raised in a relative's house due to financial strain were both related to suicidal behavior regardless of the onset period of the adversity (Table 2).

### 4. Discussion

To our knowledge, this is the first study to address the relationship of the timing of childhood adversity and adulthood suicidal behaviors. In a sample nationally representative of South Korea, we examined the association between childhood adversities, including those due to financial strain, and lifetime suicidal behaviors after adjusting for childhood and adulthood SES. Suicidal behavior was related to parental death when the parent's death occurred during early childhood. In contrast, school suspension only affected suicidal behavior when it occurred during adolescence. Together with previous ecological studies that examined the association between social integration, especially the divorce rate, and suicide rates in South Korea (Ben Park and Lester, 2006), our results may help reveal the underlying risk factors for the unusually high prevalence of suicide death.

Findings on parental death and divorce are partially consistent with previous findings that reported a significant association between parental death or divorce and suicidal behaviors

(Lizardi et al., 2009). On the other hand, our study found that those who experienced the death of their parents during adolescence were not more likely to develop suicidal ideation or plan or attempt suicide, and that the effect of parental death may only exist when the death occurred before adolescence. Loss of a caregiver may affect attachment and later psychopathology only when it occurs at a younger age, while the effect on intrapsychic structure is weaker once the attachment system has been founded, possibly starting from the adolescence period (Bowlby, 1978). In contrast to parental death, parental divorce is shown to affect later psychopathology regardless of the event timing, which is consistent with previous studies that report on the disrupted parent-child relationship and long term psychosocial effects of children of divorced parents (Lacey et al., 2014). This suggests that separation by human cause (e.g., divorce) may have a stronger and more prolonged negative impact on the individual compared to causes with an external locus of control, such as death.

A growing literature suggests that there is an association between economic troubles and suicidal behaviors in Asia (Chang et al., 2009). In this study, we found that experiencing suspension of middle or high school education due to financial strain had a significant association with suicidal ideation, plan, and attempt, even after controlling for childhood SES variables. Suspension of elementary education may be relatively easier to recover compared to higher education. This finding, which is consistent with a previous study that reported a significant association between interrupted schooling and adulthood depressive symptoms (Kim et al., 2013), implies the magnitude of educational status for one's lifetime opportunity in Korean society. A previous study reported that the most common cause of experiencing discrimination in the workplace in South Korea was educational attainment (Kim and Williams, 2012).

Several limitations should be noted. First, there could be selection bias due to loss to follow-up. In a post-hoc analysis, we found that those who dropped out of the study tended to have worse childhood SES than those who did not. Although follow-up rate at the 9th wave was relatively high (68.5%), our results need to be interpreted carefully due to this potential selection bias. Second, the experience of childhood adversity was assessed retrospectively. Nonetheless, childhood adversities such as parent death or parental divorce are less prone to recall bias because they designate a definite life event. Third, the definition of suicidal attempt was not specific.

Our study has several strengths. First, to our knowledge, this is the first research to examine the association between the timing of childhood adversity and adulthood suicidal behaviors. Second, this is the first study to be conducted in a nationally representative sample in South Korea. Combined with previous work on the link between social integration and suicide rates in South Korea (Ben Park and Lester, 2006), this study may help uncover the underlying risk factors for increasing rates of suicide. Third, the large study population allowed us to examine the association between CAs and suicidal behaviors despite the relative rarity of suicidal outcome. Finally, we could adjust for childhood SES, which may influence both CA and adulthood suicidal behaviors (Gilman et al., 2002), as a potential confounder.

In conclusion, this research found that the different childhood adversities are associated with higher prevalence of adulthood suicidal behaviors in South Korea. Our findings imply that early intervention on adversities aimed at critical time periods may be an important strategy to reduce suicide throughout the life course. In addition, future research is needed on the mechanisms by which childhood adversity could cause suicide behavior.

## Acknowledgments

None.

Role of funding source

None.

## References

- Ben Park BC, Lester D. Social integration and suicide in South Korea. *Crisis*. 2006; 27:48–50. [PubMed: 16642916]
- Bowlby J. Attachment theory and its therapeutic implications. *Adolesc. Psychiatry*. 1978; 6:5–33. [PubMed: 742687]
- Bruffaerts R, Demyttenaere K, Borges G, Haro JM, Chiu WT, Hwang I, Karam EG, Kessler RC, Sampson N, Alonso J, Andrade LH, Angermeyer M, Benjet C, Bromet E, de Girolamo G, de Graaf R, Florescu S, Gureje O, Horiguchi I, Hu C, Kovess V, Levinson D, Posada-Villa J, Sagar R, Scott K, Tsang A, Vassilev SM, Williams DR, Nock MK. Childhood adversities as risk factors for onset and persistence of suicidal behaviour. *Br. J. Psychiatry: J. Ment. Sci.* 2010; 197:20–27.
- Chang SS, Gunnell D, Sterne JA, Lu TH, Cheng AT. Was the economic crisis 1997–1998 responsible for rising suicide rates in East/Southeast Asia? A time-trend analysis for Japan, Hong Kong, South Korea, Taiwan, Singapore and Thailand. *Soc. Sci. Med.* (1982). 2009; 68:1322–1331.
- Geulayov G, Metcalfe C, Heron J, Kidger J, Gunnell D. Parental suicide attempt and offspring self-harm and suicidal thoughts: results from the Avon Longitudinal Study of Parents and Children (ALSPAC) birth cohort. *J. Am. Acad. Child Adolesc. Psychiatry*. 2014; 53:509–517. [PubMed: 24745951]
- Gilman SE, Kawachi I, Fitzmaurice GM, Buka SL. Socioeconomic status in childhood and the lifetime risk of major depression. *Int. J. Epidemiol.* 2002; 31:359–367. [PubMed: 11980797]
- Goldman-Mellor SJ, Caspi A, Harrington H, Hogan S, Nada-Raja S, Poulton R, Moffitt TE. Suicide attempt in young people: a signal for long-term health care and social needs. *JAMA Psychiatry*. 2014; 71:119–127. [PubMed: 24306041]
- Harper S, Lynch J, Hsu WL, Everson SA, Hillemeier MM, Raghunathan TE, Salonen JT, Kaplan GA. Life course socioeconomic conditions and adult psychosocial functioning. *Int. J. Epidemiol.* 2002; 31:395–403. [PubMed: 11980802]
- Jeon HJ, Hong JP, Fava M, Mischoulon D, Nyer M, Inamori A, Sohn JH, Seong S, Cho MJ. Childhood parental death and lifetime suicide attempt of the opposite-gender offspring in a nationwide community sample of Korea. *Suicide Life-Threat. Behav.* 2013; 43(6):598–610. [PubMed: 23834109]
- Kim SS, Jang H, Chang HY, Park YS, Lee DW. Association between childhood adversities and adulthood depressive symptoms in South Korea: results from a nationally representative longitudinal study. *BMJ Open*. Jul 21.2013 3(7)
- Kim SS, Williams DR. Perceived discrimination and self-rated health in South Korea: a nationally representative survey. *PLoS One*. 2012; 7:e30501. [PubMed: 22272357]
- Lacey RE, Bartley M, Pikhart H, Stafford M, Cable N. Parental separation and adult psychological distress: an investigation of material and relational mechanisms. *BMC Public Health*. 2014; 14:272. [PubMed: 24655926]

- Lizardi D, Thompson RG, Keyes K, Hasin D. Parental divorce, parental depression, and gender differences in adult offspring suicide attempt. *J. Nerv. Ment. Dis.* 2009; 197:899–904. [PubMed: 20010025]
- Organization for Economic Cooperation and Development. OECD health report. Organization for Economic Cooperation and Development; Paris: 2007.
- Strand BH, Kunst A. Childhood socioeconomic status and suicide mortality in early adulthood among Norwegian men and women. A prospective study of Norwegians born between 1955 and 1965 followed for suicide from 1990 to 2001. *Soc. Sci. Med.* (1982). 2006; 63:2825–2834.
- Substance Abuse and Mental Health Services Administration. Results from the 2013 National Survey on Drug Use and Health: Summary of National Findings. Substance Abuse and Mental Health Services Administration. , editor. Rockville, MD: 2014.
- WHO. Suicide Prevention (SUPRE). 2011. [http://www.who.int/mental\\_health/prevention/suicide/suicideprevent/en/](http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/)

**Table 1**

Distribution of study population and the prevalence of the three lifetime suicidal behaviors (i.e., ideation, plan, and attempt) by each covariate ( $N=9205$ ).

Covariates	Total Prevalence of lifetime suicidal ideation			Prevalence of lifetime suicidal plan		Prevalence of lifetime suicidal attempt	
	<i>N</i>	<i>N</i> (%)	<i>P</i> *	<i>N</i> (%)	<i>P</i> *	<i>N</i> (%)	<i>P</i> *
Sex			<0.001		0.004		<0.001
Male	4052	413 (10.2)		74 (1.8)		41 (1.0)	
Female	5153	751 (14.6)		143 (2.8)		98 (1.9)	
Age (years)			<0.001		<0.001		0.001
18–29	443	33 (7.4)		5 (1.1)		3 (0.7)	
30–39	1465	151 (10.3)		24 (1.6)		15 (1.0)	
40–49	1765	222 (12.6)		31 (1.8)		20 (1.1)	
50–59	1563	237 (15.2)		56 (3.6)		40 (2.6)	
60 or more	3969	521 (13.1)		101 (2.5)		61 (1.5)	
Education			<0.001		<0.001		<0.001
No education	4186	594 (14.2)		131 (3.1)		89 (2.1)	
Elementary school graduate	2711	366 (13.5)		61 (2.3)		36 (1.3)	
Junior high school graduate	771	72 (9.3)		9 (1.2)		6 (0.8)	
High school graduate or more	1537	132 (8.6)		16 (1.0)		8 (0.5)	
Income			<0.001		<0.001		<0.001
Lowest quartile	2699	476 (17.6)		109 (4.0)		74 (2.7)	
Second lowest quartile	2167	299 (13.8)		54 (2.5)		29 (1.3)	
Third lowest quartile	2144	219 (10.2)		28 (1.3)		19 (0.9)	
Highest quartile	2195	170 (7.7)		26 (1.2)		17 (0.8)	
Education of father			0.014		0.161		0.442
No education	3254	433 (13.3)		90 (2.8)		55 (1.7)	
Elementary school graduate	3172	393 (12.4)		70 (2.2)		48 (1.5)	
Junior high school graduate	1051	155 (14.7)		28 (2.7)		18 (1.7)	
High school graduate or more	1728	183 (10.6)		29 (1.7)		18 (1.0)	
Education of mother			0.012		0.013		0.027
No education	4658	628 (13.5)		127 (2.7)		86 (1.8)	
Elementary school graduate	2834	357 (12.6)		68 (2.4)		40 (1.4)	
Junior high school graduate	884	103 (11.7)		14 (1.6)		6 (0.7)	
High school graduate or more	829	76 (9.2)		8 (1.0)		7 (0.8)	
Occupation of father			0.038		0.014		0.463
Non-manual	1164	124 (10.7)		18 (1.5)		13 (1.1)	
Manual	7771	998 (12.8)		187 (2.4)		121 (1.6)	
Others	270	42 (15.6)		12 (4.4)		5 (1.9)	
Occupation of mother			0.372		0.016		0.063
Non-manual	80	8 (10.0)		0 (0.0)		0 (0.0)	
Manual	6605	844 (12.8)		153 (2.3)		97 (1.5)	



Covariates	Total Prevalence of lifetime suicidal ideation			Prevalence of lifetime suicidal plan		Prevalence of lifetime suicidal attempt	
	<i>N</i>	<i>N</i> (%)	<i>P</i> *	<i>N</i> (%)	<i>P</i> *	<i>N</i> (%)	<i>P</i> *
Others	2520	312 (12.4)		64 (2.5)		42 (1.7)	
Number of childhood adversities			<0.001		<0.001		<0.001
0	6365	723 (11.4)		123 (1.9)		77 (1.2)	
1	2137	322 (15.1)		70 (3.3)		47 (2.2)	
2	576	94 (16.3)		19 (3.3)		9 (1.6)	
3 or 4	127	25 (19.7)		5 (3.9)		6 (4.7)	

\* *P*-values from a chi-square test.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 2

Hazard ratio for childhood adversities and lifetime suicidal behaviors.

	Lifetime suicidal ideation			Lifetime suicidal plan			Lifetime suicidal attempt					
	Model I		Model II	Model I		Model II	Model I		Model II			
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI		
Age of childhood adversities occurrence												
Parental death												
0–12 year	1.35**	(1.13, 1.61)	1.30**	(1.09, 1.56)	1.41	(0.97, 2.05)	1.30	(0.89, 1.89)	1.60**	(1.02, 2.52)	1.43	(0.92, 2.26)
13–17 year	1.00	(0.78, 1.29)	0.98	(0.77, 1.26)	0.85	(0.47, 1.54)	0.80	(0.44, 1.45)	0.77	(0.36, 1.68)	0.73	(0.34, 1.58)
Parental divorce												
0–12 year	2.15*	(1.11, 4.17)	1.89	(0.97, 3.67)	4.71**	(1.62, 13.69)	3.61*	(1.24, 60.52)	3.13	(0.72, 13.64)	2.43	(0.56, 10.50)
13–17 year	1.72	(0.66, 4.47)	1.65	(0.63, 4.32)	5.46**	(1.23, 24.27)	5.20*	(1.16, 22.38)	9.01*	(1.99, 40.65)	9.69**	(2.00, 41.39)
Suspension of school due to financial strain												
0–12 year	0.96	(0.75, 1.23)	0.90	(0.70, 1.16)	0.75	(0.42, 1.35)	0.64	(0.36, 1.15)	1.17	(0.62, 2.20)	0.95	(0.51, 1.78)
13–17 year	1.48*	(1.22, 1.79)	1.49**	(1.22, 1.82)	1.69*	(1.16, 2.48)	1.48	(0.99, 2.19)	1.64*	(1.02, 2.64)	1.34	(0.82, 2.19)
Being raised in a relative's house due to financial strain												
0–12 year	1.62**	(1.13, 2.35)	1.52*	(1.05, 2.19)	0.73	(0.26, 2.04)	0.63	(0.23, 1.76)	1.65	(0.65, 4.18)	1.37	(0.54, 3.48)
13–17 year	1.12	(0.62, 2.03)	1.12	(0.62, 2.02)	2.39	(0.95, 5.99)	2.28	(0.91, 5.75)	2.99*	(1.08, 8.31)	2.88*	(1.04, 8.00)

Reference: Participants without childhood adversities

Model I: Adjusted for age, sex, and childhood SES variables (i.e., education and occupation of each parent).

Model II: In addition to model I, adjusted for adulthood SES variables (i.e., education and income of the respondent).

\*  $p$ -value < 0.05.\*\*  $p$ -value < 0.01.