

**Childhood Poly-victimization on Children's Health:
A Nationally Representative Study**

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Effects of Childhood Poly-victimization on Children's Health: A Nationally Representative Study

Abstract

Background: Although research on the negative effects of childhood poly-victimization is substantial, few studies have examined the relationship between poly-victimization and younger children's physical health and diseases.

Objective: This study examines the effects of poly-victimization on children's health problems requiring medical attention.

Methods: We collected data with a self-report questionnaire from a national proportionately stratified sample of 6,233 4th-grade students covering every city and county in Taiwan.

Results: Logistic regression analyses demonstrate a significant dose-response relationship between children's poly-victimization exposure and their health problems including hospitalization, serious injury, surgery, daily-medication requirements, heart murmurs, asthma, dizziness or fainting, allergies, kidney disease, special therapy, smoking, and alcohol use. The results indicate that children's risk of having a health problem grew significantly with each increase in the number of victimization types that children experienced.

Conclusions: These research findings underscore the effect of poly-victimization on children's health problems requiring medical attention, and stress the need for both proper screening methods for children's exposure to poly-victimization and stronger awareness of poly-victimization's effects on health conditions in healthcare clinics.

Keywords:

Childhood victimization, poly-victimization, adverse childhood experiences, pediatric health outcome, health

Introduction

Maltreatment of children occurring in homes, schools, and other parts of communities is a global public-health problem with severe life-long consequences (World Health Organization & International Society for the Prevention of Child Abuse & Neglect, 2006). Recent growing research demonstrates that children's cross-context exposure to multiple types of violence and victimization (i.e., poly-victimization) has immediate and lifelong damaging effects on victims' physical health, mental health, and behavior (e.g., Edwards, Holden, Felitti, & Anda, 2003; Flaherty et al., 2009; Ford, Elhai, Connor, & Frueh, 2010; Shen, 2009; Turner, Shattuck, Finkelhor, & Hamby, 2017). Specifically, the cumulative effects of poly-victimization (such as neglect, child abuse, sexual abuse, bullying, and community violence) place children at high risk for poorer health, posttraumatic stress disorder (PTSD), psychiatric disorders, substance abuse, internet addiction, suicide, delinquency, self-harm, and other-harming behavior (Chan, 2013; Hsieh et al., 2016; Norman et al., 2012; Shen et al., 2016; Tossone et al., 2015; Turner, Finkelhor, & Ormrod, 2006).

In adults, the cumulative effects of childhood poly-victimization on health outcomes have also been found across a variety of physical and mental illnesses (Anda et al., 2006; Bellis et al., 2014; Felitti et al., 1998; Flaherty et al., 2013; Flaherty et al., 2006; Flaherty et al., 2009). Focusing on adverse childhood experiences (ACEs), Hughes et al. (2017) conducted a systematic review and meta-analysis of 37 studies in order to undertake a comparison between the health outcomes for 16-or-older individuals with at least 4 of the ACEs and the health outcomes for 16-or-older individuals with no ACEs. The researchers calculated the pooled odds ratios to

estimate the associations between multiple victimizations and risks for individuals' health outcomes. The effects of multiple traumas were weak (ORs: <2) for physical inactivity, overweightness or obesity, and diabetes, moderate (ORs: 2–3) for smoking, heavy alcohol use, poor self-rated health, cancer, and chronic disease (cardiovascular and respiratory diseases and cancer), strong (ORs: 4–6) for sexual-health outcomes (multiple sexual partners, sexually transmitted infection, and teenage pregnancy), mental illness, and problematic alcohol use, and strongest (ORs: ≥ 7) for problematic drug use, violence victimization and perpetration, and suicide attempt (OR = 30.14). The World Mental Health surveys found that childhood adversities accounted for 30% of participants' lifetime DSM-IV mental disorders across 21 countries (Kessler et al., 2010).

Furthermore, research demonstrates that a dose-response relationship is evident between the number of childhood-victimization types and the level of adult-disease risk including ischemic heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease, which are the leading causes of adult deaths in the United States (Felitti et al., 1998). However, research has been less systematic in assessing the effects of childhood victimization on the health outcomes of children and adolescents. Existing studies about the short-term effects of childhood traumatic stress have focused mostly on adolescents' mental health and behavioral problems (Brown et al., 2017; Cecil, Viding, Fearon, Glaser, & McCrory, 2017). More recently, researchers have begun to examine and establish the path from childhood adversities to physical ailments including asthma, cardiovascular disease, and self-perceived health among youth (Duke & Borowsky, 2018; Pretty, O'Leary, Cairney, & Wade, 2013; Schreier, Chen, & Miller, 2016).

Oh et al. (2018) conducted a systematic review of 35 longitudinal cohort studies to examine the effects of childhood adversity on children's health outcomes including physical and cognitive

development, biomarkers of endocrine and immune functions, telomeres, obesity and other indicators of health and illness. The researchers found that exposure to violence and adversities during childhood are significantly associated with cognitive delay, asthma, infection, somatic complaints, sleep disturbance, and alterations in inflammatory, immune, and autonomic nervous functions. No effects on body height or onset of menarche were found. Evidence on cortisol levels and overweightness (including obesity) in children was mixed. Dose-response effects of childhood adversities on telomere length and somatic complaints were more pronounced.

Childhood-health conditions are a strong predictor of morbidity and mortality in adulthood (Case, Fertig, & Paxson, 2005). Prospective studies on ACEs in children help researchers reliably document adverse experiences and examine the onset times of victimization and its more immediate effects on children's health and development. Although research on the negative effects of childhood poly-victimization is substantial, few studies have examined the relationship between poly-victimization and younger children's physical health and diseases in Chinese societies. Therefore, the present study examines the effects of poly-victimization on children's health problems requiring medical attention. On the basis of prior research findings, we hypothesize that there is a dose-response relationship between poly-victimization and health problems among Taiwanese children.

Methods

Participants

This study took place in the spring semester of 2014 with 6,233 4th-grade students (10 to 11 years old) from 314 primary schools. Before the formal data collection got underway in 2014, a pilot study took place in the fall semester of 2013 with 726 4th-grade students, mainly as a way

to test the psychometrics of the measures. Of the sampled schools ($n = 34$) in the pilot study, 35.3% ($n = 12$) agreed to participate. Some measures were modified according to not only students' responses but also the results of the reliability and validity analyses from the pilot study.

The formal sample was proportionately stratified according to each county and each city in Taiwan (19 counties and cities in total, excluding outlying islands). The counties and cities were first divided into urban or rural areas, and districts within each area were randomly selected. All the primary schools in each selected district were invited to participate in the study. There were 2,583 primary schools (213,226 4th-grade students) in Taiwan in the 2013–2014 academic year (ROC Ministry of Education, 2015; excluding outlying islands), and we sampled 25% of the total primary schools in Taiwan via stratified random sampling. Of the sampled schools, 49% agreed to participate in this study. At the participating schools ($n = 314$), 99.9% of the consenting parents' children agreed to participate, and we collected 6,290 questionnaires in total. Of the 6,290 questionnaires, 57 were invalid and excluded from the analyses (owing mostly to incomplete signatures of either parents or children), so that the valid sample size was 6,233. There were significant geographical differences between participating schools and non-participating schools. The average northern Taiwanese school-participant rates were lower than the average national school-participant rates, and the average eastern Taiwanese school-participant rates were higher than the average national school-participant rates.

Procedure

The present study received approval from the Research Ethics Committee of National Taiwan University Hospital before sampling and data collection took place. After sampling the

schools for the data-collection process, we contacted the school principals for their consent to the schools' participation in the study. The schools whose principals agreed to the participation then asked the students to give their parents both a letter explaining the study and a form requesting an informed-consent signature. Children whose parents signed the informed-consent forms brought the forms back to the school teachers. Afterward, the research assistants consulted with the teachers in order to schedule a date for data collection.

Before administering the questionnaires, trained research assistants collected the informed-consent forms and explained the research purpose and procedures to students who had parental written consent, emphasizing the study's voluntary and confidential nature. Research assistants also informed students of their right to forgo or withdraw their participation at any time. Self-report questionnaires were distributed to consenting students in group sessions, scheduled for times during or outside regular class hours (depending on each school's preferences). For their participation, children received stationery as a gift.

Measures

Measures included in the self-reporting paper-and-pen questionnaire provided information about demographic and family background, violence experiences, substance-use behaviors, and health problems. The questionnaire was first sent to a group of 7 experts for content-validity examination (4 child-development scholars, 1 sociologist, 1 clinical social worker, 1 statistician) before the measures were administered to pilot-study participants. Some measures were modified according to experts' and scholars' suggestions, as well as to the results of internal-consistency and principal-component analyses after the pilot study. Psychometrics of these measures were examined again after formal data were collected. It is worth noting that other researchers have

used self-report questionnaires to collect data from 10 to 12 year olds regarding violence-victimization experience (e.g., Holt, Finkelhor, & Kantor, 2007).

Childhood victimization. We measured seven child-victimization types (please see author citation for all scale items): physical neglect (4 items), psychological violence (4 items for father and the same 4 items for mother), physical abuse (7 items for father and the same 7 items for mother), sexual violence (2 items), inter-parental violence (2 items), bullying (7 items covering verbal, physical, and relational bullying), and community violence (2 items). We adopted, modified, and simplified these self-report items from related instruments to suit the participants' cognitive ability and level of understanding (Furlong et al., 2005; Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998; Runyan et al., 1998; Walsh, MacMillan, Trocmé, Jamieson, & Boyle, 2008; Zolotor et al., 2009). Participants used a 5-point Likert scale to rate the frequency at which they had experienced each item in the preceding year. The responses for all items were coded as 0 = never, 1 = 1–2 times, 2 = 3–5 times, 3 = 6–10 times, and 4 = more than 10 times. Participants were categorized as children who had experienced a type of victimization if they scored a 1 or more on any scale item, except for the physical-abuse items. We adopted a more conservative algorithm (definition 2, proposed by Walsh et al., 2008, p. 1,041) for categorizing participants as children who had experienced physical abuse (please see all scale items in another article; author citation). We constructed a summary count of exposures to victimization types, with the possible sums ranging from 0 (experienced no victimization) to 7 (experienced all seven types). All scales showed adequate internal-consistency reliability for the present sample (from $\alpha = .45$ for sexual violence to .88 for physical abuse). Regarding the construct validity of the victimization scale, on the basis of the principal component analyses, all the sub-scale victimization items were grouped together into eight factors consistent with this study's typology of victimization (the

physical-abuse items were grouped into two factors: fathers' and mothers' violence toward children). All the victimization items explained 58.7% of the total variance.

Health problems. We used 14 items selected from Child's Developmental History (CDH; Garber, 2012) and the Family Health History Questionnaire (FHHQ; Centers for Disease Control and Prevention [CDC], 2005) to measure children's tobacco and alcohol use (2 items; 'yes' or 'no') and health problems requiring medical attention (12 items; 'yes' or 'no'). Children were asked to check whether they had experienced hospitalization, serious injury, surgery, daily-medication requirements, heart murmurs, epilepsy, asthma, dizziness or fainting, allergies, diabetes, or kidney disease, and whether they had received therapy (for physical, occupational, or speech-language issues). Participants were categorized as having experienced health problems if 'yes' was a response to any of these 12 items. Participants were categorized as having experienced smoking and drinking if 'yes' was a response to the tobacco- and alcohol-use items. Moreover, participants' body-mass index (BMI) was calculated on the basis of their self-reported weight and height. Extreme outliers of BMI values ($\geq \pm 3 SD$) were excluded (Onis et al., 2007). For the current study, we used the BMI cut-off values in the International Obesity Task Force (IOTF)'s growth references to define the thinness, moderate overweightness, and obesity of 10-year-old boys and girls (World Obesity, 2014).

Control variables. Prior research has shown that children who experience multiple types of victimization tend to have risk factors related to sex (being a boy), neonatal status and congenital diseases, family adversity (e.g., having a parent who suffers from substance abuse or mental illness), and family structure (e.g., living with a single parent or a step-parent) (Chan, 2013; Finkelhor, Turner, Hamby, & Ormrod, 2011; Shen et al., 2016). Hence, we examined several additional measures as control variables in the statistical analyses, covering gender, parental

marital status, neonatal status, and other family-related risk factors. We used one self-report item to measure parental marital status. Responses were coded as “parents married or living together,” “single parent, parents separated, or divorced,” and “other.” We used one self-report item to assess the neonatal status of children. The participating children could select any of six responses regarding neonatal status: normal birth, premature birth, low birth weight, congenital disease, other, or unknown. Each item response was coded as 1 = yes or 0 = no. Participants were categorized as having had a neonatal condition if they reported having been born prematurely, having had a low birth weight, or having had a congenital disease.

We used six items in the Family Health History & Health Appraisal questionnaire (CDC, 2005) to examine other family risks that might affect children’s mental health and behavior. Participants were asked whether or not a parent or a sibling had experienced the following stressors: alcoholism, drug abuse, gambling, a suicide attempt, mental illness, or imprisonment (yes or no questions). We calculated total exposure to these family risks. Higher scores indicate greater exposure to other family risks (scores possible range 0–18).

Statistical Analyses

Descriptive statistics were used to describe sample demographics, experience of victimization, and health outcomes. We conducted chi-square analyses to examine the relationships between the students’ self-reported experience of victimization and their health problems. We conducted logistic regression analyses to test the dose-response effect that students’ experience of victimization had on their health outcomes.

Results

Sample Demographics

A total of 6,233 4th-grade students with parental consent and valid data were retained as the final sample of this study. Students in this study had a mean age of 10.5 ($SD = .4$), and were approximately equally distributed by gender (50.3% male, $n = 3,133$). Most students' parents (79.6%) were married or lived together. Of the total number of students, 825 (13%) reported experiencing various types of family trauma including mental health problems, substance abuse, or criminality among parents or siblings. Almost 1 in 10 students (9.3%) had a birth problem, be it premature birth, low-birth weight, or congenital disease.

Prevalence of victimization and health problems

Bully was the most common type of victimization (70.9%) and sexual violence (9.2%) was the least type of victimization among participants. Of the students, 70% reported experiencing more than one type of victimization, with 30% experiencing four or more types of victimization (Table 1). Most students (84%) had at least one health problem (Table 2). Almost half of the students had experienced hospitalization (45.4%) and allergy problems (43.5%). Experiences of serious injury (e.g., stab wounds, lacerations, or fractures) were also common among students (30.4%).

Table 1. Prevalence of poly-victimization ($n = 6,233$)

Victimization Type	n (%)
Bullying victimization	4421 (70.9)
Physical neglect	4138 (66.4)
Psychological abuse	2704 (43.4)
Witness to domestic violence	1734 (27.8)

Community violence	1352 (21.7)
Physical abuse	1315 (21.1)
Sexual violence	572 (9.2)
Number of victimization types	
None	670 (10.7)
1 type	1203 (19.3)
2 types	1350 (21.7)
3 types	1148 (18.4)
4 types	886 (14.2)
5 types	574 (9.2)
6 types	280 (4.5)
7 types	109 (1.7)
Missing	13 (0.2)

Associations between children’s experience of poly-victimization and their health outcomes

Compared to those with no victimization history, students who reported experiencing at least one type of victimization reported having more health problems involving overweightness & obesity, hospitalization, serious injury, surgery, dizziness/ fainting, allergy, special therapy, smoking, and alcohol use ($p < .05$) (Table 2).

Table 2. Students' health outcomes by victimization

Outcome	Victimization			χ^2 (<i>p value</i>)
	Total	Yes	No	
	(n = 6,233) n (%)	(n = 5,550) n (%)	(n = 670) n (%)	
Overweightness & Obesity ⁺	1218 (22.3)	1104 (22.7)	111 (18.6)	5.24 (.022)
Hospitalization ⁺	2832 (45.4)	2569 (46.6)	259 (38.9)	14.2 (< .001)
Serious injury ⁺	1895 (30.4)	1765 (32.4)	126 (18.9)	50.1 (< .001)
Surgery ⁺	733 (11.8)	683 (12.5)	49 (7.5)	14.0 (< .001)
Daily medication ⁺	226 (3.6)	210 (3.8)	16 (2.4)	3.4 (.066)
Heart murmurs	181 (2.9)	167 (3.0)	14 (2.1)	1.8 (.181)
Epilepsy	27 (0.4)	26 (0.5)	1 (0.1)	1.4 (.235)
Asthma	727 (11.7)	657 (11.8)	68 (10.1)	1.7 (.198)
Dizziness/ Fainting	735 (11.8)	691 (12.5)	43 (6.4)	20.9 (< .001)
Allergy	2712 (43.5)	2447 (44.1)	260 (38.8)	6.8 (.009)
Diabetes	33 (0.5)	29 (0.5)	4 (0.6)	0.1 (.802)
Kidney disease	24 (0.4)	23 (0.4)	1 (0.1)	1.1 (.296)
Special therapy ⁺	1144 (18.4)	1062 (19.3)	78 (11.7)	22.7 (< .001)

Smoking ⁺	131 (2.1)	125 (2.3)	6 (0.9)	5.4 (.020)
Alcohol use ⁺	1147 (18.4)	1099 (20.1)	47 (7.1)	66.6 (< .001)

⁺ missing values are not included in frequency tables

After controlling for students’ sex, parental marital status, birth problems, and experiences of family trauma, we identified a dose-response relationship among students’ poly-victimization exposure and their health problems, with the exception of epilepsy and diabetes (Table 3). The results indicate that children’s risk of having a health problem grew significantly with each increase in the number of victimization types that children experienced.

Table 3. Relationships between students’ experience of poly-victimization and their health problems (logistic regression analysis)

Outcome	OR (95% CI)	<i>p</i>	Adj OR* (95% CI)	<i>p</i>
Overweightness & Obesity	1.05 (1.01 - 1.09)	.014	1.03 (0.99 - 1.07)	.132
Hospitalization	1.09 (1.06 - 1.12)	< .001	1.08 (1.05 - 1.12)	< .001
Serious injury	1.22 (1.18 - 1.26)	< .001	1.21 (1.17 - 1.25)	< .001
Surgery	1.16 (1.11 - 1.21)	< .001	1.12 (1.07 - 1.18)	< .001
Daily medication	1.18 (1.09 - 1.27)	< .001	1.14 (1.06 - 1.24)	.001
Heart murmurs	1.22 (1.12 - 1.32)	< .001	1.20 (1.10 - 1.30)	< .001
Epilepsy	1.16 (0.94 - 1.43)	.161	1.11 (0.89 - 1.38)	.375
Asthma	1.10 (1.05 - 1.14)	< .001	1.08 (1.03 - 1.13)	.002
Dizziness/ Fainting	1.21 (1.15 - 1.26)	< .001	1.19 (1.14 - 1.25)	< .001

Allergy	1.04 (1.01 - 1.07)	.018	1.04 (1.01 - 1.07)	.007
Diabetes	1.08 (0.89 - 1.31)	.419	1.04 (0.85 - 1.27)	.703
Kidney disease	1.37 (1.10 - 1.71)	.005	1.29 (1.02 - 1.62)	.034
Special therapy	1.24 (1.19 - 1.29)	< .001	1.21 (1.16 - 1.25)	< .001
Smoking	1.59 (1.44 - 1.75)	< .001	1.45 (1.30 - 1.60)	< .001
Alcohol use	1.35 (1.30 - 1.40)	< .001	1.31 (1.26 - 1.36)	< .001

*Adjusted for students' sex, birth problem, experiences of family trauma, and parental marital status.

Discussion

We employed a large 'national population'-based sample to investigate the effects of poly-victimization on children's health problems. The present study's findings corroborate prior research (Chan, 2013; Oh et al., 2018) and reveal the significant and cumulative effects of poly-victimization on children's health problems. The present research findings add to the growing knowledge of poly-victimization by extending research to the understudied populations of Chinese children and by examining the effects of poly-victimization on children's health problems requiring medical attention. We found a significant dose-response relationship between children's exposure to poly-victimization and their health problems, including hospitalization, serious injury, surgery, daily-medication requirements, heart murmurs, asthma, dizziness or fainting, allergies, kidney disease, special therapy (for physical, occupational, or speech-language issues), smoking, and alcohol use.

Unlike past studies that focused on relationships between childhood adversity and children's overall health and life style (Duke & Borowsky, 2018; Flaherty et al., 2006), our study extended the scope of the focus to outcomes concerning specific medical conditions. Many

non-communicable illnesses, such as cardiovascular disease, type II diabetes, and cancer, have a longer disease course and the onset of the disease is either more apparent in adulthood than in childhood or not at all apparent until adulthood. Early onset of chronic health conditions may indicate the future severity and chronicity of these conditions, including potential effects on individuals' long-term wellbeing. The results of this study underscore the importance that screening, early detection, and management of 'childhood victimization'-related health problems have in preventing or lessening severe health problems and early death in adulthood.

Consistent with the findings in previous studies (Abajobir et al., 2017; Nusslock & Miller, 2016; Oh et al., 2018), a significant dose-response effect of multiple victimization on allergic inflammation and asthma was found in school children in Taiwan. In our sample of respondents, we likewise observed tobacco use, alcohol use, and circulatory problems (dizziness/ fainting and heart murmurs), which may increase the risk for cardiometabolic diseases. Moreover, these unhealthy lifestyles and coping strategies of children can aggravate existing health problems (Abajobir et al., 2017; Oh et al., 2018; Suglia et al., 2018). The results of our study do not suggest that victimization is associated with overweightness in children. In previous research, the effects of childhood adversity on weight or body mass indexes remained mixed for children (Oh et al., 2018) and weak for adults (Hughes et al., 2017). Because overweightness places a substantial burden on people's health, future research should closely examine specific interactions between people's victimization and their weight across lifetimes.

This study highlights a high prevalence rate of poly-victimization among 10-year-old children in Taiwan, with 70% reporting more than 1 and 30% reporting at least 4 types of childhood victimization. The prevalence of childhood victimization in this study is higher than that reported in a systematic review of 37 studies (Hughes et al., 2017) and the World Mental

Health Survey across 21 high-income countries (Kessler et al., 2010). Without any intervention to prevent further victimization, these children are at risk of substantial exposure to traumatic experiences, which can have both initial and cumulative effects on wellbeing. Although measures and classifications of poly-victimization vary, and although its victims range across age groups, its harms are especially evident for youth, who are in formative developmental stages (Ford & Delker, 2018).

The results of this study show that healthcare clinics and schools should screen children for exposure to multiple victimization and for its negative effects on health. Of no less importance are efforts to research and implement policies that, through early intervention, reduce children's exposure to victimization. To reduce the short- and long-term negative consequences of victimization, intervention programs should be able to recognize the signs of trauma, including negative health and behavioral outcomes (Oral et al., 2016).

Study Limitations

This study's findings are limited due to its cross-sectional nature. Causal relationships between variables cannot be determined. The more health problems a child has, the more vulnerable the child may be to peer victimization (Wei et al., 2017) or to maltreatment from parents who are stressed from the burdens of childcare. Results cannot be generalized to children who are not in the 4th-grade and who did not participate in this study. Moreover, the retrospective-study method itself is subject to recall errors and memory inaccessibility for traumatic abuse. Finally, the single-source data were not verified by other informants.

Conclusion

The results of our study provide empirical insights into the high prevalence of poly-victimization among children in Taiwan and the effects of this victimization on the children's health. Community education on the severity and consequences of childhood victimization is important to raising public awareness of these issues. Intervention programs can screen children for exposure to childhood victimization and can help foster children's resilience to the negative effects of victimization, thus promoting the health of young and old alike in Taiwan.

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