

MEDIA RELEASE

Date of Issue: 16 July 2024

IMH-KKH study: Adverse Childhood Experiences (ACEs) cost the economy an estimated S\$1.18 billion per year

*Early detection and preventive care are crucial in alleviating healthcare burden and
productivity losses associated with ACEs*

1. Emotional neglect, parental separation, divorce or death of a parent, living in dysfunctional home environments and emotional abuse are among the most common forms of Adverse Childhood Experiences (ACEs) in Singapore. Based on the Singapore Mental Health Study 2016, 63.9%¹, or 2 in 3, of the adult population here have experienced at least one ACE, which are stressful or traumatic events that occur from birth to age 18, and result in harm or potential harm to the child.
2. For many of these individuals, the impact of such events continues across their lifespan and sees them chalking up higher costs related to the use of healthcare services and productivity losses. The costs range from S\$767 to S\$2168 per person annually, compared to individuals without ACEs.
3. These findings are part of a [study](#) published last month in the journal, *Psychological Trauma: Theory, Research, Practice, and Policy*. The study was conducted by the Institute of Mental Health (IMH), in collaboration with KK Women's and Children's Hospital (KKH), to establish a baseline of the economic and social cost of ACEs in Singapore.
4. Using data on healthcare resource utilisation and productivity losses, IMH and KKH researchers estimate the average annual excess costs per person associated with any ACEs to be S\$767. This means that the healthcare system and society would be expected to incur S\$767 more in total costs per year for this individual than someone without exposure to ACEs. The average annual excess costs per person nearly triples to S\$2168 for those exposed to three or more ACEs. Based on a 63.9% prevalence rate of ACEs among adults aged 18 and above, the societal cost of ACEs is estimated to be S\$1.18 billion per year for at least one ACE in terms of healthcare resource utilisation and productivity loss².

¹ [Prevalence, socio-demographic correlates and associations of adverse childhood experiences with mental illnesses: Results from the Singapore Mental Health Study - PubMed \(nih.gov\)](#)

² The total societal costs of ACEs were estimated through regression analyses. Exposure to at least one ACE was associated with higher total societal cost (based on direct medical care, indirect medical care, and productivity loss), while controlling for confounding variables, such as age, gender, ethnicity, marital status, education, employment, income, mental disorders, and chronic physical disorders.

5. “Of the 11 forms³ of ACEs examined in our study, emotional adversities contributed substantially to economic and societal costs in Singapore. While these types of ACEs are not immediately life threatening, they increase the risk of developing mental health issues later in life. For instance, compared to those who have never experienced any ACEs, individuals who have experienced one ACE were three times more likely to have mood or anxiety disorders. Should mental health issues surface, these individuals are likely to require more medical care resources and may see a drop in productivity at work,” says Dr Liu Jianlin, Research Fellow, Research Division, IMH, who is also the first author of the paper.
6. “It is well established that ACE-related trauma can lead to chronic stress. Without early intervention, the person affected is often vulnerable to poor self-care, and faces challenges in regulating emotions and forming stable relationships. All these increase the risk of physical and mental health issues. Preventing ACEs is an important first step. This can be done by creating awareness of the lifelong harm caused by them through public education, teaching parenting skills and encouraging family bonding activities. However, identifying signs early and providing preventive care and support are equally important for children who have experienced ACEs. This can minimise the damage and alleviate healthcare burden,” says Dr Mythily Subramaniam, Assistant Chairman, Medical Board (Research), IMH. “This study is among the first to establish the cost of ACEs in the Singapore population. We now know the enormous toll of ACEs – both on the individual and the economy. We hope that the findings can help to increase awareness of ACEs among communities working with vulnerable populations to reduce the impact of trauma.”

About the study

7. The study drew on data from the 2016 Singapore Mental Health Study (SMHS). A total of 4,441 respondents – out of a sample of 6,126 representing the general population – were interviewed between 2016 and 2018 to establish the prevalence of common mental disorders, and ACEs, in Singapore. The researchers also collected data on participants’ healthcare resource utilisation during the past three-month period before the interview, their chronic physical disorders (e.g., cardiovascular disorders), as well as socio-demographic information.
8. To establish costs, the researchers focused on three key components:
 - a) **Direct medical care:** refers to care provided by healthcare professionals in the public or private sector, in the outpatient or inpatient setting, including hospitalisation, and visits to accident & emergency (A&E).
 - b) **Indirect medical care:** represents the time spent by family members or friends in travelling with respondents to use various medical services, and in accompanying them during their consultations and treatments.

³ (1) emotional neglect; (2) physical neglect; (3) living with family members who were substance abusers; (4) living with family members who had mental illness; (5) witnessing domestic violence; (6) living with family members who were incarcerated; (7) emotional abuse; (8) physical abuse; (9) sexual abuse; (10) bullying; and (11) parental separation, divorce or death of a parent.

- c) **Productivity loss:** comprises the costs of absenteeism and presenteeism. Absenteeism refers to the number of days out of the past 30 when an individual was totally unable to work or carry out normal activities due to problems with physical health, mental health, or use of alcohol or drugs. Presenteeism refers to the number of days out of the past 30 when an individual had to cut back on the type or quantity of work due to problems with physical health, mental health, or use of alcohol or drugs.
9. The key findings of the study are:
- a) The unadjusted total costs incurred by a person with ACEs were S\$1018 per year (exposed to at least one ACE) and S\$3092 per year (exposed to three or more ACEs) respectively. After adjusting for socio-demographic factors (e.g. age, gender, ethnicity, marital status, education, employment, and income), chronic physical disorders, and common mental disorders, the average annual excess costs by a person with ACEs were S\$767 per year (exposed to at least one ACE) and S\$2168 per year (exposed to three or more ACEs).
 - b) Compared to individuals without ACEs, those who were exposed to at least one ACE had incurred significantly higher costs for indirect medical care and productivity losses, while those who were exposed to three or more ACEs had incurred significantly higher costs for direct medical care, indirect medical care, and productivity losses.
 - c) The cost of productivity loss in terms of absenteeism and presenteeism appears to be much higher in those with ACEs than those without ACEs. Notably, the cost of presenteeism was twice as high in those who were exposed to at least one ACE (S\$679) than those without ACEs (S\$327). On the other hand, the cost of presenteeism was nearly five times as high in those who were exposed to three or more ACEs (S\$1597) than those without ACEs (S\$327).
 - d) Emotional adversities (specifically, emotional abuse and emotional neglect) and parental separation/divorce/death of a parent were prevalent and found to be underlying drivers of increased healthcare resource utilisation and productivity losses in Singapore.
10. "It is noteworthy that despite adjusting for common mental disorders and chronic physical disorders in our analysis, the economic costs of ACEs remain significant at S\$1.18 billion. Furthermore, our study did not include costs associated with other ACE-related mental health conditions that weren't assessed in the SMHS, like post-traumatic stress disorder (PTSD) and personality disorders, as well as the use of resources like the criminal justice system and social and community services," says Dr Liu.

Mitigating the impact of trauma

11. As a mental healthcare institution, IMH is mindful that the hospital may see people with a history of trauma. Trauma-informed care approaches are incorporated into training to help staff to better understand and apply trauma-informed care principles in their interactions with patients to prioritise psychological and emotional safety.

12. Initiatives like the Forensic Rehabilitation, Intervention, Evaluation & Network Development Services (FRIENDS) and Resilience Programme also offer support to those who may have been exposed to adverse or traumatic events. FRIENDS provides comprehensive and integrated multi-disciplinary assessment and intervention services for at-risk youth, including victims of child abuse and children and parents involved in complex custody and access disputes. Staff from FRIENDS incorporate trauma-informed care and response approaches and interventions to reduce the impact of trauma and mitigate the risk of developing mental health issues in this vulnerable population.
13. Living with household members who have a mental illness is among the top five commonly faced adverse childhood experiences here. IMH's Resilience Programme is tailored to promote the well-being and resilience of children aged 9 to 14 years with a parent who has a mental health diagnosis. With groupwork for parents and children, as well as casework sessions, the family-centred programme helps children better grasp their parent's condition and learn skills to manage challenges they face at home. It also helps parents better understand the impact of mental health issues on their children, strengthen their parenting capacity, and empower them in their recovery.
14. In 2019, KKH established Anchor, a home visit pilot programme, in partnership with Temasek Foundation, to support families with children under the age of four who are exposed to adverse childhood experiences (ACEs). The Anchor team conducts regular assessments of the child's developmental, emotional and physical health, as well as evaluation for trauma symptoms, and of the primary caregiver's mental health and overall well-being, so as to identify the family's needs in a timely manner. It provides a tailored care plan for each child and family in discussion with the family, including targeted evidence-based interventions within the home setting, referrals to hospital and/or community services, and liaison with community agencies, where required.
15. "We have been working with young children exposed to ACEs and their families at KKH. We have identified that early exposure to ACEs can directly impact a child's development, including social-emotional development which may present with significant developmental delays. The child may also often exhibit challenging behaviours, some of which are likely trauma responses, and may compromise the child's learning in pre-school and beyond. It is imperative that such families are identified early and provided with targeted interventions to mitigate the long-term effects of exposure to ACEs," says Dr Padmini Yeleswarapu, Senior Consultant, Department of Child Development, KKH.

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About the Institute of Mental Health (IMH)

The Institute of Mental Health (IMH), a member of the National Healthcare Group, is the only tertiary psychiatric care institution in Singapore. Located on the sprawling 23-hectare campus of Buangkok Green Medical Park in the north-eastern part of Singapore, IMH offers a multidisciplinary and comprehensive range of psychiatric, rehabilitative and therapy services in hospital-based and community-based settings. The 2,000-bedded hospital aims to meet the needs of three groups of patients – children and adolescents (aged below 19 years), adults and the elderly. Besides providing clinical services, IMH dedicates resources to carry out mental health promotion and raise mental health literacy. IMH also leads in mental health research and training the next generation of mental health professionals in Singapore. For more information, please visit <https://www.imh.com.sg>.

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About the KK Women's and Children's Hospital (KKH)

KK Women's and Children's Hospital (KKH) is Singapore's largest tertiary referral centre for obstetrics, gynaecology, paediatrics and neonatology. The academic medical centre specialises in the management of high-risk conditions in women and children. Driven by a commitment to deliver compassionate, multidisciplinary care to patients, KKH leverages research and innovation to advance care. In 2021, the hospital launched the SingHealth Duke-NUS Maternal and Child Health Research Institute (MCHRI) to support the growth of every woman and child to their fullest potential, and transform national health in the region.

Some of the hospital's breakthroughs include uSINE[®], a landmark identification system for the administration of spinal epidural, the discovery of new genetic diseases like Jamuar Syndrome, and a series of guidelines for women and children to improve population health. The academic medical centre is also a major teaching hospital for Duke-NUS Medical School, Yong Loo Lin School of Medicine and Lee Kong Chian School of Medicine. In addition, KKH runs the largest specialist training programme for Obstetrics and Gynaecology, and Paediatrics in Singapore. KKH was founded in 1858 and celebrates its 100th year as a maternity hospital in 2024. For more information, visit www.kkh.com.sg

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