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探討重覆懷孕及早期兒童虐待對香港年輕母親及其子女的長遠影響

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Executive Summary

行政摘要

Part 1: Abstract of the Research

The life course perspectives posit that the direction and magnitude of environmental influences vary by age at the first exposure and the duration of the exposure. Exposure to adverse events during critical periods of growth and development, particularly in the first five years of life, is associated with children's heightened vulnerability to long-term physical or mental health problems, and their prevention is crucial. Notably, young mothers often face multiple stressors and lack adaptive coping strategies. Chronic stress can exacerbate health problems in these young mothers and lead to poor parenting skills, thereby disrupting their children's typical development. To stop this vicious ill health cycle across generations, research exploring factors to promote optimal child health and development in these high-risk families is needed.

In 2015, our research team recruited a cohort of 392 Hong Kong Chinese adolescent and young mothers who delivered their first child before the age of 24 years. The aim of this research is to conduct a follow-up study to examine the long-term effects of maternal rapid repeat pregnancy (RRP) and early childhood maltreatment (ECM) on the health and wellbeing of children in this cohort. The assessment of health and wellbeing in this study was conducted via two approaches. The first approach was to investigate children's utilization of healthcare services and hospital-recorded medical diagnoses using electronic health records (EHRs) from the Clinical Data Analysis and Reporting System (CDARS) in Hong Kong. The second approach was to obtain survey data about recent history of child maltreatment, child behavioral problems, mother-perceived family cohesion and social support, and maternal and child mental health and functioning. Descriptive statistics, multiple regression, subgroup analysis, as well as path analysis were performed to summarize respondents' characteristics and test the hypothesized models.

Findings show that ECM experiences were associated with higher levels of health care utilization. Compared to those without maltreatment experiences, children with maltreatment experiences in the first five years of life were more vulnerable to diseases and other health-

related problems. Using clinician-coded child maltreatment history as a proxy variable of severe maltreatment experiences, mothers of substantiated child maltreatment cases perceived their children to have more psychosocial problems at the follow-up phase when compared to their counterparts. On the other hand, the child maltreatment cases identified through mother-completed baseline questionnaires were found to have poorer functions and more symptoms of depression and anxiety at the follow-up phase when compared to those without such questionnaire records. Results of outcome comparison between substantiated and unsubstantiated child maltreatment cases suggest that severe ECM experiences could have negative effects on brain structures and functions that are responsible for planning, impulse control, and reasoning. These negative effects on the brain structures may also occur in children with questionnaire-identified ECM, although the intensity of impairment associated with questionnaire-identified ECM appeared to be smaller than those associated with hospital recorded ECM. In addition, the finding that only questionnaire-identified ECM was significantly associated with poorer physical functions suggests that some maltreated cases were not detected by the hospital system and that milder forms of maltreated parenting behaviors such as mild physical neglect could also compromise the affected child's long-term physical health. On the other hand, when investigating the effect of timing of maltreatment on child behavioral problems, the concurrent associations of maltreatment experiences and behavioral problems at the follow-up phase were mostly strong and significant, but the effect of ECM alone (i.e. without new maltreatment episodes at the follow-up phase) was relatively mild by comparison, suggesting that the affected children could be empowered to recover from or overcome early childhood adversities including ECM in the absence of further adverse exposures. Evidence also suggests that while family cohesion improvement may not be able to undo the damages caused by ECM, better family dynamics is conducive, and could be more important than improvement in maternal social support, to the healthy behavioral development of all children regardless of their history of childhood adversities.

By contrast, the levels of health care utilization did not vary substantially by the status of maternal RRP history, except the finding of more records of trauma-related AED attendance among children born to mothers with a history of RRP. In addition, children born to mothers with a history of RRP had a slightly higher risk of diseases and health-related problems than those without. Children born to mothers with a history of RRP were perceived by the mother to have more psychosocial problems, particularly conduct problems, than their counterparts at the follow-up phase. These differences were partly explained by increased stress levels in

mothers with a history of RRP at the baseline phase when compared to those without. In addition, compared to children of mothers without a history of RRP, mothers with a history of RRP were found to use more physical abusive methods to discipline children at the follow-up phase, and their children also had more records of emergency room attendance in the follow-up period, which were predicted by the differences in their baseline frequency of child physical abuse practice. However, for those with mother-perceived improvement in family cohesion, the effect of RRP on child psychosocial problems at the follow-up phase via maternal baseline stress was not significant, suggesting that improvement in family cohesion can mitigate the long-term adverse effect of maternal stress on child behavioral development. Furthermore, improvement in family cohesion was also found to alleviate the negative consequences of early-life exposure to physically abusive parenting, rendering children born to mothers with a history of RRP and those without to have similar levels of emergency room attendance in the follow-up period. Nevertheless, improved family cohesion showed small effects on preventing the recurrence of physical abuse of children in families of mothers with a history of RRP.

Based on the above findings, there are seven major recommendations in three areas covering government approach, young parent training, and public programs for policy makers to consider: (1) introduce a comprehensive and multi-sectoral approach to address mental health promotion, prevention, treatment, rehabilitation, care and recovery for young mothers particularly those with rapid repeat pregnancy; (2) monitor and address the needs and problems of young families in both short and long term; (3) promote quality child care and prevent problem behavior in young parents through universal and targeted programs; (4) equip young mothers with stress management techniques; (5) raise the awareness of families about the importance of family cohesion; (6) strengthen family services to support children (and their families) in the early years of life; and (7) inform the public about the importance of safe and supportive environments which would help to shape children's holistic development.

1.研究摘要

根據生命歷程觀點，人們受環境影響的程度會因首次身處該環境的年齡和曝露時長有所不同。在零至五歲這個成長和發展的關鍵時期，兒童會特別容易因負面事件造成長

期生理或心理健康問題。有見及此，我們有急切需要去防止這些負面事件發生。值得注意的是，年輕母親經常面對多重壓力，卻缺乏舒壓技巧。長期受壓不但有損健康，更會導致不良育兒技巧，繼而阻礙孩子正常成長。爲了打破這個跨代健康惡性循環，我們必需找出方法使成長於高風險家庭的兒童亦能很到良好的健康和發展。

研究團隊於 2015 年在香港招募了 392 名 24 歲前生過第一胎的年輕華裔母親。是項追蹤性研究旨在探討短期重覆懷孕及早期虐兒對兒童身心健康的長遠影響。本研究以兩種方式評估兒童的身心健康：第一種方式是透過在香港臨床數據分析和報告系統內的電子健康記錄收集兒童使用公營醫院服務的數據和醫療診斷情況；第二種是透過問卷取得近期虐待兒童記錄、兒童行爲問題、母親所感受到的家庭凝聚力和社交支持度、母親和兒童的心理健康及日常活動功能等的數據。數據分析採用了描述統計、多元迴歸分析、次群組分析以及路徑分析等統計方法來總結受訪者的特徵，並為假設模型進行測試。

調查結果顯示，早期虐兒經驗與高度使用醫療服務有相關性。相比於沒有受虐經驗的兒童，在出生後頭五年曾遭受虐待的兒童較易患病或出現健康問題。我們亦以入院記錄作爲嚴重虐兒案件的參考指標，這些案件的母親認為自己孩子比沒有受虐經驗的兒童在跟進階段時有更多心理社交問題。而在 2015 年受訪時發現曾被虐待的兒童亦比其他兒童在跟進階段時有更多抑鬱和焦慮症狀以及表現出更差的日常功能。這些數據顯示早期嚴重受虐經驗對於兒童大腦結構和處理計劃、控制衝動和思考功能方面或有不良影響。雖然這些不良影響亦能在問卷識別出的受虐兒童中找到，但影響程度對比有入院記錄的虐兒案件較為輕微。除此之外，分析結果同時顯示只有從問卷中發現曾受虐待的兒童有較差的生理功能。這意味著有些受虐病例並未被醫院系統發現，而即使輕微的不當育兒行爲，例如輕微忽視兒童生理需要，亦有機會危害兒童的長期身體健康。另一方面，研究團隊發現同期受虐經驗和兒童行為問題的關係大多是强烈而顯著。可是，若只有早期受到虐待（即在跟進階段時沒有新的受虐經驗），兒童行爲問題所受到的影響則相對較低。這反映出在沒有更多負面經驗的情況下，兒童是有能力克服包括受虐等早期逆境。數據亦反映，雖然提升家庭凝聚力未必能夠消除兒童早期受虐所造成的傷害，但良好的家庭互動關係相對於母親社交支持度的提升能更有效促進兒童良好行爲健康發展，不論兒童是否曾受過虐待。

然而，除了有較多因創傷而使用急症室服務的次數，兒童使用醫療服務的程度並沒有就母親短期重覆懷孕的經歷出現明顯變化。研究結果亦顯示短期重覆懷孕的母親所生的兒童有稍高患病和健康相關風險。短期重覆懷孕的母親亦認爲其子女比其他兒童在跟進階段時有更多心理社交問題，尤其在品行問題方面，此差異源自於短期重覆懷孕的母親在基線階段時已比其他母親承受更大壓力。不過，當家庭凝聚力得到改善後，短期重覆懷孕便不能透過增添母親壓力從而影響兒童行為發展。此外，由於兒童身體虐待次數基線時的差異，相對於沒有短期重覆懷孕記錄的母親，有此經歷的母親在跟進研究階段時被發現施加更多身體虐待以管教子女，其子女到了跟進階段亦有更高急症室服務使用率。研究亦發現改善家庭凝聚力能減低兒童早期遭受身體虐待管教的不良後果，從而令短期重覆懷孕母親的子女與其他子女在跟進研究階段時達到相近的急症室服務使用次數。儘管如此，改善家庭凝聚力對減低短期重覆懷孕母親的重覆虐待兒童風險作用不大。

基於上述結果，對政策制定者在三個範疇 (政策方向、年輕父母培訓及公共計劃) 的七項建議是：（1）為年輕母親尤其短期重覆懷孕者引入全面及跨業界推廣有關心理健康問題的預防、治療、復康和護理等的方案；（2）密切監察和處理年輕家庭的短期和長期需要與問題；（3）透過普及和有針對性的計劃，向年輕父母推廣良好育兒方式，防止父母不良行爲習慣；（4）教導年輕母親壓力管理技巧；（5） 提高家庭凝聚力的意識；（6）加强針對學前兒童（及其家庭）的支援服務，以及（7）向公眾宣傳有關安全及鼓勵性的成長環境對兒童全面發展的重要性。

Part 2: Layman summary on policy implications and recommendations

Recommendations for policy makers to promote optimal health and development in children born to adolescent and young mothers are to: (1) introduce a comprehensive and multi-sectoral approach to address mental health promotion, prevention, treatment, rehabilitation, care and recovery for young mothers particularly those with rapid repeat pregnancy by building strong and enduring partnerships across multiple public and private sectors, including health care, education, employment, social welfare and other relevant sectors; (2) monitor and address the needs and problems of young families in both short and long term by

establishing sustained services such as helplines and care and support services for young parents; (3) promote quality child care and prevent problem behavior in young parents through universal and targeted programs by educating parents about the use of positive disciplinary techniques and strengthening child protection systems; (4) equip young mothers with stress management techniques by providing tips and training on how to prepare for and manage stress in early motherhood; (5) raise the awareness of families about the importance of family cohesion by publicizing the benefits of support and care from other family members for both relieving early motherhood stress and promoting child development; (6) strengthen family services to support children (and their families) in the early years of life by setting out plans to enhance babies and young children's health services, parenting supports, child-friendly communities and early learning and care services; and (7) inform the public about the importance of safe and supportive environments which would help to shape children's holistic development.

2.研究項目對政策影響和政策建議的摘要

為政策制定者對如何確保年輕母親所生孩子的健康和發展的建議是：（1）透過在醫療保健、教育、就業、社會福利等公共和私營部門建立良好的伙伴關係，為年輕母親尤其短期重覆懷孕者引入全面及跨業界推廣有關心理健康問題的預防、治療、復康和護理等的方案；（2）增設求助熱線和服務平台以密切監察和處理年輕家庭的短期和長期需要與問題；（3）透過普及和有針對性的計劃，教導年輕父母正向管教方法及加強保護兒童工作，從而向年輕父母推廣良好育兒方式以及防止他們培養不良行爲習慣；（4）教導年輕母親壓力管理技巧，讓她們能更好地應對在成為母親後的壓力；（5）宣傳家庭成員的支持和照顧對減輕母親壓力和促進兒童發展的好處，從而提高家庭凝聚力的意識；（6）制定不同類型如健康服務、育兒講座、兒童友好社區以及早期學習和護理服務等計劃，加强針對學前兒童（及其家庭）的支援服務；以及（7）加強公共教育計劃和大眾媒體宣傳，向社會大眾推廣有關安全及鼓勵性的成長環境對兒童全面發展的重要性。

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Details of the public dissemination held

The findings will be published in peer-reviewed journals, discussed in seminars and conferences, and released through the press to maximize their policy impact.

1. Introduction

Early childbearing refers to the process of giving birth to children by adolescent or young unmarried women (Cramer & McDonald, 1996). The consequences of early childbearing are almost universally negative and encompass a wide range of adverse physical, psychological, and social outcomes in these young mothers and their children. In Hong Kong, the fertility rate for women aged 15-24 years has been declining, but each year, there are still a significant proportion of babies born to local adolescent and young women (HKSAR Census and Statistics Department, 2018). Without timely and proper intervention, stressors associated with early motherhood may exacerbate psychological distress in these mothers putting them at an increased risk of mental disorders. As a result, their children are also more likely to have poor health and development, live in a chaotic family environment, and encounter troubles in school (Mollborn, 2017). However, not all young mothers and their children display suboptimal outcomes, suggesting that modifiable factors are available to influence early childbearing consequences.

Comprehensive support and care programs have a promising potential to promote optimal life outcomes of these high-risk families. Although such programs are available for Hong Kong local young mothers and children, targeted interventions are lacking. Existing programs provide general support yet not resolve the livelihood difficulties facing these young mothers. There has been scant attention to the needs and burden of young mothers, particularly for those mothers who have been troubled by adverse conditions. For example, rapid repeat pregnancy (RRP), defined as any pregnancy occurring within 24 months after any previous pregnancy outcomes, inclusive of abortion, miscarriage, still birth, or live birth (Centers for Disease Control Prevention, 2013), is common among young mothers. However, little is known about the causes and long-term effects of RRP on the mothers and their children, particularly in Chinese societies including the Hong Kong society. There has been no good quality evidence to inform policy and practice of why and how to improve the life course outcomes of these young mothers and their children and families as a whole. To raise Hong Kong public and policymaker awareness, longitudinal research investigating the long-term consequences of RRP is urgently needed.

1.1 Pregnancy in Adolescence and Young Adulthood

Childbearing imposes significant costs and unexpected burden on young women, as most of the pregnancies at young ages are unplanned and occur in single mothers, which makes these mothers more vulnerable to psychological distress during and after pregnancy (Barton et al., 2017). Inadequate prenatal care also increases their risk for negative pregnancy outcomes such as preterm delivery and low birth weight especially for those giving births during adolescence (Klein, 2005). Pooled data from meta-analysis found that preterm-born children had more behavioral problems and 2.64 times higher risk for developing attention-deficit/hyperactivity disorder (ADHD) (Bhutta et al., 2002). Other factors associated with early childbearing include poverty, unmarried status, low educational levels, substance use behavior, and limited employment opportunities (Klein, 2005). These are the known risk factors for suboptimal family environments which may further jeopardize the development of both mother and child. In our previous study of Hong Kong Chinese teenage and young mothers, we found multiple risk factors in the mothers, and the risk domains of poor family background/structure, stressors, and mother-child dysfunctional interactions had particularly strong effects on maternal physical abusive and neglectful behavior toward the child (Lo et al., 2017).

1.2 Early Child Maltreatment as an Escalating yet Underexplored Problem

An increasing body of evidence shows that maltreatment of infants and preschoolers is not a rare situation. The 2015 report of Child Maltreatment in the United States indicated that the rate of victimization among infants in their first year of life was 24.2 per 1,000 children, and the rates for ages 1, 2, and 3 were 11.8, 11.3, and 10.7 out of 1,000 children, respectively (U.S. Department of Health and Human Services et al., 2017). Another national study of children and youth in the United States reported that 9.5% of children aged 2-5 years had experienced maltreatment in the preceding year (Finkelhor et al., 2013). In the United Kingdom, approximately 10% of child protection registrations were records of infants under the age of one, and two-thirds of these infant cases suffered neglect (54%) and emotional abuse (18%) (Barlow & Underdown, 2017). In Hong Kong, data on rates of maltreatment among infants and preschoolers were generally lacking. The child maltreatment statistics reported by the Child Protection Registry has not been stratified by ages of victims, making it difficult to estimate the severity of this problem in Hong Kong. However, recent media coverages of several high-profile cases have drawn public attention and alerted the

government and child care providers to address issues related to early child maltreatment (ECM).

1.3 Elevated Risk of Child Maltreatment in Adolescent and Young Motherhood

A meta-analysis identified parental stress and mental/psychiatric problems, poor parental psychological wellbeing, poor parent-child relationship, family conflict, and lower socioeconomic status as risk factors for child maltreatment (Mulder et al., 2018; Stith et al., 2009). These factors are common and inherent in adolescent and young mothers, which can increase their child abuse potential (Lee, 2009). Although we have identified the locally relevant risk factors for child maltreatment in the young mother population (Lo et al., 2017), there is scant research on the risk and consequences of maltreating a very young child in Chinese context.

1.4 Child Behavioral Development after Exposure to Maltreatment

Trauma such as maltreatment can induce substantial stress in a young child. Excessive stress is known to disrupt the architecture of the developing brain (Magalhães et al., 2018). Over time, chronic stress can heighten stress responses, resulting in disrupted brain and immune systems (Harden et al., 2016). Immune dysregulation may increase the later risk of various physical and mental illnesses. On the other hand, impairments in the key brain regions involved in higher order thinking and emotion/behavioral regulation are associated with a higher risk of serious behavioral problems such as violence and aggression later in life (Davidson et al., 2000). In addition to brain abnormalities which can put children at an increased risk for ADHD, several psychological theories postulate that behavioral problems such as conduct problems in abused children can be the consequence of observational learning of violent behaviors (Gallego et al., 2019). These children are also likely to be overwhelmed with negative emotions after the abuse episode (Belsky, 1993). Given that brain undergoes a highly plastic period during early life, positive changes in the environment may be able to restore some lost neural pathways and functions resulting from the adverse event (Sale et al., 2014), leading to better behavioral outcomes over time.

1.5 Common Social Protective Factors for Child Development

Changing the temperament and characters of children and parents is often more difficult than promoting the protective elements in their social contexts. The ecological model of child maltreatment also places great emphasis on the influences of the broader socio-cultural context (Kilanowski, 2017). The established protective factors within such context for child development include social support and family cohesion (Thompson, 2015; Vanderbilt-Adriance et al., 2015). Both social support and family cohesion have shown effectiveness in reducing life stress (Cohen & McKay, 2020; Goodrum et al., 2020). Our previous research found that family cohesion was more important than friend support in mitigating the risk of child maltreatment among young mothers with a history of RRP (Tung et al., 2020). As infants and preschoolers primarily rely on parents for support and nurturance, their development would likely benefit from positive changes in both parental wellbeing and family environment. Although there are a wide range of community support services for adolescent and young mothers, it is important to realize that maternal wellbeing can be improved only when the mother perceives benefits from these services (Taylor & Conger, 2017), and yet very few research has explored the impact of improvement in maternal perceived psychosocial wellbeing on child development.

1.6 Rapid Repeat Pregnancy among Young Mothers – an Understudied Problem in Hong Kong

In 2015, our team recruited a cohort of 392 Hong Kong Chinese adolescent and young mothers who delivered their first child before the age of 24 years. Our baseline data reveals that 35% of the young mothers had a history of RRP (Lo et al., 2017), suggesting that RRP is not a rare phenomenon among youth in Hong Kong. This is an important public health concern, as RRP often co-occurs with other problems such as anxiety, depression, aggression, trauma, and abuse that are recognized risk factors for adverse health outcomes (Crittenden et al., 2009). Furthermore, we found that local young mothers with RRP were more likely to physically abuse (odd ratio [OR]=1.88, $p=0.005$) and neglect (OR=2.44, $p<0.001$) their children, and had more psychosocial problems such as more symptoms of stress ($\beta=0.19$, $p<0.001$), depression ($\beta=0.14$, $p=0.007$), and anxiety ($\beta=0.13$, $p=0.013$) and lower family cohesion ($\beta=-0.23$, $p<0.001$) and social support ($\beta=-0.11$, $p=0.039$) than those without RRP. More alarmingly, among the 56 children above 5 years of age at that time, more psychosocial problems were found in children born to mothers with a history of RRP ($\beta=0.33$, $p=0.013$), albeit the small sample size. More investigations would be helpful to ascertain or refute the

link between RRP and long-term health outcomes of young mothers and children. Hence, we conducted a follow-up assessment in 2021 when all children in this young mother cohort reached at least 6 years of age and began to develop independence and make new social contacts.

2. Objectives of the study

The objectives of this study are as follows:

- To investigate the long-term outcomes of mothers with a history of rapid repeat pregnancy and their children and the underlying mechanisms
- To investigate whether early child maltreatment predicts subsequent behavioral problems (including emotional symptoms, conduct problems, hyperactivity/inattention, and peer problems) among children born to adolescent and young mothers;
- To investigate how improvement in these mother's perception of family cohesion over time affects the behavioral development of abused young children;
- To investigate how improvement in mother's perception of social support over time affects the behavioral development of abused young children.

3. Research methodology

3.1 Study Design

Early adverse experiences are recognized as potential causes of long-term behavioral difficulties. Persistent problem behaviors can impede educational and occupational outcomes, creating financial difficulties and poor health, thus increasing the potential of a vicious cycle of ill health and poverty. There is a need of research to identify ways to improve the long-term life outcomes of children suffering from abuse or neglect early in life. Hence, we conducted a comprehensive follow-up evaluation of health and behavioral development of children in our existing young mother cohort via two approaches. The first approach was to investigate children's utilization of healthcare services and hospital-recorded medical diagnoses using electronic health records (EHRs) from the Clinical Data Analysis and Reporting System (CDARS) in Hong Kong. The second approach was to obtain survey data about recent history of child maltreatment, child behavioral problems, mother-perceived

family cohesion and social support, and maternal and child mental health and functioning. With the use of administrative health records as objective outcomes and survey measures as subjective perception outcomes, the findings of this study would be able to provide robust locally relevant evidence to inform policymakers and service providers about the unmet needs and risks currently facing local young mothers and their children. This study was approved by the ethics committee of the Institutional Review Board of Hospital Authority Hong Kong West Cluster (Reference UW 20-187), and all respondents provided informed consent to participate in this survey.

3.1.1 Participants

In this survey, the target population was the mother-child cohort, established in 2015, consisting of 392 Hong Kong Chinese adolescent and young mothers who delivered their first child before the age of 24 years and their children. They all satisfied the following inclusion criteria and without any exclusion criterion:

Inclusion criteria:

- The mother participant had completed the 2015 baseline assessment
- The mother has provided informed consent to take part in this follow-up study.

Exclusion criteria:

- Mothers who cannot speak or read Chinese
- Mothers who delivered their first child after the age of 24 years
- Children born prematurely and/or with a congenital deformity or physical disability

3.1.2 Sample size estimation

A previous prospective study in the United Kingdom found that 37% of the children exposed to early physical punishment showed parent-reported problematic behaviors at age 46 months compared with the prevalence of only 19% in children without maltreatment (unadjusted odd ratio=2.5, 95% confidence level: 1.9-3.2) (Scott et al., 2014). Assuming a small-to-medium effect size of OR=2.5, a sample size of 212 mother-child pairs is needed to detect such effect size at 80% power and 5% level of significance.

Our baseline data showed an association between maternal RRP history and child psychosocial problems with a small to medium effect size (β =0.33, p=0.013). Considering this effect size under a comprehensive adjustment scheme with 2 latent variables and 7 observed variables, a total sample size of 236 (79 with RRP and 157 without) would be needed to achieve 80% power at the 5% significance level.

3.1.3 Data Collection

This is a follow-up study of our existing cohort of adolescent and young mothers and their children in Hong Kong. All the mothers had provided their mobile phone number and/or home address at the baseline assessment. A trained project assistant, together with the Caritas Hyacinth social workers, invited the mother to join the follow-up study by phone, or mail when we cannot reach the mother by phone or when her mobile phone number was not available in our database. If the mother expressed interest to join this follow-up study, a set of study questionnaires (both child and mother versions) together with a consent form and information sheet, as well as a postage-paid, pre-addressed return envelope were mailed to the mother. The mother was instructed to complete and return the documents to the research team using the prepaid envelop within one month from the date of our first approach. An electronic version of the mother and child surveys was also available if the participant preferred to complete it online. For mothers who had difficulty finishing the questionnaire set themselves, the project assistant administered the questionnaires on them by phone. If the mother had not returned the questionnaire set within one month, the project assistant would follow up with her by phone or text. Those who fail to complete the questionnaire set within six months from the date of our first approach were considered as dropouts. As a token of appreciation for their participation in this study, a $200 supermarket coupon was given to the mother upon completion of the follow-up assessment.

3.2 Study Measures

The study measures consist of two components which are 1) children's utilization of healthcare services and hospital-recorded medical diagnoses using EHRs from the CDARS in Hong Kong, as well as 2) the baseline and follow-up questionnaire survey data.

3.2.1 Health Care Utilization and Medical Diagnosis

Using the child Hong Kong Identity Card Number (HKID) provided by the mothers at the 2015 baseline assessment, we can retrieve their CDARS-specific reference keys (Gao et al., 2021). Data queries were then submitted to the CDARS for extracting the type, time and number of emergency room attendance and hospital admission from the EHRs and medical diagnosis using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis codes.

3.2.2 Survey Measures

While the baseline survey was conducted during January to June 2015 (Time 1/baseline), the follow-up questionnaire set, each for mother (see Appendix A) and child participants (see Appendix B), was administered in Traditional Chinese during February to June 2021 (Time 2/follow-up) and consisted of a wide range of items assessing recent history of child maltreatment, child behavioral problems, mother-perceived family cohesion and social support, and maternal functioning:

History of child maltreatment at baseline and follow-up. The Parent-Child Conflict Tactics Scale (CTS-PC) is a 41-item questionnaire assessing child maltreatment which was completed by the mother in this study. The CTS-PC comprises subscales of non-violent discipline, psychological aggression, minor physical assault, severe physical assault, very severe physical assault, weekly discipline, neglect, and sexual abuse. The Chinese version of CTS-PC has demonstrated satisfactory reliability in local Hong Kong Chinese population (Cronbach's alphas ranging from 0.77 to 0.88) (Chan et al., 2012). This scale was included in our 2015 baseline assessment and used to measure history of child maltreatment with a dichotomous rating ("yes" or "no") (Lo et al., 2017). Mothers who indicated "yes" among any of the corresponding items in the subscales of severe physical abuse, very severe physical abuse, sexual abuse, and neglect would be considered as having maltreated the child in the preceding year. Children who were five years old or younger at the baseline assessment and had experienced any type of severe physical assault, very severe physical assault, neglect, or/and sexual abuse behavior, according to the responses of their mothers to the CTSPC questionnaire items, were regarded as those with ECM history in our analyses. As some

mothers provided their children's HKID during the baseline assessment, we can retrieve their hospital records and further grouped them according to the status of whether the abuse experiences were substantiated by clinicians or reported by the mother only.

Child behavioral problems at follow-up. Different aspects of behavioral problems (psychosocial wellbeing, hyperactive and inattentive symptoms, depressive and anxious symptoms, and daily functioning) were measured in this follow-up study:

- Psychosocial wellbeing (maternal proxy-report) – Strength and Difficulties Questionnaire (SDQ) is a 25-item questionnaire measuring child behaviors. The SDQ comprises five subscales, namely emotional symptoms, conduct problems, hyperactivity/inattention, prosocial behaviors and peer problems. Each subscale consists of five items which can be summated to a subscale score. The scores of the four problem behavior subscales (emotional symptoms, conduct problems, hyperactivity, and peer problems) can be further summated to a Total Difficulties score. The Chinese version of the SDQ has been validated and used widely with satisfactory reliability and validity (Cronbach's alpha ranging from 0.45 to 0.82) (Lai et al., 2010).
- Hyperactive and inattentive symptoms (maternal proxy-report) – Chinese Strengths and Weaknesses of ADHD-Symptoms and Normal-Behaviors Questionnaire (Chinese SWAN) is a screening measure for ADHD in children and adolescents. It has 18 neutrally or positively phased items, with 9 items measuring the inattentive symptoms and another 9 measuring the hyperactivity symptoms. Against the findings of direct assessment conducted by a child psychiatrist as the gold standard, the Chinese SWAN demonstrated excellent performance in identifying children with ADHD (AUC=0.83). Clinically relevant and alternative (borderline) cut-off scores have also been confirmed during the validation (Lai et al., 2013), and were adopted in this study to identify children at a high risk of ADHD who were referred to specialist clinics for further assessments if preferred.
- Depressive and anxious symptoms (maternal proxy-report/child self-report) – The short version of the Revised Child Anxiety and Depression Scale (RCADS) is a 25-item questionnaire measuring child depressive and anxious symptoms yielding two subscale scores (total anxiety and total depression) (Ebesutani et al., 2017).

- Daily functioning (maternal proxy-report/child self-report) – The PedsQL^{TM} Generic Core Scales measures child physical, emotional, social and school functioning, with higher total scores indicating better development (Chan et al., 2005).

Improvement in mother-perceived family cohesion. Family Environment Scale - Family Cohesion subscale (FES-FC) is a 9-item scale measuring the mother's perceived degree of concern, commitment, and support from family members on a 6-point Likert scale. A total score is computed by adding up the item scores. The Chinese version of the FES-FC has been used in previous adolescent studies and demonstrated good internal consistency (Lee et al., 2006; Lo et al., 2017). This measure was included in our 2015 baseline assessment (Lo et al., 2017). An increase in the FES-FC scores at the follow-up assessment would be considered as having an improvement in mother-perceived family cohesion.

Improvement in mother-perceived social support. Multidimensional Scale of Perceived Social Support (MSPSS) is a 12-item questionnaire measuring the mother's perceived degree of social support from family members, friends, and significant others on a 7-point Likert scale. A total score can be generated to reflect the level of overall support from family members, friends, and significant others, respectively. The Chinese version of MSPSS has been validated in a previous study with excellent internal consistency (Chou, 2000; Lo et al., 2017). This measure was included in our 2015 baseline assessment (Lo et al., 2017). An increase in the MSPSS scores at the follow-up assessment would be considered as having an improvement in mother-perceived social support.

Improvement in maternal functioning. In our original study proposal, we suggested to administer the Center for Epidemiological Studies (CES-D) which is a depression screening tool. However, after discussing with our social worker collaborators, in order to minimize the participant's response burden and having considered the length of our existing questionnaire survey and the sensitive items of CES-D, we decided to administer only the general mental well-being scale (i.e., SF-12v2 - mental wellbeing) because of its adequacy to assess the holistic mental health of the participant and also of its data availability at Time 1 for studying changes in mental well-being over the follow-up period. Specifically, SF-12 Health Survey version 2 (SF-12v2) measures the mother's physical and mental health-related quality of life (HRQOL), with higher summary scores of physical and mental component scales (i.e. Physical Component Score (PCS) and Mental Component Score (MCS)) indicating better

HRQOL (Lo et al., 2018). An increase in the PCS and/or MCS score at the follow-up assessment would be considered as having an improvement in maternal physical and mental HRQOL, respectively.

Sociodemographic factors and maternal baseline stress level. At the 2015 baseline assessment, the mothers were asked to report their own demographics (age at baseline assessment, age at 1st delivery, RRP history, marital status, highest education level, employment status, and history of substance use (smoking, alcohol drinking, and drug) behavior), their child's demographics (date of birth, age at baseline assessment, and gender), and their family characteristics (monthly household income, household size, and whether or not receiving Comprehensive Social Security Assistance (CSSA)) as well as their stress level using the stress scale of the Depression Anxiety Stress scale – 21 (DASS-21). At the 2021 follow-up assessment, the mothers provided an update on their own employment status and marital status, their current spouse's demographics (highest education level and employment status), and their family characteristics (monthly household income, household size, and whether or not receiving CSSA).

3.3 Data analysis

Data analyses were carried out using IBM SPSS version 26 and R version 3.6.3. First, descriptive statistics (mean and standard deviation for continuous variables and frequency and percentage for categorical variables) were computed to describe the baseline and follow-up sociodemographic and family characteristics of the respondents, as well as the mother's status of improvement in perceived family cohesion, perceived social support, and physical and mental HRQOL at follow-up. The demographic findings and participant characteristics were compared between the completers and drop-outs using a t-test for continuous variables and a chi-squared test for categorical variables. In addition, the health care utilization patterns were tabulated and compared by status of ECM or RRP using a t-test for continuous variables and a chi-squared for categorical variables.

Second, multiple linear regression analyses were conducted to examine the relationship between ECM experiences and different behavioral problem measure scores in the subset of children aged 0 to 5 years at the baseline assessment. In the first model, we included only the potential confounders (child age and gender) as predictors. After controlling for these

influences, we added "ECM status" to the second model. Furthermore, we also examined the effect of maltreatment data sources and timing. To study the timing effect, based on the CTS-PC responses at baseline and follow-up assessments, children were categorized into 1) those with maltreatment report at both baseline and follow-up, 2) those with maltreatment report at baseline only, 3) those with maltreatment report at follow-up only, and 4) those with no maltreatment report at both baseline and follow-up. Following this, multivariable-adjusted generalized linear models were conducted to compare the behavioral measure score of interest between groups, with those having no maltreatment reports at both time points as the reference group. The same analyses were repeated but with maltreatment data sources as the independent variable, and the study groups for this part of analyses were 1) those with questionnaire-identified ECM and hospital-recorded ECM, 2) those with hospital-recorded ECM only, 3) those with questionnaire-identified ECM only, and 4) those with no ECM records. On the other hand, the relationships between maternal RRP status and children's behavioral problems were tested in all child completers using multiple linear regression analyses with maternal RRP status as the independent variable, the child behavioral problem of interest as the dependent variable, and child age and gender as covariates.

Third, subgroup analyses were conducted to explore potential changes in the strength and significance of effect of ECM on children's behavioral outcomes due to the improvement in family cohesion or social support over the follow-up period. Child age- and gender-adjusted linear regression models were computed to examine the effect of ECM status (independent variable) on each indicator of children's behavior (dependent variable) under the conditions of 1) improved family cohesion, 2) no family cohesion improvement, 3) improved social support, and 4) no social support improvement, respectively. The effect size was compared between conditions to assess the impact of family cohesion/social support improvement.

Fourth, the proposed path model containing maternal RRP status (independent variable); Time 1 maternal DASS stress score and frequency of child physical abuse (mediators); and Time 2 SDQ total difficulties and child physical abuse episodes as well as child emergency room attendance records in the follow-up period (dependent variable) was tested using structural equation modelling techniques provided by the R package lavaan which allows for the simultaneous examination of direct and indirect effects (Rosseel, 2012). The same model was tested again in the condition of improved family cohesion and the condition of no family cohesion improvement, respectively, to explore possible changes in path effects. All path

models were adjusted for baseline household size-adjusted household income and child age and gender.

In our analytic sample, missing data was less than 5%. Assuming data were missing at random, we imputed missing data (5 imputed datasets) using multiple imputation by chained equations (MICE) R package (Buuren & Groothuis-Oudshoorn, 2010). All variables selected for analysis models were used to predict missing data. In addition to checking for missing values, continuous data were also checked for outliers and deviations from normality. To account for missing data in the analyses, the path models were fitted using maximum likelihood methods (Little et al., 2014). A p-value < 0.05 was used to determine statistical significance.

4. Research results/findings

The results reported below were generated through the analysis of health records and survey data of the 392 mother-child pairs recruited in 2015.

4.1 Subject characteristics

4.1.1 Comparison of baseline characteristics by follow-up survey participation status

Table 4-1 shows the baseline characteristics of participants who completed the follow-up survey and those who did not. Participants who completed the follow-up survey and those who did not were comparable regarding maternal age at baseline and delivery, child age and gender, maternal education level, marital status and employment status at baseline, number of children in the household, and engagement in risk behavior (smoking, alcohol drinking, and illicit drug use) at baseline. However, compared to those who did not complete the follow-up survey, participants who completed the follow-up survey reported lower levels of adjusted household income at baseline (follow-up: HKD 3,504 vs dropouts: HKD 4,045, p=0.036).

Table 4-1. Baseline characteristics by status of follow-up survey participation.

	Overall (n = 392)	Completed follow-up survey	Did not complete follow-up	p-value

		(n = 232)	survey (n = 160)	
Age of the mother, mean (SD)	21.78 (2.97)	21.88 (2.86)	21.64 (3.13)	0.441
Age of the index child, mean (SD)	2.70 (2.34)	2.64 (2.19)	2.79 (2.54)	0.548
Gender of the index child, n(%)				0.185
Male	202 (51.5%)	126 (54.3%)	76 (47.5%)	
Female	190 (48.5%)	106 (45.7%)	84 (52.5%)	
Age of the mother at 1st delivery, n(%)				0.112
13-16 years	67 (17.1%)	33 (14.2%)	34 (21.3%)	
17-19 years	200 (51.0%)	118 (50.9%)	82 (51.3%)	
Above 19 years	125 (31.9%)	81 (34.9%)	44 (27.5%)	
Marital status, n(%)				0.154
Single	156 (39.8%)	83 (35.8%)	73 (45.6%)	
Married	204 (52.0%)	129 (55.6%)	75 (46.9%)	
Divorced	31 (7.9%)	19 (8.2%)	12 (7.5%)	
Missing	1 (0.3%)	1 (0.4%)	0 (0.0%)	
Highest Education level attained, n(%)				0.137
Lower secondary school or below	215 (54.8%)	124 (53.4%)	91 (56.9%)	
Upper secondary school	168 (42.9%)	105 (45.3%)	63 (39.4%)	
Tertiary education	8 (2.0%)	2 (0.9%)	6 (3.8%)	
Missing	1 (0.3%)	1 (0.4%)	0 (0.0%)	
Employment status, n(%)				0.423
Full time	78 (19.9%)	44 (19.0%)	34 (21.3%)	
Part time	42 (10.7%)	27 (11.6%)	15 (9.4%)	
Unemployed	28 (7.1%)	13 (5.6%)	15 (9.4%)	
Housewife	239 (61.0%)	145 (62.5%)	94 (58.8%)	
Missing	5 (1.3%)	3 (1.3%)	2 (1.3%)	
Number of children, n(%)				0.785
1	282 (71.9%)	169 (72.8%)	113 (70.6%)	
2	94 (24.0%)	55 (23.7%)	39 (24.4%)	
3	13 (3.3%)	7 (3.0%)	6 (3.8%)	
4 or more	3 (0.8%)	1 (0.4%)	2 (1.3%)	
Family income level adjusted for household size (HKD), mean(SD)	3,725 (2,499)	3,504 (2,277)	4,045 (2,766)	0.036
Receiving Comprehensive Social Security Assistance (CSSA), n(%)				0.638
Yes	70 (17.9%)	40 (17.2%)	30 (18.8%)	
No	314 (80.1%)	189 (81.5%)	125 (78.1%)	
Missing	8 (2.1)	3 (1.3%)	5 (3.1%)	
Current smokers, n(%)	168 (42.9%)	87 (37.5%)	77 (48.1%)	0.305
Current alcohol consumption frequency (preceding month), n(%)				0.075
Never	254 (64.8%)	153 (65.9%)	101 (63.1%)	
1 to 9 days	99 (25.3%)	60 (25.9%)	39 (24.4%)	
10 to 29 days	20 (5.1%)	8 (3.4%)	12 (7.5%)	
30 days	3 (0.8%)	0 (0.0%)	3 (1.9%)	
Missing	16 (4.1%)	11 (4.7%)	5 (3.1%)	
Mothers with drug abuse experience in preceding month, n(%)	16 (4.1%)	6 (2.6%)	10 (6.3%)	0.102

SD: standard deviation

4.1.2 Overall characteristics of subjects who participated in the follow-up survey

Table 4-2 shows the overall characteristics of subjects who participated in the follow-up survey. The surveyed children (54.3% males and 45.7% females) were on average 8.83 years old. 36 (15.5%) had elevated psychosocial problems defined as SDQ total difficulties score ≥ 19. 96.6% and 2.2% of the surveyed mothers reported having attained secondary and tertiary education, respectively. Compared to the baseline education attainment statistics (45.3% for upper secondary education and 0.9% for tertiary education), these statistics at the follow-up rose to 50.0% and 2.2%, respectively, suggesting that some cohort mothers were able to continue to study and attain higher education level after the baseline survey. Despite a large increase in monthly household income adjusted for household size (HKD 3,504 at baseline vs HKD 5,609 at follow-up), 22.4% reported receiving Comprehensive Social Security Assistance (CSSA) at the time of the follow-up survey compared to 17.2% at baseline.

Table 4-2. Characteristics of families who completed the follow-up survey.

	Overall (n = 232)
Child	
Age, mean(SD)	8.83 (2.33)
Gender, n(%)	
Male	126 (54.3)
Female	106 (45.7)
Elevated psychosocial problems, n(%)	36 (15.5)
Mother	
Highest education level attained, n(%)	
Lower secondary school or below	108 (46.6)
Upper secondary school	116 (50.0)
Tertiary education	5 (2.2)
Missing	3 (1.3)
Employment status, n(%)	
Full-time	52 (22.4)
Part-time	27 (11.6)
Unemployed	7 (3.0)
Homemaker	143 (61.6)
Missing	3 (1.3)
Current marital status, n(%)	
Married and/or cohabited	133 (57.3)
Divorced/separated	94 (40.5)
Missing	5 (2.2)
Current spouse	

Highest education level attained, n(%)	
Lower secondary school or below	73 (31.5)
Upper secondary school	77 (33.2)
Tertiary education	5 (2.2)
Missing	77 (33.2)
Employment status, n(%)	
Full-time	128 (55.2)
Part-time	11 (4.7)
Unemployed	12 (5.2)
Homemaker	2 (0.9)
Missing	79 (34.1)
Family	
Monthly household income adjusted for household size (HKD), mean(SD)	5,609 (5,000)
Receiving Comprehensive Social Security Assistance (CSSA), n(%)	
Yes	52 (22.4)
No	162 (69.8)
Missing	18 (7.8)

SD: standard deviation

Table 4-3 shows the status of improvement in social life and wellbeing of mothers overall and by the status of RRP history. Considering the whole sample, compared to the maternal baseline level, 62.1% perceived an improvement in family cohesion and 51.3% perceived an improvement in social support. 56.5% reported an improvement in physical HRQOL and 55.6% reported an improvement in mental HRQOL. For subgroup analyses, mother with a history of RRP overall experienced poorer psychosocial and physical conditions than those without a history of RRP at the baseline assessment. However, at the follow-up assessment, despite no statistical significance, the proportion of mothers perceiving improved family cohesion and social support was larger for mothers with a history of RRP than those without. There were also a larger proportion of mothers experiencing improved mental HRQOL in the RRP group, but the proportion of mothers experiencing improved physical HRQOL was comparable between the two groups. The results highlight the possible psychosocial harms that can be caused by the RRP experiences at a young age and the ability of the mothers to bounce back and feel positive about their surrounding environments again over time.

Table 4-3. Improvement in social life and wellbeing of mothers overall and by RRP status.

	History of rapid repeat pregnancy			
	Overall (n = 232)	Yes (n = 80)	No (n = 152)	p-value
Perceived family cohesion at baseline, mean(SD)	36.99 (8.19)	34.03 (8.61)	38.56 (7.53)	<0.001
Perceived social support at baseline, mean(SD)	60.77 (16.83)	58.03 (15.99)	62.23 (17.13)	0.071
Physical HRQOL at baseline, mean(SD)	49.04 (7.27)	47.57 (7.65)	49.80 (6.98)	0.027
Mental HRQOL at baseline, mean(SD)	41.95 (9.89)	39.35 (10.02)	43.30 (9.58)	0.004
Proportion of mothers with improvement in cohesion, n(%)				0.196
Improvement	144 (62.1)	55 (68.8)	89 (58.6)	
No improvement	81 (34.9)	24 (30.0)	57 (37.5)	
Missing	7 (3.0)	1 (1.3)	6 (3.9)	
Proportion of mothers with improvement in social support, n(%)				0.259
Improvement	119 (51.3)	46 (57.5)	73 (48.0)	
No improvement	108 (46.6)	34 (42.5)	74 (48.7)	
Missing	5 (2.2)	0 (0.0)	5 (3.3)	
Proportion of mothers with improvement in physical HRQOL, n(%)				0.913
Improvement	131 (56.5)	45 (56.3)	86 (56.6)	
No improvement	97 (41.8)	34 (42.5)	63 (41.4)	
Missing	4 (1.7)	1 (1.3)	3 (2.0)	
Proportion of mothers with improvement in mental HRQOL, n(%)				0.137
Improvement	129 (55.6)	50 (62.5)	79 (52.0)	
No improvement	99 (42.7)	29 (36.3)	70 (46.1)	
Missing	4 (1.7)	1 (1.3)	3 (2.0)	

HRQOL: health-related quality of life

4.2 Health and behavioral characteristics of subjects based on ECM status

This section describes the health and behavioral outcomes of children aged five years or below in the cohort at the time of baseline survey overall and by ECM status. The ECM status of the analyzed children (i.e. those with or without maltreatment experiences in the first five years of life) was assigned based on the mother's baseline report and the assumption of no new maltreatment episode occurring after the baseline survey until the follow-up assessment.

4.2.1 Children's healthcare service utilization and diagnoses following ECM

Among those aged five years or below, we obtained mother-approved access to 285 children's EHRs. Table 4-4 describes their patterns of healthcare service utilization since the 2015 baseline survey. 193 (67.72%) were found to have at least one AED service record. On average the cohort participants had 3.30 visits to AED during the 6-year follow-up period. 60 (21.05%) were found to have trauma-related AED attendance records, and 121 (42.46%) had hospital admission records. However, it should be noted that the entire sample on average had less than one trauma-related AED visit or hospital admission record, suggesting that the reasons for AED visits were generally mild in nature. There were significant differences in AED attendance and hospital admission records between children with and without ECM experiences. Compared to those without the exposure, children with maltreatment experiences in the first five years of life were found to have a higher likelihood of using AED services (p=0.002) and being admitted to hospital (p=0.002) as well as higher number of AED attendance (p=0.005) and hospital admission records (p=0.017).

Table 4-4. Healthcare service utilization among young children overall and by ECM status.

Child healthcare service utilization pattern since July 2015	Total	Early childhood maltreatment experience		
	n = 285	Yes (n = 142)	No (n = 143)	
	n (%) / Mean (SD)			p-value
Used any AED services	193 (67.72%)	102 (71.83%)	91 (63.64%)	0.002
Had trauma-related AED attendances	60 (21.05%)	34 (23.94%)	26 (18.18%)	0.093
Admitted to hospital	121 (42.46%)	65 (45.77%)	56 (39.16%)	0.002
Number of AED attendances	3.30 (4.25)	3.50 (4.43)	3.10 (4.06)	0.005
Number of trauma-related AED attendances	0.28 (0.71)	0.26 (0.49)	0.30 (0.14)	0.977
Number of hospital admission	0.85 (1.35)	0.92 (1.31)	0.78 (1.38)	0.017

AED: Accident and Emergency Department; SD: standard deviation
Adjusted for child age and gender

Table 4-5 describes the disease description of the 119 children who were five years old or younger at baseline and had diagnosis records in the CDARS since the 2015 baseline survey. The most frequent diagnosis was diseases of the respiratory system (50.42%) followed by

infectious and parasitic diseases (30.25%) and symptoms, signs, and ill-defined conditions (18.49%). Children exposed to maltreatment in the first five years of life had more diagnosis records in 9 disease categories (i.e. disease of the blood and blood-forming organs, mental disorders, diseases of the circulatory system, diseases of the respiratory system, diseases of the genitourinary system, diseases of the skin and subcutaneous tissue, diseases of the musculoskeletal system and connective tissue, congenital anomalies, and injury and poisoning), whereas non-exposed children had more diagnosis records in 5 disease categories (i.e. infectious and parasitic diseases, neoplasms, diseases of the nervous system and sense organs, disease of the digestive system, and symptoms, signs, and ill-defined conditions). The findings suggest that children experiencing maltreatment in the first five years of life face a higher risk of diseases and health-related problems than those without.

Table 4-5. Diagnosis records of young children overall and by ECM status.

Description (ICD-9-CM code range)	Total	Early childhood maltreatment experience	
	n = 119	Yes (n = 64)	No (n = 55)
		n (%)	
Infectious and parasitic diseases (001-139)	36 (30.25%)	16 (25.00%)	20 (36.36%)
Neoplasms (140-239)	1 (0.84%)	0 (0.00%)	1 (1.82%)
Endocrine, nutritional and metabolic diseases, and immunity disorders (240-279)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Diseases of the blood and blood-forming organs (280-289)	2 (1.68%)	2 (3.13%)	0 (0.00%)
Mental disorders (290-319)	3 (2.52%)	2 (3.13%)	1 (1.82%)
Diseases of the nervous system and sense organs (320-389)	5 (4.20%)	1 (1.56%)	4 (7.27%)
Diseases of the circulatory system (390-459)	1 (0.84%)	1 (1.56%)	0 (0.00%)
Diseases of the respiratory system (460-519)	60 (50.42%)	34 (53.13%)	26 (47.27%)
Diseases of the digestive system (520-579)	12 (10.08%)	5 (7.81%)	7 (12.73%)
Diseases of the genitourinary system (580-629)	5 (4.20%)	3 (4.69%)	2 (3.64%)
Complications of pregnancy, childbirth, and the puerperium (630-679)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Diseases of the skin and subcutaneous tissue (680-709)	5 (4.20%)	4 (6.25%)	1 (1.82%)

Diseases of the musculoskeletal system and connective tissue (710-739)	3 (2.52%)	3 (4.69%)	0 (0.00%)
Congenital anomalies (740-759)	3 (2.52%)	3 (4.69%)	0 (0.00%)
Certain conditions originating in the perinatal period (760-779)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Symptoms, signs, and ill-defined conditions (780-799)	22 (18.49%)	11 (17.19%)	11 (20.00%)
Injury and poisoning (800-999)	21 (17.65%)	13 (20.31%)	8 (14.55%)

4.2.2 Behavioral problems among children with and without evidence of ECM experiences

The follow-up survey examined different aspects of behavioral problems (psychosocial wellbeing, hyperactive and inattentive symptoms, depressive and anxious symptoms, and daily functioning) using both maternal proxy-report and child self-report measures. We analyzed these behavioral outcomes by ECM exposure status identified through maternal baseline questionnaire responses or electronic health records that are verified by healthcare professionals.

4.2.2.1 Psychosocial wellbeing (maternal proxy-report)

When ECM exposure was determined through maternal baseline questionnaire responses (Table 4-6b), there was no significant differences in psychosocial wellbeing between children with and without such exposure. However, when determined through electronic health records (Table 4-6a), there were significant differences in overall psychosocial problems and emotional symptoms and conduct problems between children with and without ECM exposure. Children with substantiated ECM records had higher levels of psychosocial problems (B=3.07, p=0.012), emotional symptoms (B=0.91, p=0.027), and conduct problems (B=0.90, p=0.015) than those without such records.

Table 4-6a. Comparison of SDQ-measured psychosocial wellbeing between children with early childhood maltreatment exposure substantiated by health professionals and those without.

SDQ scales	Early childhood maltreatment identified by electronic health records		d	B (95%CI)	p-value
	Yes (n = 25)	No (n = 153)			

	Mean (SD)	Mean (SD)			
Overall psychosocial problems	15.16 (5.91)	12.12 (5.60)	0.53	3.07 (0.69,5.44)	0.012
Emotional symptoms	2.80 (2.06)	1.84 (1.84)	0.49	0.91 (0.11,1.71)	0.027
Conduct problems	3.32 (1.68)	2.44 (1.71)	0.52	0.90 (0.18,1.63)	0.015
Hyperactivity	6.24 (2.60)	5.30 (2.33)	0.38	0.96 (-0.05,1.97)	0.062
Peer problems	2.80 (1.96)	2.53 (1.48)	0.16	0.30 (-0.36,0.95)	0.370

SD: standard deviation
Adjusted for child age and gender

Table 4-6b. Comparison of SDQ-measured psychosocial wellbeing between children with early childhood maltreatment exposure identified through maternal baseline questionnaire responses and those without.

SDQ scales	Early childhood maltreatment identified by questionnaires		d	B (95%CI)	p-value
	Yes (n = 98)	No (n = 88)			
	Mean(SD)	Mean(SD)			
Overall psychosocial problems	13.06 (6.15)	11.84 (5.11)	0.22	0.69 (-1.11,2.44)	0.459
Emotional symptoms	2.11 (2.11)	1.82 (1.64)	0.15	0.14 (-0.46,0.75)	0.642
Conduct problems	2.73 (1.76)	2.34 (1.62)	0.23	0.32 (-0.21,0.85)	0.236
Hyperactivity	5.59 (2.54)	5.19 (2.20)	0.17	0.22 (-0.53,0.97)	0.566
Peer problems	2.62 (1.59)	2.49 (1.48)	0.08	-0.01 (-0.49,0.46)	0.952

SD: standard deviation
Adjusted for child age and gender

4.2.2.2 Hyperactive and inattentive symptoms (maternal proxy-report)

There were no significant differences in hyperactive and inattentive problems between children with and without ECM exposure irrespective of whether it was determined through maternal baseline questionnaire responses (Table 4-7b) or electronic health records (Table 4-7a).

Table 4-7a. Comparison of SWAN-measured hyperactive and inattentive problems between children with early childhood maltreatment exposure substantiated by health professionals and those without.

SWAN scales	Early childhood maltreatment identified by electronic health records		d	B (95%CI)	p-value
	Yes (n = 25)	No (n = 150)			
	Mean(SD)	Mean(SD)			
Overall hyperactive and inattentive problems	0.30 (1.09)	-0.11 (1.15)	0.37	0.45 (-0.03,0.93)	0.138
Hyperactive problems	0.20 (1.44)	-0.25 (1.38)	0.32	0.51 (-0.07,1.08)	0.086
Inattentive problems	0.41 (0.98)	0.02 (1.05)	0.38	0.40 (-0.05,0.84)	0.078

SD: standard deviation
Adjusted for child age and gender

Table 4-7b. Comparison of SWAN-measured hyperactive and inattentive problems between children with early childhood maltreatment exposure identified through maternal baseline questionnaire responses and those without.

SWAN scales	Early childhood maltreatment identified by questionnaires		d	B (95%CI)	p-value
	Yes (n = 97)	No (n = 86)			
	Mean(SD)	Mean(SD)			
Overall hyperactive and inattentive problems	-0.01 (1.21)	-0.15 (1.05)	0.12	0.08 (-0.28,0.43)	0.680
Hyperactive problems	-0.19 (1.53)	-0.26 (1.22)	0.05	-0.01 (-0.44,0.42)	0.974
Inattentive problems	0.16 (1.05)	-0.03 (1.02)	0.18	0.16 (-0.17,0.49)	0.939

SD: standard deviation
Adjusted for child age and gender

4.2.2.3 Depressive and anxious symptoms (maternal proxy-report/child self-report)

There were no significant between-group differences in symptoms of depression and anxiety when ECM exposure was determined by electronic health records (Table 4-8a). However, when identified through maternal baseline questionnaire responses (Table 4-8b), children with ECM exposure reported higher levels of depressive (B=1.52, p=0.021) and anxious symptoms (B=1.76, p=0.022) than those without.

Table 4-8a. Comparison of RCADS-measured depressive and anxious symptoms between children with early childhood maltreatment exposure substantiated by health professionals and those without.

RCADS scales	Early childhood maltreatment identified by electronic health	d	B (95%CI)	p-value

	records				
	Yes (n = 22)	No (n = 139)			
	Mean(SD)	Mean(SD)			
Depression scale	4.59 (3.33)	3.91 (4.09)	0.13	0.51 (-1.28,2.30)	0.578
Anxiety scale	8.14 (4.98)	6.14 (4.50)	0.42	1.82 (-0.24,3.88)	0.082

SD: standard deviation
Adjusted for child age and gender

Table 4-8b. Comparison of RCADS-measured depressive and anxious symptoms between children with early childhood maltreatment exposure identified through maternal baseline questionnaire responses and those without.

RCADS scales	Early childhood maltreatment identified by questionnaires		d	B (95%CI)	p-value
	Yes (n = 84)	No (n = 84)			
	Mean(SD)	Mean(SD)			
Depression scale	4.87 (3.96)	3.05 (3.78)	0.47	1.52 (0.23,2.81)	0.021
Anxiety scale	7.32 (4.86)	5.26 (4.07)	0.46	1.76 (0.26,3.25)	0.022

SD: standard deviation
Adjusted for child age and gender

4.2.2.4 Daily functioning (maternal proxy-report/child self-report)

There were no significant between-group differences in functioning when ECM exposure was determined by electronic health records (Table 4-9a). However, when identified through maternal baseline questionnaire responses (Table 4-9b), children with ECM exposure reported significantly lower levels of functioning in all domains except the social functioning domain than those without.

Table 4-9a. Comparison of PedsQL-measured functioning between children with early childhood maltreatment exposure substantiated by health professionals and those without.

PedsQL scales	Early childhood maltreatment identified by electronic health records		d	B (95%CI)	p-value
	Yes (n = 22)	No (n =138)			
	Mean(SD)	Mean(SD)			
Overall functioning	81.49 (11.07)	84.04 (11.47)	-0.23	-2.48 (-7.69,2.73)	0.348
Physical functioning	90.48 (9.57)	91.85 (9.93)	-0.11	-1.39 (-5.89,3.10)	0.541
Emotional	75.45 (19.02)	80.80 (17.35)	-0.29	-5.17 (-13.20,2.86)	0.205

functioning					
Social functioning	87.27 (14.62)	89.06 (14.42)	-0.12	-2.03 (-8.63,4.57)	0.544
School functioning	57.95 (21.59)	60.27 (25.87)	-0.10	-1.65 (-13.21,9.92)	0.779

SD: standard deviation
Adjusted for child age and gender

Table 4-9b. Comparison of PedsQL-measured functioning between children with early childhood maltreatment exposure identified through maternal baseline questionnaire responses and those without.

PedsQL scales	Early childhood maltreatment identified by questionnaires		d	B (95%CI)	p-value
	Yes (n = 83)	No (n = 84)			
	Mean(SD)	Mean(SD)			
Overall functioning	80.90 (12.05)	86.69 (10.14)	-0.52	-5.98 (-9.71, -2.24)	0.002
Physical functioning	89.19 (10.85)	94.08 (8.30)	-0.51	-4.98 (-8.21, -1.74)	0.003
Emotional functioning	76.75 (19.02)	83.87 (15.45)	-0.41	-7.08 (-12.89, -1.26)	0.017
Social functioning	87.17 (15.21)	90.48 (13.32)	-0.23	-3.79 (-8.57, 0.99)	0.119
School functioning	55.22 (24.89)	65.38 (24.42)	-0.41	-10.46 (-18.70, -2.21)	0.013

SD: standard deviation
Adjusted for child age and gender

4.2.3 Relation between maltreatment data sources and child behavioral problems

Tables 4-10a to 4-10d show the levels of behavioral problems in different aspects by records of questionnaire and hospital data. Compared to those with no ECM verified by both record types, children with both types of ECM records were found to have more conduct problems (B=1.12, p=0.019) and poorer functions overall (B=-6.67, p=0.049). When investigating each record type separately, children with only hospital records of ECM showed more psychosocial problems overall (B=4.41, p=0.022), particularly emotion-related variables measured by SDQ, RCAD, and PedsQL, than those without. On the other hand, children with only questionnaire records of ECM showed higher levels of depression (B=1.96, p=0.005) and anxiety (B=2.42, p=0.002) and poorer functions overall (B=-6.26, p=0.002), particularly for the physical (B=-5.10, p=0.004) and emotional (B=-8.04, p=0.011) functioning domains. As the hospital records of ECM can be an indicator of more severe ECM experiences, the

findings suggest that these severe ECM experiences could have negative effects on the emotional part of the human brain that is responsible for planning, impulse control, and reasoning. These negative effects on the brain structures may also have occurred in children with questionnaire-identified ECM, although the intensity of impairment appeared to be smaller for questionnaire-identified ECM than hospital recorded ECM. Notably, poorer physical functions were significantly associated only with questionnaire-identified ECM, suggesting that some maltreated cases were not detected by the hospital systems and milder forms of maltreated parenting behaviors such as mild physical neglect could also compromise the affected child's long-term physical health.

Table 4-10a. Comparison of SDQ-measured psychosocial wellbeing between children with early childhood maltreatment exposure and those without identified through questionnaire and electronic health records.

SDQ scales	Questionnaire + EHR n = 16		EHR only n = 9		Questionnaire only n = 79	
	B (95%CI)	p-value	B (95%CI)	p-value	B (95%CI)	p-value
Overall psychosocial problems	3.13 (0.07,6.20)	0.045	4.41 (0.64,8.19)	0.022	0.94 (-0.92,2.80)	0.322
Emotional symptoms	0.71 (-0.33,1.74)	0.180	1.68 (0.41,2.95)	0.010	0.27 (-0.35,0.90)	0.393
Conduct problems	1.12 (0.19,2.06)	0.019	1.04 (-0.12,2.19)	0.079	0.33 (-0.24,0.90)	0.254
Hyperactivity	1.18 (-0.12,2.49)	0.076	0.96 (-0.65,2.57)	0.242	0.25 (-0.54,1.04)	0.539
Peer problems	0.12 (-0.72,0.97)	0.775	0.74 (-0.31,1.78)	0.166	0.09 (-0.43,0.60)	0.737

Reference group: No early childhood trauma exposure (n = 74)
Adjusted for child age and gender

Table 4-10b. Comparison of SWAN-measured hyperactive and inattentive problems between children with early childhood maltreatment exposure and those without identified through questionnaire and electronic health records.

SWAN scales	Questionnaire + EHR n = 16		EHR only n = 9		Questionnaire only n = 78	
	B (95%CI)	p-value	B (95%CI)	p-value	B (95%CI)	p-value
Overall hyperactive and inattentive problems	0.48 (-0.14,1.10)	0.126	0.68 (-0.08,1.45)	0.080	0.18 (-0.20,0.56)	0.344
Hyperactive	0.40	0.292	0.92	0.050	0.15	0.524

problems	(-0.35,1.15)		(-0.002,1.83)		(-0.31,0.60)	
Inattentive problems	0.57 (-0.01,1.14)	0.053	0.45 (-0.26,1.15)	0.213	0.22 (-0.13,0.57)	0.223

Reference group: No early childhood trauma exposure (n = 72)
Adjusted for child age and gender

Table 4-10c. Comparison of RCADS-measured depressive and anxious symptoms between children with early childhood maltreatment exposure and those without identified through questionnaire and electronic health records.

RCADS scales	Questionnaire + EHR n = 13		EHR only n = 9		Questionnaire only n = 69	
	B (95%CI)	p-value	B (95%CI)	p-value	B (95%CI)	p-value
Depression scale	0.72 (-1.58, 3.01)	0.540	2.69 (0.06,5.33)	0.045	1.96 (0.59, 3.33)	0.005
Anxiety scale	1.82 (-0.79,4.43)	0.173	4.90 (1.90,7.91)	0.001	2.42 (0.85,3.98)	0.002

Reference group: No early childhood trauma exposure (n = 70)
Adjusted for child age and gender

Table 4-10d. Comparison of PedsQL-measured functioning between children with early childhood maltreatment exposure and those without identified through questionnaire and electronic health records.

PedsQL scales	Questionnaire + EHR n = 13		EHR only n = 9		Questionnaire only n = 68	
	B (95%CI)	p-value	B (95%CI)	p-value	B (95%CI)	p-value
Overall functioning	-6.67 (-13.32,-0.02)	0.049	-4.40 (-12.05,3.24)	0.259	-6.26 (-10.25,-2.28)	0.002
Physical functioning	-4.84 (-10.59,0.91)	0.099	-2.91 (-9.52,3.71)	0.389	-5.10 (-8.54,-1.65)	0.004
Emotional functioning	-7.47 (-17.81,2.86)	0.156	-12.05 (-23.93,-0.17)	0.047	-8.04 (-14.23,-1.84)	0.011
Social functioning	-6.18 (-14.78,2.42)	0.159	-0.49 (-10.38,9.40)	0.923	-3.48 (-8.64,1.67)	0.186
School functioning	-11.03 (-25.94,3.87)	0.147	-2.18 (-19.31,14.95)	0.803	-11.05 (-19.89,-2.21)	0.015

Reference group: No early childhood trauma exposure (n = 70)
Adjusted for child age and gender

4.2.4 Relation between timing of maltreatment and child behavioral problems

Tables 4-11a to 4-11d show the levels of behavioral problems in different aspects among children with ECM in the presence or absence of maltreatment exposure at the follow-up based on questionnaire responses. Compared to those with no records of ECM at both time

points, children exposed to maltreatment both at the baseline and follow-up phases showed more psychosocial problems (B=4.04, p<0.001) in all domains except the peer problem domain, higher levels of depression (B=3.66, p<0.001) and anxiety (B=3.88, p<0.001) symptoms, and lower levels of overall and specific functions. The findings highlight the profound effects of repeated maltreatment on child development and health. When investigating the associations at each assessment time point, the concurrent associations of maltreatment experiences and behavioral problems at the follow-up phase were generally strong and significant, but the effect of ECM alone (i.e. no maltreatment episodes at the follow-up phase) was relatively mild by comparison, suggesting that the affected children can be empowered to recover from or overcome early childhood adversities including ECM.

Table 4-11a. Comparison of SDQ-measured psychosocial wellbeing in children by timing of maltreatment experiences.

SDQ scales	ECM + FU n = 59		FU only n = 45		ECM only n = 39	
	B (95%CI)	p-value	B (95%CI)	p-value	B (95%CI)	p-value
Overall psychosocial problems	4.04 (1.90,6.18)	<0.001	3.93 (1.74,6.12)	<0.001	0.46 (-1.89,2.81)	0.703
Emotional symptoms	0.77 (0.01,1.53)	0.048	0.63 (-0.15,1.40)	0.113	-0.02 (-0.86,0.81)	0.957
Conduct problems	1.39 (0.75,2.03)	<0.001	1.39 (0.74,2.05)	<0.001	0.45 (-0.26,1.15)	0.213
Hyperactivity	1.57 (0.66,2.48)	0.001	1.54 (0.61,2.46)	0.001	0.90 (-0.91,1.09)	0.860
Peer problems	0.32 (-0.29,0.93)	0.303	0.37 (-0.25,0.99)	0.239	-0.06 (-0.72,0.61)	0.871

Reference group: No childhood trauma exposure (n = 43)
Adjusted for child age and gender

Table 4-11b. Comparison of SWAN-measured hyperactive and inattentive problems in children by timing of maltreatment experiences.

SWAN scales	ECM + FU n = 59		FU only n = 45		ECM only n = 39	
	B (95%CI)	p-value	B (95%CI)	p-value	B (95%CI)	p-value
Overall hyperactive and inattentive problems	0.66 (0.22,1.10)	0.004	0.70 (0.25,1.15)	0.002	0.09 (-0.39,0.57)	0.714
Hyperactive problems	0.57 (0.03,1.11)	0.040	0.66 (0.11,1.21)	0.020	-0.03 (-0.62,0.56)	0.914

Inattentive problems	0.75 (0.35,1.16)	<0.001	0.74 (0.33,1.16)	<0.001	0.21 (-0.23,0.66)	0.344

Reference group: No childhood trauma exposure (n = 41)
Adjusted for child age and gender

Table 4-11c. Comparison of RCADS-measured depressive and anxious symptoms in children by timing of maltreatment experiences.

RCADS scales	ECM + FU n = 52		FU only n = 45		ECM only n = 32	
	B (95%CI)	p-value	B (95%CI)	p-value	B (95%CI)	p-value
Depression scale	3.61 (2.02,5.19)	<0.001	2.78 (1.21,4.34)	0.001	1.95 (0.18,3.72)	0.031
Anxiety scale	3.88 (2.02,5.73)	<0.001	2.75 (0.91,4.58)	0.003	2.10 (0.02,4.17)	0.048

Reference group: No childhood trauma exposure (n = 39)
Adjusted for child age and gender

Table 4-11d. Comparison of PedsQL-measured functioning in children by timing of maltreatment experiences.

PedsQL scales	ECM + FU n = 51		FU only n = 45		ECM only n = 32	
	B (95%CI)	p-value	B (95%CI)	p-value	B (95%CI)	p-value
Overall functioning	-11.99 (-16.59,-7.39)	<0.001	-7.42 (-11.96,-2.89)	0.001	-6.45 (-11.58,-1.31)	0.014
Physical functioning	-7.38 (-11.50,-3.26)	<0.001	-2.11 (-6.18,1.96)	0.309	-3.97 (-8.58,0.63)	0.091
Emotional functioning	-15.38 (-22.61,-8.15)	<0.001	-9.33 (-16.46,-2.20)	0.010	-6.45 (-14.53,1.62)	0.117
Social functioning	-10.36 (-16.32,-4.40)	0.001	-8.26 (-14.14,-2.38)	0.006	-4.51 (-11.17,2.14)	0.184
School functioning	-21.37 (-31.63,-11.10)	<0.001	-17.02 (-27.15,-6.90)	0.001	-16.24 (-27.71,-4.78)	0.005

Reference group: No childhood trauma exposure (n = 39)
Adjusted for child age and gender

4.2.5 <u>The impact of improvement in family cohesion or maternal-perceived social support on the relation between early maltreatment exposure and child behavioral problems</u>

This section presents the findings of a comprehensive examination of child behavioral development by indicators of maternal social life improvement. Multiple indicators of behaviors were selected, namely SDQ conduct problems, SWAN overall hyperactive and inattentive problems, RCADS depression and anxiety, and PedsQL social functioning scale

scores. As family cohesion and social support were measured using the same scales at the baseline and follow-up assessment, the degree of improvement can be estimated by studying the differences in scale scores since the baseline survey. Individuals with positive changes at the follow-up assessment would be assigned to the group with improvement, whereas individuals with negative or no changes would be assigned to the group without improvement.

4.2.5.1 Improvement in family cohesion

Subgroup analyses were conducted to explore differences in the strength and significance of the associations between ECM and behavioral problems of interest among children with (Table 4-12a) and without improvement (Table 4-12b) in family cohesion. The results showed a significant increase in the SDQ conduct problems scale score (B=0.96, p=0.003) and the RCADS Depression scale (B=2.27, p=0.002) and a significant decrease in the PedsQL social functioning scale score (B=-6.53, p=0.041) among children with ECM than those without only when family cohesion was improved during the follow-up period. Figure 4-1 illustrates how family cohesion improvement over the years may affect the association between ECM and conduct problems in children. As shown, although children with ECM showed similar levels of conduct problems irrespective of whether family cohesion was improved, when family cohesion showed improvement, the effect of ECM on conduct problems became stronger because of a bigger reduction in conduct problems among children without ECM. The finding suggests that while family cohesion improvement may not be able to undo the damages caused by ECM, better family dynamics is conducive to the healthy behavioral development of all children regardless of their history of childhood adversities. Notably, chronic exposure to family chaos appeared to be more harmful to those children without other adverse experiences, perhaps because prior adversities might have uplifted the affected children's threshold for fear and chaos tolerance. Therefore, their responses to family chaos could be more subtle when compared to those without prior adversity exposure.

Table 4-12a. Effect of ECM on child behavioral problems under improved family cohesion.

	Number of children with ECM	Number of children without ECM (reference group)	B (95%CI)	p-value
SDQ conduct problems	67	49	0.96 (0.34,1.59)	0.003

SWAN overall hyperactive and inattentive problems	67	49	0.28 (-0.17, 0.72)	0.227
RCADS Depression scale	59	47	2.27 (0.87, 3.68)	0.002
RCADS Anxiety scale	59	47	1.74 (-0.18, 3.66)	0.075
PedsQL social functioning	59	47	-6.53 (-12.81, -0.26)	0.041

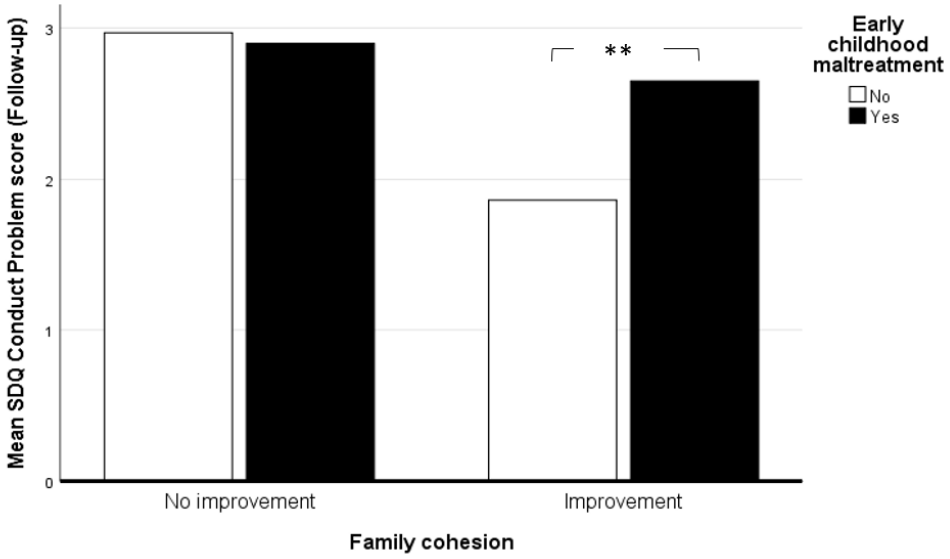
Adjusted for child age and gender

Table 4-12b. Effect of ECM on child behavioral problems under no family cohesion improvement.

	Number of children with ECM	Number of children without ECM (reference group)	B (95%CI)	p-value
SDQ conduct problems	27	36	-0.27 (-1.30,0.76)	0.597
SWAN overall hyperactive and inattentive problems	27	36	0.02 (-0.63,0.67)	0.942
RCADS Depression score	23	36	1.49 (-1.15,4.13)	0.262
RCADS Anxiety score	23	36	2.52 (-0.11,5.15)	0.060
PedsQL social functioning	22	36	-1.73 (-9.93,6.47)	0.674

Adjusted for child age and gender

Figure 4-1. Effect of ECM on child conduct problems by status of improvement in family cohesion.



4.2.5.2 Improvement in maternal-perceived social support

Subgroup analyses were conducted to explore differences in the strength and significance of the associations between ECM and behavioral problems of interest among children with (Table 4-13a) and without improvement (Table 4-13b) in maternal-perceived social support. Similar to the finding of the analysis by family cohesion improvement status, a significant increase in the RCADS Depression scale (B=1.73, p=0.025) was observed among children with ECM than those without only when social support was improved during the follow-up period. However, the results showed no significant differences in children's conduct problems or social functioning between the ECM groups for both maternal-perceived social support conditions. Figure 4-2 illustrates the impact of maternal-perceived social support changes on the association between ECM and conduct problems in children. As shown, children exposed to ECM, regardless of whether mothers perceived an improvement in social support, demonstrated more conduct problems than those without ECM. The findings suggest that improvement in maternal-perceived social support, compared to improvement in family cohesion, was less influential on the association between ECM and behavioral problems in children.

Table 4-13a. Effect of ECM on child behavioral problems under improved social support.

	Number of children with ECM	Number of children without ECM (reference group)	B(95%CI)	p-value
SDQ conduct problems	56	40	0.35 (-0.41,1.10)	0.361
SWAN overall hyperactive and inattentive problems	56	40	0.18 (-0.33,0.70)	0.484
RCADS Depression score	47	39	1.73 (0.22,3.25)	0.025
RCADS Anxiety score	47	39	1.76 (-0.39,3.90)	0.107
PedsQL social functioning	47	39	-4.73 (-11.79,2.34)	0.187

Adjusted for child age and gender

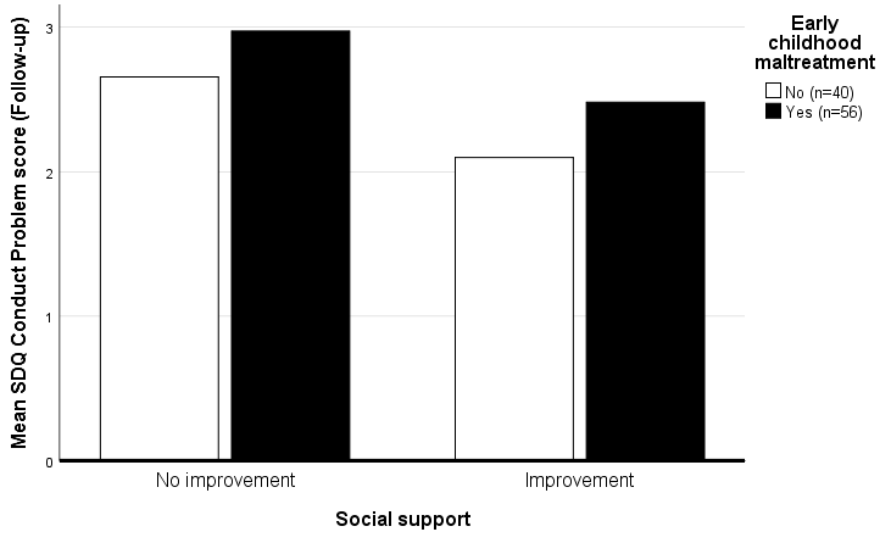
Table 4-13b. Effect of ECM on child behavioral problems under no social support improvement.

	Number of children with ECM	Number of children without ECM (reference group)	B (95%CI)	p-value
SDQ conduct problems	40	46	0.34 (-0.47,1.14)	0.404
SWAN overall hyperactive and inattentive problems	40	46	0.06 (-0.45,0.57)	0.819

RCADS Depression score	37	45	1.56 (-0.52,3.64)	0.140
RCADS Anxiety score	37	45	1.97 (-0.16,4.10)	0.070
PedsQL social functioning	36	45	-3.05 (-9.83,3.73)	0.374

Adjusted for child age and gender

Figure 4-2. Effect of ECM on child conduct problems by status of improvement in social support.



4.3 Health and behavioral characteristics of subjects based on RRP exposure status

While the previous section focuses on children aged five years or below at baseline, this section focuses on all cohort children. Furthermore, this section would describe the health and behavioral outcomes of children born to mothers with and without a history of RRP (i.e. any pregnancy occurring within 24 months after any previous pregnancy outcomes, inclusive of abortion, miscarriage, still birth, or live birth).

4.3.1 Children's healthcare service utilization and diagnoses based on RRP exposure status

Table 4-14 describes the cohort children's healthcare service utilization overall and based on their RRP exposure status. Among all studied cohort children, 87 (23.32%) had records of admission to neonatal intensive care unit immediately after birth. 288 (79.34%) had used AED services, with an average number of 6.93 visits per subject, 122 of which were related to traumatic exposure, and the average age of first AED attendance was 0.81 years. Moreover, 208 had hospital admission records with an average number of 2.20 hospital admission

records per subject. When focusing only on the post-baseline service statistics, there were 77 trauma-related AED attendance records with significant differences observed between children born to mothers with a history of RRP and those without (p=0.026). Children born to mothers with a history of RRP were found to have more records of trauma-related AED attendance than those without (24.82% vs 18.22%). For other parameters, there were no significant between-group differences by status of RRP exposure.

Table 4-14. Children's healthcare service utilization by RRP exposure status.

Child healthcare utilisation pattern	Total	Born to mothers with RRP experience		*p#*
	n = 363	Yes (n = 127)	No (n = 236)	
	n (%) / Mean (SD)			
Admitted to NICU immediately after birth	87 (23.32%)	34 (24.82%)	53 (22.46%)	0.255
Since Birth				
Used any AED services	288 (79.34%)	101 (79.53%)	187 (79.24%)	0.436
Had trauma-related AED attendances	122 (32.71%)	49 (35.77%)	73 (30.93%)	0.214
Admitted to hospital	208 (55.76%)	70 (51.09%)	138 (58.47%)	0.946
Since the baseline survey (July 2015)				
Used any AED services	237 (63.54%)	84 (61.31%)	153 (64.83%)	0.198
Had trauma-related AED attendances	77 (20.64%)	34 (24.82%)	43 (18.22%)	0.026
Admitted to hospital	139 (37.27%)	45 (32.85%)	94 (39.83%)	0.596
Number of AED attendances				
Ever since birth	6.93 (10.63)	7.08 (7.75)	6.85 (11.90)	0.740
Since the baseline survey (July 2015)	3.06 (4.16)	3.00 (4.16)	3.09 (4.17)	0.444
Number of trauma-related AED attendances				
Ever since birth	0.56 (1.11)	0.54 (0.80)	0.56 (1.24)	0.604
Since the baseline survey (July 2015)	0.27 (0.66)	0.30 (0.52)	0.25 (0.73)	0.350
Number of hospital admission				
Ever since birth	2.20 (4.33)	2.02 (2.30)	2.29 (5.10)	0.823
Since the baseline survey (July 2015)	0.93 (3.90)	0.62 (1.04)	1.10 (4.77)	0.567
Age of first AED attendance	0.81 (1.17)	0.75 (0.89)	0.84 (1.29)	0.347
Age of first hospital admission (excluding those admitted to NICU immediately after birth)	1.11 (1.79)	1.08 (1.84)	1.12 (1.77)	0.645

AED: Accident and Emergency Department; NICU: Neonatal Intensive Care Unit; SD: standard deviation

Adjusted for child age and gender

Table 4-15 describes the disease description of the 254 cohort children who had diagnosis records in the CDARS during the 6-year follow-up period. The most frequent diagnosis was diseases of the respiratory system (50.42%) followed by infectious and parasitic diseases (39.76%) and certain conditions originating in the perinatal period (27.17%). Children born to mothers with a history of RRP had more diagnosis records in 8 disease categories (i.e. infectious and parasitic diseases, diseases of the blood and blood-forming organs, mental disorders, diseases of the musculoskeletal system and connective tissue, congenital anomalies, certain conditions originating in the perinatal period, symptoms, signs, and ill-defined conditions, and injury and poisoning), whereas children born to mothers without RRP had more diagnosis records in 7 disease categories (i.e. endocrine, nutritional and metabolic diseases, and immunity disorders, diseases of the nervous system and sense organs, diseases of the circulatory system, diseases of the respiratory system, diseases of the digestive system, diseases of the genitourinary system, and diseases of the skin and subcutaneous tissue). The findings suggest that children born to mothers with a history of RRP had a slightly higher risk of diseases and health-related problems than those without.

Table 4-15. Children's diagnosis records by RRP exposure status

Description (ICD-9-CM code range)	Total	Born to mothers with RRP experience	
	n = 254	Yes (n = 89)	No (n = 165)
	n (%)		
Infectious and parasitic diseases (001-139)	101 (39.76%)	37 (41.57%)	64 (38.79%)
Neoplasms (140-239)	3 (1.18%)	1 (1.12%)	2 (1.21%)
Endocrine, nutritional and metabolic diseases, and immunity disorders (240-279)	1 (0.39%)	0 (0.00%)	1 (0.61%)
Diseases of the blood and blood-forming organs (280-289)	2 (0.79%)	2 (2.25%)	0 (0.00%)
Mental disorders (290-319)	4 (1.57%)	3 (3.37%)	1 (0.61%)
Diseases of the nervous system and sense organs (320-389)	11 (4.33%)	1 (1.12%)	10 (6.06%)
Diseases of the circulatory system (390-459)	1 (0.39%)	0 (0.00%)	1 (0.61%)
Diseases of the respiratory system (460-519)	129 (50.79%)	45 (50.56%)	84 (50.91%)
Diseases of the digestive system (520-579)	25 (9.84%)	6 (6.74%)	19 (11.52%)
Diseases of the genitourinary system (580-629)	13 (5.12%)	4 (4.49%)	9 (5.45%)

Complications of pregnancy, childbirth, and the puerperium (630-679)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Diseases of the skin and subcutaneous tissue (680-709)	9 (3.54%)	1 (1.12%)	8 (4.85%)
Diseases of the musculoskeletal system and connective tissue (710-739)	7 (2.76%)	3 (3.37%)	4 (2.42%)
Congenital anomalies (740-759)	12 (4.72%)	6 (6.74%)	6 (3.64%)
Certain conditions originating in the perinatal period (760-779)	69 (27.17%)	27 (30.34%)	42 (25.45%)
Symptoms, signs, and ill-defined conditions (780-799)	66 (25.98%)	24 (26.97%)	42 (25.45%)
Injury and poisoning (800-999)	34 (13.39%)	14 (15.73%)	20 (12.12%)

4.3.2 Behavioral problems among children of all surveyed mothers with and without RRP history

The follow-up survey examined different aspects of behavioral problems (psychosocial wellbeing, hyperactive and inattentive symptoms, depressive and anxious symptoms, and daily functioning) using both maternal proxy-report and child self-report measures. We analyzed these problems in children based on their mothers' history of RRP. In addition to the whole-sample analysis, we also conducted subgroup analyses targeting the subset of children aged five years or below at baseline to examine the short-term effect of RRP.

4.3.2.1 Psychosocial wellbeing (maternal proxy-report)

No significant associations were observed in the subset of children aged five years or below at baseline (Table 4-16b), but when we examined all children (Table 4-16a), maternal history of RRP was significantly associated with more psychosocial problems in children (B=1.58, p=0.039), particularly in the domain of conduct problems (B=0.59, p=0.010).

Table 4-16a. Comparison of SDQ-measured psychosocial wellbeing between children born to mothers with a history of RRP and those without (whole sample).

SDQ scales	Born to mothers with RRP experience		d	B (95%CI)	p-value
	Yes (n = 80)	No (n = 152)			
	Mean(SD)	Mean(SD)			
Overall psychosocial	12.89(5.26)	11.45 (5.71)	0.26	1.58 (0.08,3.07)	0.039

problems					
Emotional symptoms	2.09 (2.01)	1.68 (1.78)	0.22	0.45 (-0.07,0.96)	0.088
Conduct problems	2.81 (1.61)	2.26 (1.68)	0.33	0.59 (0.14,1.05)	0.010
Hyperactivity	5.50 (2.32)	5.02 (2.38)	0.20	0.54 (-0.09,1.18)	0.095
Peer problems	2.49 (1.38)	2.49 (1.60)	0.00	-0.10 (-0.42,0.40)	0.966

SD: standard deviation
Adjusted for child age and gender

Table 4-16b. Comparison of SDQ-measured psychosocial wellbeing between children born to mothers with a history of RRP and those without (young children aged ≤ 5 at baseline).

SDQ scales	Born to mothers with RRP experience		d	B (95%CI)	p-value
	Yes (n = 63)	No (n = 123)			
	Mean(SD)	Mean(SD)			
Overall psychosocial problems	13.08 (5.41)	12.18 (5.84)	0.16	0.72 (-1.04,2.48)	0.419
Emotional symptoms	2.10 (2.05)	1.91 (1.83)	0.10	0.10 (-0.50,0.70)	0.747
Conduct problems	2.79 (1.67)	2.42 (1.71)	0.22	0.36 (-0.16,0.89)	0.176
Hyperactivity	5.71 (2.36)	5.24 (2.39)	0.20	0.43 (-0.32,1.17)	0.258
Peer problems	2.48 (1.29)	2.60 (1.65)	-0.08	-0.17 (-0.64,0.31)	0.491

SD: standard deviation
Adjusted for child age and gender

4.3.2.2 Hyperactive and inattentive symptoms (maternal proxy-report)

No significant associations between maternal RRP history and child ADHD symptoms were observed for all children (Table 4-17a) and those aged five years or below at baseline (Table 4-17b).

Table 4-17a. Comparison of SWAN-measured hyperactive and inattentive problems between children born to mothers with a history of RRP and those without (whole sample).

SWAN scales	Born to mothers with RRP experience		d	B (95%CI)	p-value
	Yes (n = 80)	No (n = 149)			
	Mean(SD)	Mean(SD)			
Overall hyperactive and inattentive problems	-0.08 (1.11)	-0.19 (1.13)	0.10	0.12 (-0.18,0.43)	0.422
Hyperactive problems	-0.27 (1.29)	-0.40 (1.42)	0.10	0.18 (-0.19,0.54)	0.345
Inattentive problems	0.11 (1.08)	0.03 (1.00)	0.08	0.07 (-0.21,0.36)	0.611

SD: standard deviation

Adjusted for child age and gender

Table 4-17b. Comparison of SWAN-measured hyperactive and inattentive problems between children born to mothers with a history of RRP and those without (young children aged ≤ 5 at baseline).

SWAN scales	Born to mothers with RRP experience		d	B (95%CI)	p-value
	Yes (n = 63)	No (n = 120)			
	Mean(SD)	Mean(SD)			
Overall hyperactive and inattentive problems	-0.05 (1.14)	-0.09 (1.14)	0.04	0.04 (-0.31,0.39)	0.838
Hyperactive problems	-0.18 (1.35)	-0.25 (1.41)	0.05	0.08 (-0.34,0.51)	0.708
Inattentive problems	0.08 (1.07)	0.07 (1.03)	0.01	-0.01 (-0.33,0.32)	0.965

SD: standard deviation
Adjusted for child age and gender

4.3.2.3 Depressive and anxious symptoms (maternal proxy-report/child self-report)

No significant associations between maternal RRP history and child depressive and anxious symptoms were observed for all children (Table 4-18a) and those aged five years or below at baseline (Table 4-18b).

Table 4-18a. Comparison of RCADS-measured depressive and anxious symptoms between children born to mothers with a history of RRP and those without (whole sample).

RCADS scales	Born to mothers with RRP experience		d	B(95%CI)	p-value
	Yes (n = 74)	No (n = 140)			
	Mean(SD)	Mean(SD)			
Depression scale	4.61 (4.50)	3.61 (3.67)	0.25	0.87 (-0.26,2.01)	0.131
Anxiety scale	6.57 (4.91)	5.94 (4.82)	0.13	0.53 (-0.86,1.92)	0.456

SD: standard deviation
Adjusted for child age and gender

Table 4-18b. Comparison of RCADS-measured depressive and anxious symptoms between children born to mothers with a history of RRP and those without (young children aged ≤ 5 at baseline).

RCADS scales	Born to mothers with RRP experience		d	B(95%CI)	p-value
	Yes (n = 58)	No (n = 111)			
	Mean(SD)	Mean(SD)			

Depression scale	4.67 (4.49)	3.58 (3.61)	0.27	0.77 (-0.51,2.05)	0.237
Anxiety scale	6.76 (4.78)	6.04 (4.46)	0.16	0.35 (-1.14,1.84)	0.643

SD: standard deviation
Adjusted for child age and gender

4.3.2.4 Daily functioning (maternal proxy-report/child self-report)

No significant associations between maternal RRP history and child functioning were observed for all children (Table 4-19a) and those aged five years or below at baseline (Table 4-19b).

Table 4-19a. Comparison of PedsQL-measured functioning between children born to mothers with a history of RRP and those without (whole sample).

PedsQL scales	Born to mothers with RRP experience		d	B(95%CI)	p-value
	Yes (n = 73)	No (n=140)			
	Mean(SD)	Mean(SD)			
Overall functioning	83.74 (11.58)	84.64 (11.37)	-0.08	-0.94 (-4.23,2.36)	0.577
Physical functioning	92.08 (8.70)	91.29 (10.98)	0.08	1.07 (-1.87,4.01)	0.475
Emotional functioning	80.62 (19.33)	82.04 (17.42)	-0.08	-1.54 (-6.76,3.68)	0.561
Social functioning	88.01 (15.47)	89.75 (13.25)	-0.12	-1.66 (-5.69,2.37)	0.417
School functioning	59.59 (28.49)	62.74 (24.37)	-0.12	-4.05 (-11.45,3.35)	0.282

SD: standard deviation
Adjusted for child age and gender

Table 4-19b. Comparison of PedsQL-measured functioning between children born to mothers with a history of RRP and those without (young children aged ≤ 5 at baseline).

PedsQL scales	Born to mothers with RRP experience		d	B (95%CI)	p-value
	Yes (n = 57)	No (n = 111)			
	Mean(SD)	Mean(SD)			
Overall functioning	82.31 (11.63)	84.50 (11.35)	-0.19	-1.88 (-.5.66,1.91)	0.329
Physical functioning	91.23 (8.89)	91.95 (10.45)	-0.07	-0.46 (-3.75,2,82)	0.782
Emotional functioning	78.51 (17.85)	81.35 (17.46)	-0.16	-2.34 (-8.16,3.48)	0.428
Social	86.75 (16.16)	89.59 (13.60)	-0.19	-3.02 (-7.82,1.77)	0.215

functioning					
School functioning	57.46 (27.94)	61.41 (23.78)	-0.15	-2.96 (-11.29,5.38)	0.485

SD: standard deviation
Adjusted for child age and gender

4.3.3 Path model linking maternal RRP history to child psychosocial problems and emergency room attendance at follow-up

This section describes the mechanism underlying the relationship between maternal RRP history and child psychosocial problems and emergency room attendance at follow-up. To examine the possible link between RRP history and suboptimal parenting, we examined maternal stress and child physical abuse measured at baseline (Time 1) as factors linking maternal RRP history and child psychosocial problems and emergency room attendance at follow-up (Time 2). Child age and gender and baseline household income adjusted for household size were the control variables. The model was tested in the whole sample and subgroups based on the status of family cohesion improvement defined as positive changes in family cohesion since the baseline assessment. The magnitude and significance of path estimates in each study sample were compared to examine the impact of family cohesion improvement on the associations between different variables of interest. To evaluate the overall model fit, we used chi-square, the root mean square error approximation (RMSEA), the standardized root mean square residual (SRMR), the confirmatory fit index (CFI), and the Tucker Lewis Index (TLI). A non-significant chi-square value ($p>0.05$), RMSEA < 0.08, SRMR < 0.08, CFI > 0.90, and TLI $\geq$ 0.90 reflect an acceptable model fit (Hooper et al., 2008; Hu & Bentler, 1999).

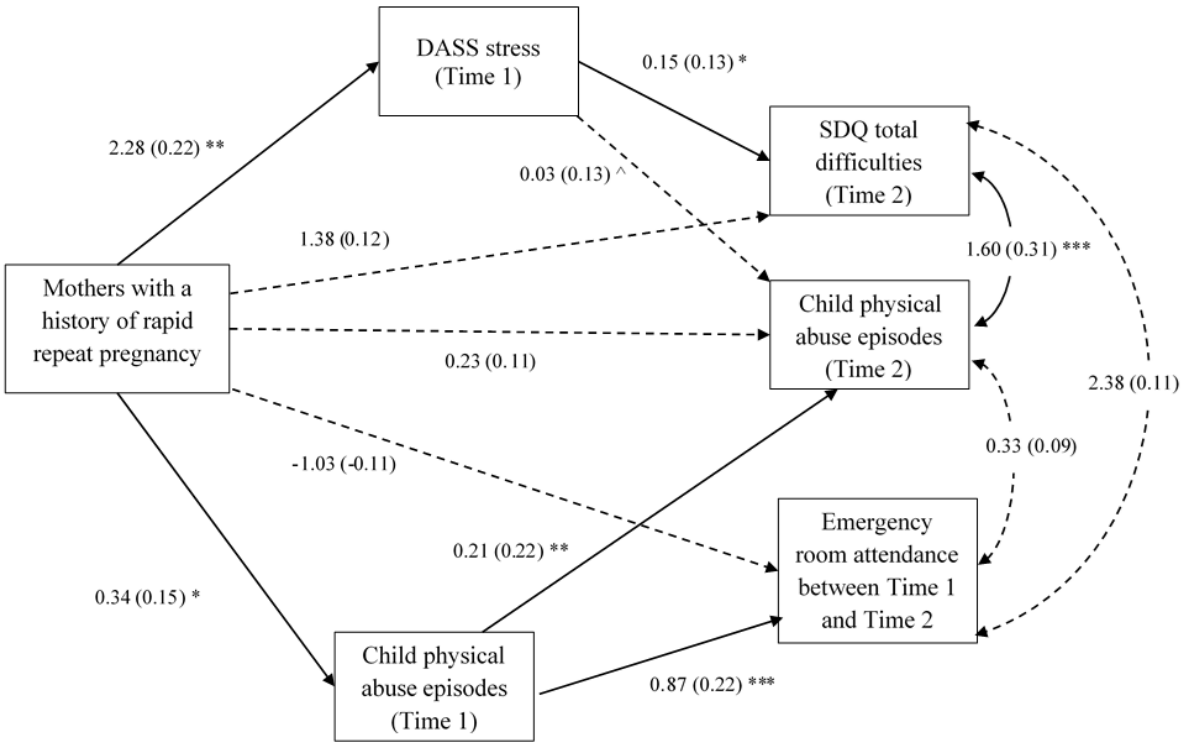
4.3.3.1 Whole cohort

Figure 4-3 shows the best fit model based on data from the overall sample with the following significant pathways:

- Mothers with a history of RRP -> higher DASS stress (Time 1) -> higher SDQ total difficulties (Time 2) which correlated with more concurrent child physical abuse episodes (Time 2)

- Mothers with a history of RRP -> more child physical abuse episodes (Time 1) -> more child physical abuse episodes (Time 2) which correlated with higher concurrent SDQ total difficulties (Time 2)
- Mothers with a history of RRP -> more child physical abuse episodes (Time 1) -> more emergency room attendance in the follow-up period

Figure 4-3. Model linking maternal RRP history, maternal stress, child physical abuse, and child psychosocial problems and emergency room attendance at follow-up.



The model was adjusted for baseline household size-adjusted household income and child age and gender. Both unstandardized and standardized (i.e. the value in parenthesis) coefficients are presented. Solid lines are significant paths, whereas the dashed line is insignificant path.
*Note. ^ $p = 0.05$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; Fit indices: chi-square value = 4.00, $p>0.05$; RMSEA = 0.038; SRMR = 0.017; and CFI = 0.999*

The results showed that children of mothers with a history of RRP had more psychosocial problems at Time 2 compared to children of mothers without a history of RRP, and these differences were partly explained by increased stress levels in mothers with a history of RRP at Time 1. In addition, compared to children of mothers without a history of RRP, mothers with a history of RRP were found to use more physical abuse strategies to discipline children

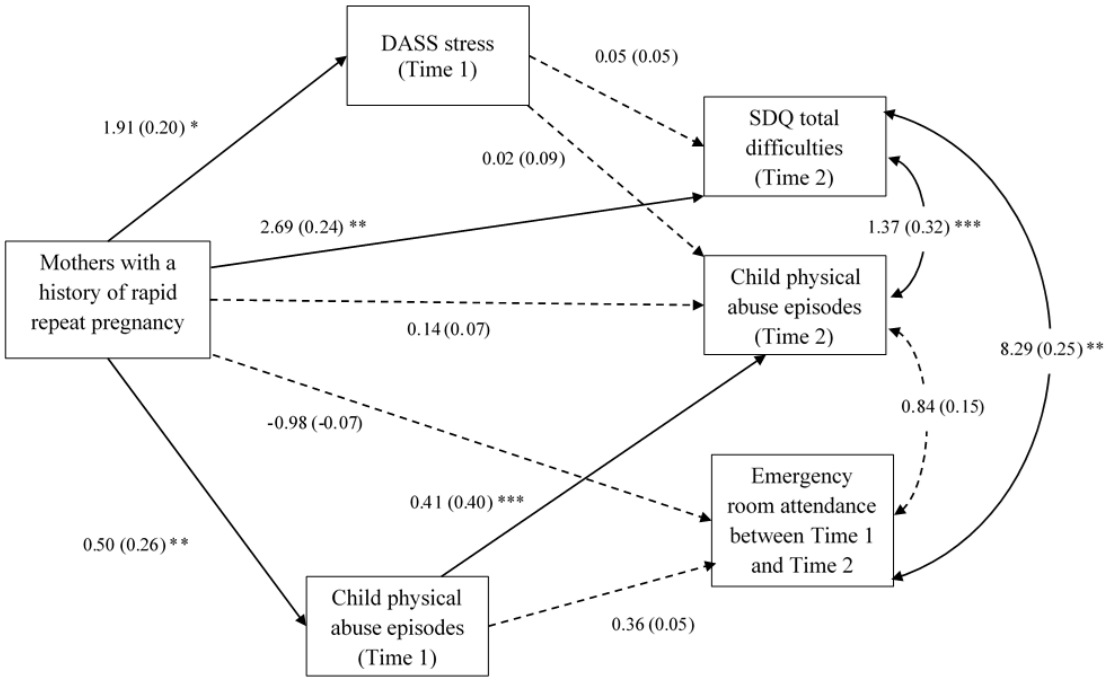
at Time 2, and their children also had more records of emergency room attendance in the follow-up period, and these differences were partly explained by their higher rates of physically abusing children at Time 1, highlighting the importance of early parenting interventions to minimize chances of physical abuse recurrence. On the other hand, the significant and positive correlation between child psychosocial problems and child physical abuse episodes provides evidence of their mutual influences on each other.

4.3.3.2 Based on the status of family cohesion improvement

To examine the potential differences due to improvement in family cohesion since the baseline assessment, the same model was tested within families experiencing improved family cohesion and those having no improvement, respectively. Figure 4-4a shows the best fit model based on data from families with an improvement in cohesion, and here are the significant pathways:

- Mothers with a history of RRP -> higher DASS stress (Time 1)
- Mothers with a history of RRP -> higher SDQ total difficulties (Time 2) which correlated with more concurrent child physical abuse episodes (Time 2) and more emergency room attendance in the follow-up period
- Mothers with a history of RRP -> more child physical abuse episodes (Time 1) -> more child physical abuse episodes (Time 2)

Figure 4-4a. Model linking maternal RRP history, maternal stress, child physical abuse, and child psychosocial problems and emergency room attendance at follow-up (with improvement in family cohesion).

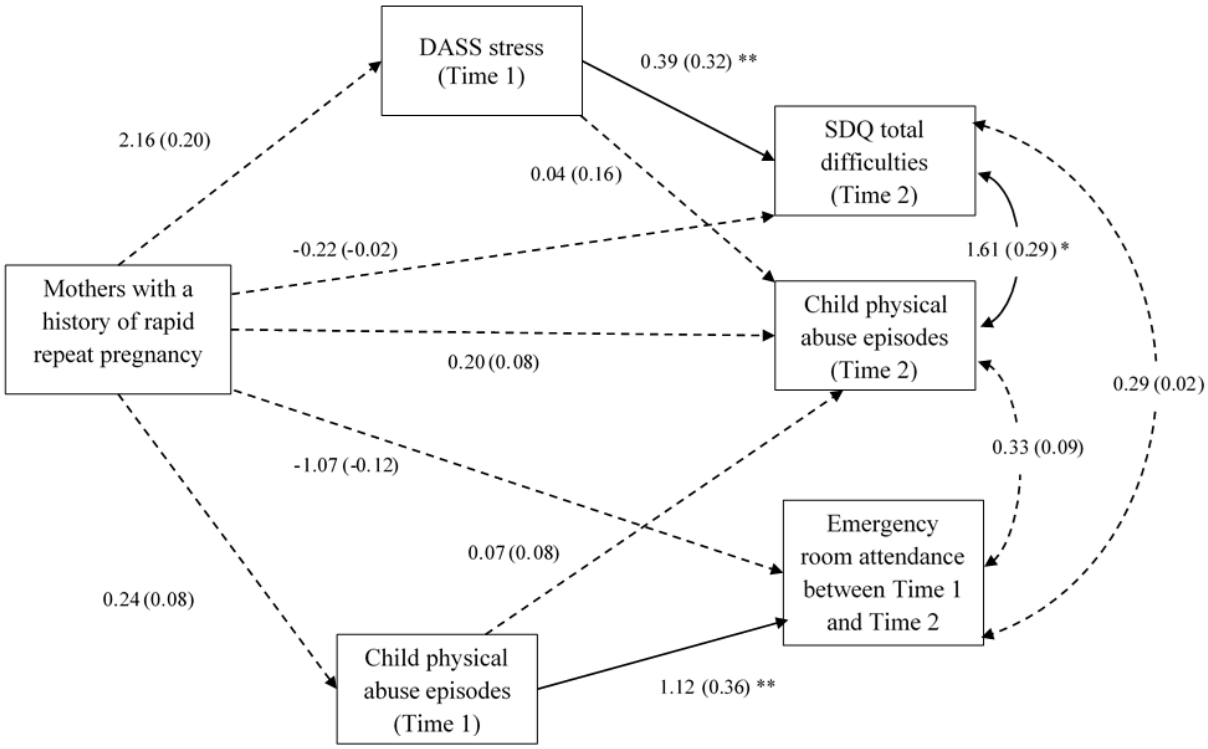


The model was adjusted for baseline household size-adjusted household income and child age and gender. Both unstandardized and standardized (i.e. the value in parenthesis) coefficients are presented. Solid lines are significant paths, whereas the dashed line is insignificant path.
*Note. ^ p = 0.05; * p < 0.05; ** p < 0.01; *** p < 0.001; Fit indices: chi-square value = 3.14, p>0.05; RMSEA = 0.018; SRMR = 0.021; and CFI = 1.000*

Figure 4-4b shows the best fit model based on data from families without improvement in cohesion, and here are the significant pathways:

- Higher DASS stress (Time 1) -> higher SDQ total difficulties (Time 2) which correlated with more concurrent child physical abuse episodes (Time 2)
- More physical abuse episodes (Time 1) -> more emergency room attendance in the follow-up period

Figure 4-4b. Model linking maternal RRP history, maternal stress, child physical abuse, and child psychosocial problems and emergency room attendance at follow-up (with no improvement in family cohesion).



The model was adjusted for baseline household size-adjusted household income and child age and gender. Both unstandardized and standardized (i.e. the value in parenthesis) coefficients are presented. Solid lines are significant paths, whereas the dashed line is insignificant path.
*Note. ^ p = 0.05; * p < 0.05; ** p < 0.01; *** p < 0.001; Fit indices: chi-square value = 3.95, p>0.05; RMSEA = 0.063; SRMR = 0.024; and CFI = 0.998*

After taking into account the status of family cohesion improvement, similar to its effect on the relationship between ECM and conduct problems, when family cohesion was improved, children of mothers with a history of RRP remained to have more psychosocial problems at Time 2 than those born to mothers without a history of RRP. This observation could be due to the effect of other unmeasured environmental or non-environmental factors, as the effect of RRP on child psychosocial problems was no longer mediated by maternal stress at Time 1. Although mothers with RRP history experienced higher stress at Time 1, improvement in family cohesion after Time 1 was found to mitigate the long-term adverse effect of maternal stress on child behavioral development. Similarly, although mothers with RRP history used more physical abuse practices to discipline children at Time 1 than those without, improvement in family cohesion after Time 1 appeared to alleviate the negative consequences of early-life exposure to physically abusive parenting including emergency room attendance, rendering children born to mothers with a history of RRP and those without to have similar levels of emergency room attendance in the follow-up period. Emergency room attendance, in

the situation of improved family cohesion, was related to the child's own psychosocial problems but not due to the influences of maternal parenting practices. However, improvement in family cohesion after Time 1 did not help to prevent physical abuse recurrence in families of mothers with RRP history. Direct advice and tips for proper parenting techniques should be provided to mothers with RRP history to improve their parenting quality. On the other hand, for those families experiencing no improvement in cohesion, maternal RRP history appeared to have small effects on child psychosocial problems, emergency room attendance, and child physical abuse, suggesting that health and behavioral problems are equally likely to develop in children of mothers with a history of RRP and those without when being raised in a poor family environment characterized by conflicts and unsupportive relationships. Notably, for these families with poor dynamics, the strongest effect on child psychosocial problems came from maternal stress at Time 1, whereas the strongest predictor of child emergency room attendance in the follow-up period was child physical abuse at Time 1. The results suggest that while children of mothers with a history of RRP may have innate vulnerability to health and behavioral problems, poor family dynamics could elevate maternal stress and risk of suboptimal parenting which in turn could similarly impair the health and behavioral development of children including those born to mothers without a history of RRP, thereby narrowing the health and behavioral disparities between children of mothers with RRP history and those without.

5. Policy implications and recommendations

The current research study investigates the long-term effects of RRP and ECM experiences among young mothers and their children in Hong Kong. A major limitation of this study is its reliance on self-report or proxy-report psychosocial questionnaires which could involve reporting bias. Future research can consider the use of direct assessment methods or psychiatric diagnosis records to improve the robustness of psychosocial assessments. As suggested by the study's findings, RRP at a young age by itself may not be problematic, and many mothers are able to recover from these experiences and continue to provide a developmentally appropriate context to support the growth and development of their children. However, as reported in our previous research, mothers with a history of RRP were found to have a higher likelihood of physically abusing and neglecting their children (Lo et al., 2017), but such risk of child maltreatment can be minimized in cohesive families (Tung et al., 2020). Together with the current study findings, evidence suggests that family cohesion is beneficial

for preventing maltreatment occurrence (and thus also recurrence) in children of young mothers with RRP experiences which in turn could minimize these children's health care utilization. Hence, in this section, we offer seven practical and workable recommendations based on the research results for the government's consideration.

(a) Introduce a comprehensive and multi-sectoral approach to address mental health promotion, prevention, treatment, rehabilitation, care and recovery for young mothers particularly those with rapid repeat pregnancy

The findings indicate that RRP experiences at a young age are associated with suboptimal psychosocial conditions at the beginning, but with timely interventions and supportive care, the adversities and stressors associated with RRP, or early motherhood as a whole, can be mitigated over time, thereby improving the physical and mental health of the mothers.

- Early motherhood, particularly when coupled with RRP experiences, can be stressful and challenging. However, our follow-up survey found that 62.1% of the mothers in our cohort perceived an improvement in family cohesion and 51.3% perceived an improvement in social support. There were also 56.5% with an improvement in physical HRQOL and 55.6% with an improvement in mental HRQOL. Hence, although pregnancy at a young age is associated with multiple stressors, the social disadvantages facing young mothers are not fixed and can be eradicated.
- Some of the stressors that commonly affect young women in pregnancy and early motherhood include poor educational achievement, unfavorable employment conditions, pregnancy complications, low material resources, strain in family and partner relationships, poor physical and mental health, heavy parenting and household responsibilities, and social isolation. Addressing these multi-domain problems require strong and enduring partnerships across various public and private sectors, including health care, education, employment, social welfare, and other relevant sectors. Hence, mental health initiatives should involve collaborative efforts from various stakeholders to work together to improve the social conditions of young mothers in order to achieve better health and wellbeing in these families.

(b) Monitor and address the needs and problems of young families in both short and long term

The findings indicate that early-life adversities, even in milder forms of maltreated parenting behaviors such as mild physical neglect, could compromise the affected child's long-term physical health. Even in the absence of early-life adversities, if later family dynamics were impaired, negative consequences such as increased maternal stress and psychosocial problems in children could still be possible.

- Early-life adversities such as ECM were found to have profound implications for the physical and mental health of the affected children. Even without ECM or RRP experiences, the data reveals that worsening family conditions can be equally damaging to maternal mental health and child behavioral development in these young families.
- Service providers should regularly monitor and assess the shared and individual needs of both young parents and their children and develop services such as helplines and empowerment programs to respond to their needs for both short and long term.

(c) Promote quality child care and prevent problem behavior in young parents through universal and targeted programs

The findings indicate that RRP experiences are associated with increased use of physically disciplinary acts in young motherhood. Elevated stress is common among young mothers with a history of RRP. Elevated stress and increased episodes of child physical abuse are among the factors that can contribute to more psychosocial problems, greater use of health care services, and physical abuse recurrence in children born to mothers with a history of RRP.

- Our baseline survey found that 42.9% of the cohort mothers had smoking habit and 4.1% had a history of substance abuse at the time of survey. The data support the notion of a higher likelihood of young mothers having engaged in high-risk behaviors and their vulnerability to recurrence after temporary cessation due to pregnancy or for other reasons. Even in the context of no recurrence, the past habit of high-risk behaviors such as substance abuse could give rise to cognitive control problems such

as problems with decision making and impulse control, which can disrupt the mother's ability to provide quality care.

- Universal programs targeting all young parents should be designed to promote the provision of high-quality child care and prevent problematic parenting behaviors such as unreasonable expectations, harsh parenting, and lack of nurturing parenting. Targeted programs for high-risk young parents and their children, including those young mothers with a history of RRP, should deliver a wide range of services and activities designed to address their needs, for example, through behavior modification (e.g. smoking cessation programs and positive parenting training), parenting support (e.g. prevention of parental mental health problems through cognitive behavioral and person-based counselling), and child protection programs (e.g. early identification and referral of suspected child maltreatment cases to child protection specialists).

(d) Equip young mothers with stress management techniques

The findings indicate that increased maternal stress levels are predictive of subsequent child psychosocial problems. Notably, in the context of poor family dynamics, elevated stress levels are observed in young mothers regardless of their history of RRP history, and thus their children are equally likely to suffer from maternal stress-related behaviors such as abusive disciplinary acts.

- It is known that young mothers feel stressed out more easily, and those stressors can have potentially damaging effects on the mother's attitudes and behaviors toward their children. Consistent with existing reports, we found that maternal stress can reduce maternal patience and tolerance toward children and increase the use of punitive practices. Practitioners, social workers, and community partners should work together to provide emotional support, information, advice, and guidance to prepare young mothers for and manage their stress in early motherhood.

(e) Raise the awareness of families about the importance of family cohesion

The findings indicate that while children of mothers with a history of RRP may have innate vulnerability to health and behavioral problems, poor family dynamics could elevate

maternal stress and risk of suboptimal parenting. These behaviors would also have negative effects on the health and behavioral development of children including those born to mothers without a history of RRP. As such, disparities in health and behavioral problems between children of mothers with RRP history and those without could be reduced.

- Evidence shows that although family cohesion improvement may not be able to undo the damages caused by ECM, better family dynamics is conducive, and could be more important than improvement in maternal social support, to the healthy behavioral development of all children regardless of their history of childhood adversities.
- Apart from the strategies to relieve early motherhood stress and promote child development, interventions and support services that help young parents to establish household rules (e.g. speaking respectfully) and routines (e.g. regular family meetings or gatherings to promote greater communication and address important family issues as they arise) would be useful for promoting harmony and respect both within families and at the societal level.

(f) Strengthen family services to support children (and their families) in the early years of life

The findings suggest that children experiencing maltreatment in the first five years of life face a higher risk of diseases and health-related problems including behavioral problems than those without. However, in the absence of repeated exposures, individuals can be empowered to overcome the negative consequences of early childhood hardships.

- Much research shows that the first five years of life are crucial. Investing in early childhood can yield the greatest return for success in school and life. Although a variety of maternal and child health and woman health services have been provided by the Family Health Service of the Department of Health, the existing services are primarily designed to address maternal or woman problems and focus on parenting, immunization, and health and developmental surveillance of children. High-risk groups such as teenage mothers and young mothers with a history of RRP may not actively seek help and support from external parties even when problems arise. Tailored outreach programs involving long-term case management and mentoring services should be developed to address the needs of these special groups in the

population, such as their education, housing, contraception, mental health, or general health needs. These programs, for example, can help clients define specific life aspirations and engage in planning to successfully achieve them. In addition, programs for fathers and grandparents that help them identify free services they need and connect them to those services should also be encouraged.

(g) Inform the public about the importance of safe and supportive environments which would help to shape children's holistic development

The findings suggest that early maltreatment experiences in the first five years of life have damaging effects on children's health and health-related problems. Even without experiencing early adversities such as ECM, children growing up in a family environment characterized by low cohesion are also at an increased risk of psychosocial and conduct problems.

- Creating a safe and supportive environment is important for promoting positive relationships and good communication which are conducive to children's healthy development. These experiences can help children develop the ability to connect with others, build positive relationships and support them to understand and self-regulate their own emotions and negotiate their interactions with others constructively. Building such environments requires participation and collaboration of partners in different contexts including schools and families. Public education and awareness campaigns are needed to raise awareness of not only the child learning and care providers but also the whole public for why and how to make a safe and supportive environment at home and in both school and community to support children's holistic development.

6. Conclusion

Despite declining rates of pregnancy at young ages, early childbearing, particularly when coupled with RRP experiences, poses a serious public health threat to the society, as it is linked with a wide variety of adverse physical, psychological, and social outcomes in young mothers and their children. Intergenerational problems are also common among these high-risk families. There is an urgent need for plans to stop this vicious cycle between poor health

and development in mothers and children. Notably, ECM is increasingly common worldwide, especially in these young families. This research, based on the baseline and follow-up data of 392 Hong Kong Chinese adolescent and young mothers who delivered their first child before the age of 24 years and their children, has found that ECM experiences are predictive of subsequent health and behavioral problems, whereas improved family cohesion can protect children against psychosocial problems particularly for those who grow up in typical families without the more severe risk factors such as RRP and ECM.

The majority of cohort mothers reported an improvement in family cohesion and social support at the follow-up phase. In addition, the finding of a greater proportion of mothers with a history of RRP having experienced an improvement in social and mental wellbeing than those without indicates the possible psychosocial harms that can be caused by RRP experiences at a young age and the ability of the mothers to bounce back and feel positive about their surrounding environments again over time. Likewise, although the first five years of a child's life are sensitive to poor parenting even in a mild form, the affected children, in the absence of repeated exposure, can be empowered to recover from or overcome early childhood adversities including ECM. For maltreatment events occurring after the first five years of a child's life, their associations with children's behavioral problems are notable, but whether they have lasting impacts on the child's behavioral development deserves further investigations.

While families today, particularly for those high-risk families such as families of teenage mothers, generally have multiple and complex needs, the Hong Kong SAR Government can consider working with stakeholders from different backgrounds to devise strategies to help these families resolve conflicts and differences to enhance positive interactions and good communication between members. The recommended polices include 1) introducing a comprehensive and multi-sectoral approach to address mental health promotion, prevention, treatment, rehabilitation, care and recovery for young mothers particularly those with rapid repeat pregnancy; 2) monitoring and addressing the needs and problems of young families in both short and long term; 3) promoting quality child care and preventing problem behavior in young parents through universal and targeted programs; 4) equipping young mothers with stress management techniques; 5) raising the awareness of families about the importance of family cohesion; 6) strengthening family services to support children (and their families) in the early years of life; and 7) informing the public about the importance of safe and

supportive environments which would help to shape children's holistic development. These policies can improve family relationships and health and empower young mothers, all of which are key to building a better environment for children and the community as a whole.

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Appendix A: Mother Questionnaires

香港大學李嘉誠醫學院*兒童及青少年*科學系
探討重覆懷孕及早期兒童虐待對香港年輕母親及其子女的長遠影響 (家長問卷)

受訪兒童

姓名: _____ 出生日期：年_____月_____日

受訪母親 (即你本人)

姓名: _____

母親聯絡資料

聯絡電話: _____ 電郵：_____

住址: _____

受訪兒童部分

我們想知道當**受訪兒童**犯錯或激怒你時或在其他情況下，你是否曾作過下列的行為。請選出**在過去十二個月中**，你曾向**受訪兒童**作過下列行為表現的次數。假如你在**過去十二個月**沒有作過某項行為，**但在十二個月以前有的話，請選 7**。先在左欄選上曾經發生的項目，然後才選擇發生的次數。

注意：填寫次數時只須憑印象，選擇最接近的類別即可。

		從沒發過	來有生	過去十二個月發生的次數						過去十二個月沒有，但以前曾經發生
				1次	2次	3-5次	6-10次	11-20次	20次以上	
1.	解釋點解佢做錯	□0	□1	□2	□3	□4	□5	□6	□7	
2	要佢暫時行開或返入房	□0	□1	□2	□3	□4	□5	□6	□7	
3.	如果做錯了，罰佢做過第二樣野	□0	□1	□2	□3	□4	□5	□6	□7	
4.	挪走佢本來有嘅好處或唔准外出，作為懲罰	□0	□1	□2	□3	□4	□5	□6	□7	
5.	嚇佢話要打佢，但無真係打	□0	□1	□2	□3	□4	□5	□6	□7	
6.	向佢大罵或大叫大嚷	□0	□1	□2	□3	□4	□5	□6	□7	
7.	咒罵佢	□0	□1	□2	□3	□4	□5	□6	□7	
8.	鬧佢蠢或懶	□0	□1	□2	□3	□4	□5	□6	□7	
9.	話要趕佢走	□0	□1	□2	□3	□4	□5	□6	□7	
10.	用手打佢屁股	□0	□1	□2	□3	□4	□5	□6	□7	
11.	用皮帶/藤條/硬物 打佢屁股	□0	□1	□2	□3	□4	□5	□6	□7	
12.	打佢手或腳	□0	□1	□2	□3	□4	□5	□6	□7	
13.	擰痛佢	□0	□1	□2	□3	□4	□5	□6	□7	
14.	搖佢	□0	□1	□2	□3	□4	□5	□6	□7	
15.	摑佢塊面、頭或耳仔	□0	□1	□2	□3	□4	□5	□6	□7	
16.	用皮帶/藤條/硬物打佢屁股以外的地方	□0	□1	□2	□3	□4	□5	□6	□7	
17.	掟佢落地或一拳將佢打落地	□0	□1	□2	□3	□4	□5	□6	□7	
18.	拳打腳踢	□0	□1	□2	□3	□4	□5	□6	□7	
19.	毆打佢	□0	□1	□2	□3	□4	□5	□6	□7	
20.	箍佢頸或勒住佢	□0	□1	□2	□3	□4	□5	□6	□7	

		從來沒有發生過	過去十二個月發生的次數						過去十二個月沒有，但以前曾經發生
			1次	2次	3-5次	6-10次	11-20次	20次以上	
21.	故意燒傷或燙傷佢	□0	□1	□2	□3	□4	□5	□6	□7
22.	用刀或利器嚇佢	□0	□1	□2	□3	□4	□5	□6	□7
23.	曾單獨留佢係屋企	□0	□1	□2	□3	□4	□5	□6	□7
24.	因為自己有好多野煩，無表示關心佢	□0	□1	□2	□3	□4	□5	□6	□7
25.	我沒有理會佢肚餓時有冇食飽	□0	□1	□2	□3	□4	□5	□6	□7
26.	我沒有理會佢有病時有冇睇醫生	□0	□1	□2	□3	□4	□5	□6	□7
27.	因為飲醉酒，照顧唔到佢	□0	□1	□2	□3	□4	□5	□6	□7
28.	罰佢跪，或坐冇影椅	□0	□1	□2	□3	□4	□5	□6	□7
29.	在別人面前羞辱佢	□0	□1	□2	□3	□4	□5	□6	□7
30.	在日常生活中孤立佢	□0	□1	□2	□3	□4	□5	□6	□7
31.	沒有給佢足夠/乾淨衣服	□0	□1	□2	□3	□4	□5	□6	□7
32.	剝奪佢休息時間	□0	□1	□2	□3	□4	□5	□6	□7

過去一星期的情況：在過去一星期, 當受訪兒童犯錯或激怒你時，你會：

		過去一星期沒有發生	過去一星期發生的次數					
			1次	2次	3-5次	6- 10次	11-20次	20次以上
33.	要佢暫時行開或返入房	□0	□1	□2	□3	□4	□5	□6
34.	向佢大罵或大叫大嚷	□0	□1	□2	□3	□4	□5	□6
35.	用手打佢屁股	□0	□1	□2	□3	□4	□5	□6
36.	打佢手或腳	□0	□1	□2	□3	□4	□5	□6

受訪兒童有沒有遇到以下情況：

		從來沒有發生過	曾發生	不知道
37.	有人曾迫**受訪兒童**望或摸他/她的私處(性器官)，或他/她強行望或摸我的子/女的私處(性器官)	□0	□1	□2
38.	有人曾迫**受訪兒童**發生性行為(性交、肛交或口交)	□0	□1	□2
39.	除以上兩項，有人曾對**受訪兒童**侵犯(請註明:_____)	□0	□1	□2

若第 37-39 題答有, 請回答第 41 題

40. 對**受訪兒童**做過上述行為的人(第 38-40 項)，與**受訪兒童**的關係是：(可選多項)

□1 陌生人　　□3 家人
□2 親戚/朋友　　□4 不知道

請根據**受訪兒童過去六個月**的行為來回答，圈出最能代表他/她的數字。

	不符合	有點符合	完全符合
1. 能體諒到別人的感受	□0	□1	□2
2. 不安定、過分活躍、不能長久安靜	□0	□1	□2
3. 經常抱怨頭痛、肚子痛或身體不舒服	□0	□1	□2
4. 很樂意與別的小孩分享東西(糖果、玩具、鉛筆、等等)	□0	□1	□2
5. 經常發脾氣或大吵大鬧	□0	□1	□2
6. 頗孤獨，比較多自己玩	□0	□1	□2
7. 一般來說，比較順從，通常是大人要求要做的都肯做	□0	□1	□2
8. 有很多擔憂，經常表現出憂慮	□0	□1	□2
9. 如果有人受傷、不舒服或是生病，都很樂意提供幫助	□0	□1	□2
10. 經常的坐立不安或躁動	□0	□1	□2
11. 至少有一個好朋友	□0	□1	□2
12. 經常與別的小孩吵架或欺負其他小孩子	□0	□1	□2
13. 經常不高興、情緒低落或哭泣	□0	□1	□2
14. 一般來說，受別的小孩所喜歡	□0	□1	□2
15. 容易分心，注意力不集中	□0	□1	□2
16. 在新的情況下，會緊張或黏住大人，容易失去信心	□0	□1	□2
17. 對年紀小的小孩和善	□0	□1	□2
18. 經常撒謊或欺騙	□0	□1	□2
19. 受別的小孩作弄或欺負	□0	□1	□2
20. 經常自願的幫助別人(父母、老師或其他小孩)	□0	□1	□2
21. 做事前會想清楚	□0	□1	□2
22. 會從家裡、學校或其他地方偷東西	□0	□1	□2
23. 跟大人相處比跟小孩相處融洽	□0	□1	□2
24. 對很多事物感到害怕，容易受驚嚇	□0	□1	□2
25. 做事情能做到底，注意力持久	□0	□1	□2

孩子在專注力、控制行為和抑制衝動的能力上各有不同。請將**受訪兒童**與同齡的孩子比較，並根據您在過去一個月內的觀察，評估他/她在以下各項目的表現。

	遠遠低於一般	低於一般	稍低於一般	一般	稍高於一般	高於一般	遠遠高於一般
1. 留意細節，能避免不小心的錯誤	□1	□2	□3	□4	□5	□6	□7
2. 做事或遊戲時，有持久的專注力	□1	□2	□3	□4	□5	□6	□7
3. 對著他說話時，他會聆聽	□1	□2	□3	□4	□5	□6	□7
4. 能依足指示，和完成指派的工作	□1	□2	□3	□4	□5	□6	□7
5. 能夠組織工作及活動	□1	□2	□3	□4	□5	□6	□7
6. 能投入那些需要持久專注的工作	□1	□2	□3	□4	□5	□6	□7
7. 會留意帶備活動時所需的物件	□1	□2	□3	□4	□5	□6	□7
8. 不受無關的事物干擾專注力	□1	□2	□3	□4	□5	□6	□7
9. 能依著每日既定的生活程序行事	□1	□2	□3	□4	□5	□6	□7
10. 能安坐（沒有身體郁動或揮動手腳）	□1	□2	□3	□4	□5	□6	□7
11. 能安坐位中（能依循課室慣例或規則）	□1	□2	□3	□4	□5	□6	□7
12. 能因應環境而調節自己的動作（能自我控制）	□1	□2	□3	□4	□5	□6	□7
13. 遊戲時，能保持安靜（將聲浪減至合理程度）	□1	□2	□3	□4	□5	□6	□7
14. 有安定下來的時候（不會不停地活動）	□1	□2	□3	□4	□5	□6	□7
15. 適當的時候才說話（不會不斷地說話）	□1	□2	□3	□4	□5	□6	□7
16. 思考後，才回應問題（不會急於說出答案）	□1	□2	□3	□4	□5	□6	□7
17. 能夠排隊或輪候	□1	□2	□3	□4	□5	□6	□7
18. 能夠適當地介入對話或遊戲（不會打岔或強行加入）	□1	□2	□3	□4	□5	□6	□7

過去**一個月**內，以下各項問題對**受訪兒童**的**影響程度**……

體能方面（出現以下問題）	**從不**	**甚少**	**有時**	**經常**	**差不多一直有**
1. 步行多於一個街口感到困難	□0	□1	□2	□3	□4
2. 跑步時覺得有困難	□0	□1	□2	□3	□4
3. 參與體育活動或運動時覺得有困難	□0	□1	□2	□3	□4
4. 提起重物時感到困難	□0	□1	□2	□3	□4
5. 洗澡有困難	□0	□1	□2	□3	□4
6. 做家務時感到困難	□0	□1	□2	□3	□4
7. 感到痛楚或疼痛	□0	□1	□2	□3	□4
8. 精力不足	□0	□1	□2	□3	□4

情緒方面（出現以下問題）	**從不**	**甚少**	**有時**	**經常**	**差不多一直有**
1. 感到害怕或不安	□0	□1	□2	□3	□4
2. 感到悲傷或難過	□0	□1	□2	□3	□4
3. 感到憤怒	□0	□1	□2	□3	□4
4. 難以入睡	□0	□1	□2	□3	□4
5. 擔憂	□0	□1	□2	□3	□4

社交方面（出現以下問題）	**從不**	**甚少**	**有時**	**經常**	**差不多一直有**
1. 難於跟其他同輩相處	□0	□1	□2	□3	□4
2. 其他同輩不想跟他或她做朋友	□0	□1	□2	□3	□4

3. 被其他同輩取笑	□0	□1	□2	□3	□4
4. 做不到其他同輩所能做的事	□0	□1	□2	□3	□4
5. 跟不上其他同輩	□0	□1	□2	□3	□4

上學方面（出現以下問題）	從不	甚少	有時	經常	差不多一直有
1. 在課堂上集中精神感到困難	□0	□1	□2	□3	□4
2. 善忘	□0	□1	□2	□3	□4
3. 功課跟不上	□0	□1	□2	□3	□4
2. 因不舒服而缺課	□0	□1	□2	□3	□4
3. 因要看醫生或到醫院而缺課	□0	□1	□2	□3	□4

<u>母親部分</u>

C1. 以下是有關你對家庭的看法，請按照你<u>過去一個月</u>感受，圈出右邊適當的答案。

	非常不同意	頗不同意	少許不同意	少許同意	頗同意	非常同意
1. 家人真心互相幫忙和支持。	□1	□2	□3	□4	□5	□6
2. 在家裡，我們常無聊地浪費時間。	□1	□2	□3	□4	□5	□6
3. 我們在家裡無論做什麼，都盡力而為。	□1	□2	□3	□4	□5	□6
4. 我們家人一團和氣。	□1	□2	□3	□4	□5	□6
5. 家裡有事要辦時，我們極少自願去做。	□1	□2	□3	□4	□5	□6
6. 家人真心互相扶持。	□1	□2	□3	□4	□5	□6
7. 在我們家裡，很少團結精神。	□1	□2	□3	□4	□5	□6
8. 我們很能和洽相處。	□1	□2	□3	□4	□5	□6
9. 在我們家裡，每個人都享有足夠的閒暇和關懷。	□1	□2	□3	□4	□5	□6

F2. 以下是一些描述<u>你現在和你的朋友及家人的</u>句子, 請你表示你對這些句子的同意程度。

	十分不同意						十分同意
1. 當你有需要的時候，總有一個好朋友在你身邊。	□1	□2	□3	□4	□5	□6	□7
2. 你有一個好朋友，無論開心或者不開心，你都可以同他/她分享。	□1	□2	□3	□4	□5	□6	□7
3. 你的家人真的十分願意幫助你。	□1	□2	□3	□4	□5	□6	□7
4. 你的家人可以給你情緒上需要的支持。	□1	□2	□3	□4	□5	□6	□7
5. 你有一個真的可以安慰你的朋友。	□1	□2	□3	□4	□5	□6	□7
6. 你的朋友真的願意嘗試幫助你。	□1	□2	□3	□4	□5	□6	□7
7. 如果有甚麼事發生，你可以倚靠你的朋友。	□1	□2	□3	□4	□5	□6	□7
8. 你可以和家人訴說你自己的問題。	□1	□2	□3	□4	□5	□6	□7

9.	你有一些朋友，無論開心或者不開心，你都可以同他們分享。	□1	□2	□3	□4	□5	□6	□7
10.	你生命中有個好朋友，他/她會關心你的感受。	□1	□2	□3	□4	□5	□6	□7
11.	你的家人願意和你一起做決定。	□1	□2	□3	□4	□5	□6	□7
12.	你可以同你的朋友訴說你自己的問題。	□1	□2	□3	□4	□5	□6	□7

1. 總括來說，您認為您的健康狀況是：

極好	很好	好	一般	差
□1	□2	□3	□4	□5

2. 下列問題是關於您日常生活中可能進行的活動。以您目前的健康狀況，您在進行這些活動時，有沒有受到限制？如果有的話，程度如何？

	有很大限制	有一點限制	沒有任何限制
a 中等強度的活動，比如搬桌子、使用吸塵器清潔地面、玩保齡球或打太極拳	□1	□2	□3
b 上幾層樓梯	□1	□2	□3

3. 在過去四個星期裏，您在工作或其它日常活動中，有多少時間會因為身體健康的原因而遇到下列的問題？

	常常如此	大部分時間	有時	偶爾	從來沒有
a 實際做完的比想做的要少	□1	□2	□3	□4	□5
b 工作或其它活動的種類受到限制	□1	□2	□3	□4	□5

4. 在過去的四個星期裏，您在工作或其它日常活動中，有多少時間由於情緒方面的原因（比如感到沮喪或焦慮）遇到下列的問題？

	常常如此	大部分時間	有時	偶爾	從來沒有
a 實際做完的比想做的要少	□1	□2	□3	□4	□5
b 工作時或從事其它活動時不如往常細心了	□1	□2	□3	□4	□5

5. 在過去四個星期裏，您身體上的疼痛對您的日常工作（包括上班和家務）有多大影響？

毫無影響	有很少影響	有一些影響	有較大影響	有極大影響
□1	□2	□3	□4	□5

6. 下列問題是有關您在過去四個星期裏您覺得怎樣和您其它的情況。針對每一個問題，請選擇一個最接近您的感覺的答案。在過去四個星期裏，有多少時間：

	常常如此	大部分時間	有時	偶爾	從來沒有
a 您感到心平氣和？	□1	□2	□3	□4	□5
b 您感到精力充足？	□1	□2	□3	□4	□5
c 您覺得心情不好，悶悶不樂？	□1	□2	□3	□4	□5

7. 在過去四個星期裏，有多少時間由於您的身體健康或情緒問題妨礙了您的社交活動（比如探親、訪友等）？

常常 有妨礙	大部分時間 有妨礙	有時 有妨礙	偶爾 有妨礙	從來沒 有妨礙
□1	□2	□3	□4	□5

家庭背景資料

D1. 你的教育程度是：

□0 沒有受過正規教育　□1 小學教育　□2 初中教育　□3 高中教育
□4 高級證書，文憑，副學士　□5 學士學位　□6 研究生學位

D2. 你的工作是：

□1 全職　□2 兼職，每週_____小時　□3 尋找工作中　□4 全職照顧家庭

D3. 你的職業是：

□1 經理及行政人員　□2 專業人員　□3 輔助專業人員　□4 文員
□5 服務工作及商店銷售人員　□6 漁農業熟練工人　□7 工藝及有關人員
□8 機台及機器操作員及裝配員　□9 非技術工人　□10 全職照顧家庭
□11 其他（請註明）: _____

D4. 你現時配偶的教育程度是：

□0 沒有受過正規教育　□1 小學教育　□2 初中教育　□3 高中教育
□4 高級證書，文憑，副學士　□5 學士學位　□6 研究生學位

D5. 你現時配偶的工作是：

□1 全職　□2 兼職，每週_____小時　□3 尋找工作中　□4 全職照顧家庭

D6. 你現時配偶的職業是：

□1 經理及行政人員　□2 專業人員　□3 輔助專業人員　□4 文員
□5 服務工作及商店銷售人員　□6 漁農業熟練工人　□7 工藝及有關人員
□8 機台及機器操作員及裝配員　□9 非技術工人　□10 全職照顧家庭
□11 其他（請註明）: _____

D7. 你現時的婚姻狀況：　□1 已婚並同住　□2 離婚/分居　□3 同居

D8. 你現時家庭每月的總收入大約為：

❑沒有收入　❑<$4000　❑$4,000-$5,999　❑$6,000-$7,999
❑$8,000-$9,999　❑$10,000-$14,999　❑$15,000-$19,999　❑$20,000-$24,999
❑25,000-$29,999　❑$30,000-$39,999　❑$40,000-$49,999　❑$50,000-$59,999
❑$60,000-$79,999　❑$80,000-$89,999　❑$90,000-$99,999　❑$100,000-$-$119,999
❑$120,000-$149,999　❑$150,000 或以上

D9. 你現時家庭是否接受綜援？　□1 是　□0 否　□99 不想說

D10. 受訪兒童與多少人同住 (包括你自己及受訪兒童)　_____ 人

--問卷完成，謝謝你完成這個訪問---

Appendix B: Child Survey

香港大學李嘉誠醫學院*兒童及青少年*科學系
探討重覆懷孕及早期兒童虐待對香港年輕母親及其子女的長遠影響 (兒童問卷)

受訪兒童姓名: _____ 出生日期: ____ 年____月____日
受訪兒童聯絡電話: _____

情緒健康

請根據你過去**一個月**的情況，選出你認為最合適的答案。

	從來沒有	有時會	大多數時候	總是
1. 我感覺空虛或悲傷。	☐0	☐1	☐2	☐3
2. 我一想到什麼事情都做得不好的時候 ，我就憂心忡忡。	☐0	☐1	☐2	☐3
3. 我怕一人在家。	☐0	☐1	☐2	☐3
4. 什麼都不再那麼好玩了。	☐0	☐1	☐2	☐3
5. 我擔心有什麼可怕的事會發生在我家人的身上。	☐0	☐1	☐2	☐3
6. 我怕在擁擠的地方 (如商場 、電影院 、巴士 、遊樂場) 。	☐0	☐1	☐2	☐3
7. 我顧慮別人對我怎麼想。	☐0	☐1	☐2	☐3
8. 我睡眠有問題。	☐0	☐1	☐2	☐3
9. 我怕一個人睡覺。	☐0	☐1	☐2	☐3
10. 我胃口有問題。	☐0	☐1	☐2	☐3
11. 無緣無故我突然變得昏暈。	☐0	☐1	☐2	☐3
12.我必須重複做某些動作 (如洗手、清潔 、或把東西放整齊) 。	☐0	☐1	☐2	☐3
13. 我没有力氣。	☐0	☐1	☐2	☐3
14. 無緣無故的，我突然開始發抖。	☐0	☐1	☐2	☐3
15. 我不能清楚地思考。	☐0	☐1	☐2	☐3
16. 我感覺無用。	☐0	☐1	☐2	☐3
17. 我必須默想特殊的想法(如數字或詞句) 來阻止不好的事情發生。	☐0	☐1	☐2	☐3
18. 我思考關於死亡的事情。	☐0	☐1	☐2	☐3
19. 我感覺不想動。	☐0	☐1	☐2	☐3
20.我擔心我會突然無緣無故地感覺恐慌。	☐0	☐1	☐2	☐3
21. 我常常覺得疲倦。	☐0	☐1	☐2	☐3
22. 我擔心我會在別人面前出醜。	☐0	☐1	☐2	☐3
23. 我必須用特定的方式做一些特定的事來阻止不好的事情發生。	☐0	☐1	☐2	☐3
24. 我感覺坐立不安。	☐0	☐1	☐2	☐3
25. 我擔憂不好的 事會發生在我身上。	☐0	☐1	☐2	☐3

生活質量

過去**一個月**，下列事情對你來說有多大問題？

有關我的健康和活動（有多大問題）	從不	甚少	有時	經常	差不多一直有
9. 我步行多於一條街有困難	□0	□1	□2	□3	□4
10. 我跑步有困難	□0	□1	□2	□3	□4
11. 我參與體育活動或運動有困難	□0	□1	□2	□3	□4
12. 我舉起重的東西時有困難	□0	□1	□2	□3	□4
13. 我自己浸浴或淋浴有困難	□0	□1	□2	□3	□4
14. 我在家裡做雜務有困難	□0	□1	□2	□3	□4
15. 我感到痛楚	□0	□1	□2	□3	□4
16. 我感覺疲倦	□0	□1	□2	□3	□4

有關我的感受（有多大問題）	從不	甚少	有時	經常	差不多一直有
6. 我感到害怕或恐懼	□0	□1	□2	□3	□4
7. 我感到難過	□0	□1	□2	□3	□4
8. 我感到憤怒	□0	□1	□2	□3	□4
9. 我睡不好	□0	□1	□2	□3	□4
10. 我擔心有甚麼事將發生在我身上	□0	□1	□2	□3	□4

我如何與他人相處（有多大問題）	從不	甚少	有時	經常	差不多一直有
1. 我與其他孩子相處有困難	□0	□1	□2	□3	□4
2. 其他孩子不願和我做朋友	□0	□1	□2	□3	□4
3. 其他孩子取笑我	□0	□1	□2	□3	□4
4. 我不能做其他同齡小孩能做的事情	□0	□1	□2	□3	□4
5. 我和其他孩子玩耍時，我很難跟上	□0	□1	□2	□3	□4

有關學校（有多大問題）	從不	甚少	有時	經常	差不多一直有
1. 上課時很難專注	□0	□1	□2	□3	□4
2. 我忘記事情	□0	□1	□2	□3	□4
3. 我很難跟上學校的功課或堂課	□0	□1	□2	□3	□4
4. 我因身體不舒服沒有上學	□0	□1	□2	□3	□4
5. 我因看醫生或去醫院沒有上學	□0	□1	□2	□3	□4