



UNIVERSITI PUTRA MALAYSIA

***PREVALENCE OF ADVERSE CHILDHOOD EXPERIENCES AND ITS
ASSOCIATED FACTORS AMONG UNDERGRADUATE MEDICAL
STUDENTS, UNIVERSITI PUTRA MALAYSIA***

GROUP 32

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ABSTRACT

Title: Prevalence of adverse childhood experience and its associated factors among undergraduate medical students, Universiti Putra Malaysia.

Background

Adverse Childhood Experiences (ACEs) are traumatic events occurring during early life. ACEs include physical, emotional and sexual abuse, physical and emotional neglect, substance abuse, incarcerated household members, parental separation, parental mental illness, household violence, bullying, collective violence and community violence. The more a child experiences ACEs, the more likely for them to suffer later in life from suicidal behaviour, depression, chronic health illness, poor academic performance and substance abuse. In Malaysia, there was a rise in reports of all forms of abuse, with triple the number of cases between 2001 and 2010, to more than 3000 per year.

Objective

Our study aims to assess the prevalence of adverse childhood experiences among undergraduate medical students. Besides, this study also aims to assess the factors (sociodemographic factors, parental factors) associated with ACEs among undergraduate medical students.

Methodology

This study was conducted at the Faculty of Medicine and Health Sciences, University Putra Malaysia (UPM). The study design chosen was a cross-sectional study and it was carried out from 20th December 2020 until 31st May 2021. Our sampling population were year 1 to year 4 undergraduate medical students from the Faculty of Medicine and Health Sciences in UPM and the total eligible participants were 445 students, however the targeted population was only 410 students. Students that were excluded from the study were those who did not have internet connection during data collection and this included a 35% non-response rate. However, we only managed to achieve 82% response rate which was 336 participants. The questionnaire used was the World Health Organization Adverse Childhood Experiences International Questionnaire (ACE-IQ) with Cronbach alpha value of 0.76 which showed good reliability. For the data

analysis, the Statistical Package for Social Sciences (SPSS) version 26 was used. Chi-Square test, Fisher's Exact test and multiple logistic regression were conducted to analyse bivariate and multivariate analysis.

Results

Thirteen types of ACEs were assessed in the study. The prevalence of at least one ACE reported by participants was about 97% and more than half had experienced at least 4 ACEs. The third most frequently reported adverse childhood experiences were emotional neglect (94.3%) followed by community violence (56.3%) and collective violence (45.2%). Multiple logistic regression showed respondents whose fathers obtained secondary school education or less were 3 times more likely to have been abused either physically, emotionally or sexually compared to respondents whose fathers had higher education level (OR = 3.046, 95% CI: 1.014 – 9.152, P = 0.047). While respondents with mothers who smoke were nearly 17 times more likely to experience household dysfunction compared to those who have mothers who did not smoke. (OR = 16.815, 95% CI: 1.822 – 150.220, p = 0.012).

Conclusion

This study shows that ACEs were experienced by majority of undergraduate medical students with the most common ACEs were emotional neglect, community violence, and collective violence. Parental education and maternal smoking status were important predictors for adverse childhood experiences. These should be the target groups for prevention of childhood adverse experiences.

CHAPTER 1: INTRODUCTION

1.1 Background

According to the World Health Organization (2018), Adverse Childhood Experiences (ACE) refers to some of the most intensive and frequently occurring sources of stress that children may suffer early in life. The thirteen ACEs include various types of abuse and neglect; household violence, other forms of household dysfunction such as substance abuse; as well as peer, community, and collective violence.

Adverse childhood experiences, or ACEs, are potentially traumatic events that occur in childhood (less than 18 years old). About 61% of adults have reported to experience at least one type of ACE, with 1 in 6 adults who have reported to experience four or more ACEs (Centre for Disease Control and Prevention, 2020).

In Malaysia, the data shows that over the years, reports of all forms of abuse have increased, with the number of cases tripling between 2001 and 2010, to more than 3000 per year (Ahmed et al, 2015). Most of the research, however, has been carried out in developed countries. Therefore, awareness of the factors contributing to ACEs in developing countries has been limited.

The purpose of this study is to determine the prevalence of ACEs and identify the associated factors among undergraduate medical students in Universiti Putra Malaysia. We chose undergraduate medical students as they are future doctors and should be aware of the prevalence and effects of ACEs. From this study, we expect that the result of sociodemographic and parental factors would have significant association with the prevalence of ACEs.

1.2 Problem Statement

Globally in the year 2020, the prevalence of adverse childhood experiences among adults is about 61% with 16% experiencing 4 or more types of ACEs (Centers for Disease Control and Prevention, 2020). The prevalence of ACEs was found to be increasing gradually compared to the year 2009, where the prevalence was 59.4% with only 8.7% experiencing 5 or more types of ACEs (Frieden et al., 2010) and the year 1998, where the prevalence was 52% with only 6.2% reporting more than 4 types of ACEs (Felitti et al., 1998).

In developed countries such as the United States, a 25-state population study conducted by the US Department of Health and Human Services among 144,017 adults, found that 15.6% (95% CI = 15.2 - 16.0) of adults reported experiencing four or more types of ACEs namely physical abuse, sexual abuse, emotional abuse, and household challenges compared to 39% (95% CI = 38.6 - 39.5) of adults who did not experience any ACEs (Merrick et al., 2019). In developing countries such as Brazil, the prevalence of ACEs among adolescents aged up to 18 years old was approximately 85%, with the most common ACEs being parental separation (42%, 95% CI = 40.4 - 43.5), followed by emotional neglect (19.7%, 95% CI = 18.5 - 21.0) and domestic violence (10.3%, 95% CI = 9.4 - 11.3) (Soares et al., 2016).

Within the Asia continent, a study conducted among adolescents in Singapore showed a 63.9% lifetime prevalence of ACEs with 50.9% ($p < 0.05$) of adolescents who reported physical, emotional abuse or neglect and 33.2% ($p < 0.05$) who experienced some form of household dysfunction. This also supports the issue that ACEs are not uncommon in the Asian population (Subramaniam et al., 2020).

In Malaysia, the prevalence of ACEs was found to be higher (75.5%) (Ahmed et al., 2015) as compared to Singapore (63.9%) (Subramaniam et al., 2020). In a study conducted among primary school children in Malaysia, it was found that 52.7% (95% CI = 50.5 – 54.8) had experienced parental physical abuse followed by 37% (95% CI = 35.0 – 39.2) who experienced parental neglect (Ahmed et al., 2015). Another cross-sectional survey conducted among 1870 secondary school students in Selangor showed a significant proportion of adolescents (22.1%) had experienced two or more types of victimization with 22.2% who reported neglect and 20.4% with emotional abuse (Choo et al., 2011).

Based on relevant studies of ACEs in adolescents, a great number of implications of ACEs were reported by individuals. The first major implication was the impact on mental health such as elevated risks of suicide and reported suicide attempts in adulthood (Dube et. al., 2001). Secondly, these individuals also fall into mood disorders such as depression due to childhood trauma (Cheong et al., 2017). Chronic health conditions were also highly indicated among individuals who suffer from ACEs. For instance, they are more likely to be diagnosed with majorly non-communicable diseases (NCD) including diabetes, respiratory diseases (COPD, asthma), cancer, cardiovascular disease, and stroke. Chronic health conditions were strongly associated with childhood physical maltreatment and drug abuse (Bellis et al., 2015). One study also found that ACEs are significantly associated with leading causes of mortality and morbidity as well as socioeconomic outcomes in adulthood (Merrick et al, 2019).

Relevant studies have also shown factors that could be associated with adverse childhood experiences. Socio-demographic factors include the age, gender of the individual and their ethnicity (Merrick et al., 2019), household income, area of residence (Marryat & Frank, 2019) and the number of siblings in their family (Soares et. al, 2016). Parental factors show the

influence of parents on children who experience ACEs, and these factors are the parent's education level, maternal age at birth of the individual (Marryat & Frank, 2019), parent's mental health, parental employment, parental smoking (Soares et. al, 2016), parental conflict (Fosco & Grych, 2010) and parent-adolescent relationship (Brown et. al., 1998). Other factors include teacher-inflicted abuse (Ahmed et al., 2015).

One of the research gaps that we have found is that there are only 2 studies carried out previously in Malaysia which focused on victimization (Choo et al., 2011) and child maltreatment (Ahmed et al., 2015), both of which are subsets under ACE and do not solely comprise of ACEs. Another research gap is that both studies focused more on primary and secondary school students and not on the older age group such as undergraduate students. Next, the study on victimization experiences conducted by Choo et al., (2011) focused on similar risk factors as our study such as ethnic groups, gender, parental educational level, parental employment status, number of siblings, and quality of school environment while the different variables assessed were quality of neighbourhood environment, family interaction, marital status, paternal polygamy, and presence of any psychiatric illness. The other study conducted by Ahmed et al., (2015) assessed the association of child maltreatment with ethnicity, gender, parental employment status, and school environment which are similar to associated factors in our study. The different factors studied were parental communication, parent-child relationship, security at home and parental conflict.

Based on these research gaps, especially on the lack of studies that focus on all categories of ACEs, we would like to assess the prevalence of ACEs and its associated factors. Furthermore, we would like to focus on young adults as opposed to two previous studies in Malaysia which were conducted among children and adolescents. According to Merrick, the age group between ages 25 and 34 years reported higher prevalence of having more than 4 ACEs compared to older age groups

(Merrick et al., 2019). In addition, undergraduate medical students are the future doctors, and learning about ACEs will create awareness among them. We will also include other parental variables that have not been studied in both previous studies such as parent's education level, maternal age at birth of the respondent and parental smoking habits which we hypothesized would have association to ACEs experienced by undergraduate medical students in our study.

1.3 Significance of Study

This study provided details on the prevalence of ACEs among undergraduate medical students in University Putra Malaysia. The factors that are associated with ACEs will also be investigated in this study. The findings of this study can be beneficial to fill the gap in knowledge on ACEs in Malaysia. There is a need for improved knowledge on the prevalence and risk factors of ACEs as it has implications on mental health and other non-communicable diseases. This would bring more insight into the development of psychological problems among adolescents and young people and the need for suitable interventions to minimize the effects of ACEs. This study would be able to help young adults particularly undergraduate medical students to build understanding and manage their ACEs. By understanding the prevalence and implications of ACEs, undergraduate medical students can protect themselves from mental health illnesses, chronic health conditions and risks of substance abuse. This study would help prevent ACEs in the community by assuring a safe, stable, nurturing relationship and environment among communities. The study findings would also aid the government particularly the Ministry of Health, Malaysia in implementing suitable policy and programs to prevent ACEs in Malaysia especially primary and secondary prevention.

1.4 Research Question

1. What is the prevalence of ACEs among undergraduate medical students?
2. What are the factors associated with ACEs among undergraduate medical students?

1.5 Objective

1.5.1 General Objective

To determine the prevalence of adverse childhood experiences (ACEs) and its associated factors among undergraduate medical students of Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

1.5.2 Specific Objective

1. To determine the distribution of respondents among undergraduate medical students of Universiti Putra Malaysia according to:
 - a. Socio-demographic factors (age, genders, ethnicity, family income, urban-rural area, number of siblings)
 - b. Parental factors (parent's education level, the age of the mother at birth of respondent, parental employment, and parental smoking)
2. To determine the prevalence of ACEs among undergraduate medical students of Universiti Putra Malaysia.
3. To determine association between socio-demographic factors (age, gender, ethnicity, family income, urban-rural area, number of siblings) and ACEs among undergraduate medical students of Universiti Putra Malaysia.

4. To determine association between parental factors (parent's education level, the age of the mother at birth of respondent, parental employment, and parental smoking) and ACEs among undergraduate medical students of Universiti Putra Malaysia.
5. To determine the predictors of ACEs among undergraduate medical students of Universiti Putra Malaysia.

1.6 Research hypothesis

1. There is an association between ACEs and socio-demographic factors (age, gender, ethnicity, family income, urban-rural area, number of siblings) among undergraduate medical students, Universiti Putra Malaysia.
2. There is an association between ACEs and parental factors (parents' education level, the age of the mother at birth of respondent, parental employment and parental smoking) among undergraduate medical students, Universiti Putra Malaysia.

CHAPTER 2: LITERATURE REVIEW

2.1 Definition of Adverse Childhood Experiences

According to the Centres for Disease Control and Prevention, adverse childhood experiences are traumatic experiences that occurs to someone aged 1-18 years old. ACEs include physical, verbal, sexual abuse, and neglect. Other than that, family problems such as violence and parental separation and death can cause mental stress that can induce further ACEs (Centres for Disease Control and Prevention (2019)). According to the 2011 Minnesota telephone survey, adverse childhood experiences (ACEs) is described as a traumatic experience in a person's life occurring before the age of 18 that the person remembers as an adult. According to the World Health Organization (2018), adverse childhood experiences (ACEs) are intensive and frequently occurring sources of stress that children may suffer early in life. Such experiences include various types of abuse, neglect, violence between parents, other forms of household dysfunction such as substance abuse; as well as peer, community, and collective violence. Another definition of ACEs by Frewen is witnessing violent action or behaviour in family members either in parents or siblings which may cause trauma during childhood. (Frewen et. al., 2015). Based on the above, it is shown that there is a consistent definition of ACE by all the studies. In our study, we would be using the ACEs definition by the World Health Organization since the definition clearly reflects that there are many forms of adverse childhood experiences that affect children such as abuse, neglect, household dysfunction, substance abuse, peer violence and community violence, all of which are assessed in our study.

2.2 Prevalence of Adverse Childhood Experiences

2.2.1 Prevalence in developed countries

According to data from the 2016 National Survey of Children's Health (NSCH), there is an increase in adverse childhood experiences among children aged 1-17 years old reported by the parents and guardians in the United State of America. The prevalence of ACEs, nationally, and by race is less than half (45 %) of children in the United States who have experienced at least one ACE, which is similar to the ACE prevalence reported in a 2011/2012 survey. It is shown that the prevalence of ACEs is increasing. It was found that 61% of black non-Hispanic children and 51% of Hispanic children have experienced at least one ACEs, compared to 40% of white non-Hispanic children and 23% of Asian non-Hispanic children. In every region, the prevalence of ACEs is lowest among Asian non-Hispanic children and, in most regions, is highest among black non-Hispanic children. About 0.1% of children nationally have experienced 3 or more ACEs, putting them in a high-risk category (Sacks et al., 2018)

According to a 25-state population study conducted by the US Department of Health and Human Services among 144,017 adults, about 15.6% (95% CI = 15.2 - 16.0) of adults reported experiencing four or more types of ACEs namely physical abuse, sexual abuse, emotional abuse and household challenges compared to 39% (95% CI = 38.6 - 39.5) of adults who did not experience any ACEs. (Merrick et al., 2019). A survey in Germany showed that out of 293 adults, 5% (n = 59) of them had four or more ACEs. The most prevalent forms of child maltreatment were emotional and physical abuse (5%, n = 59) with sexual abuse (1%, n = 12) being the least prevalent. The most frequent household dysfunction reported was parental divorce or separation (13%, n = 153), followed by household substance abuse (11%, n = 129) (Witt et al., 2019).

In another prospective cohort study carried out among 3119 Scottish children aged 8 years old, about 65% of children experienced more than 1 type of adverse childhood experiences (physical abuse, domestic violence, substance abuse, mental illness, parental separation, parental incarceration and emotional neglect) compared to 35% of children who did not experience any ACEs. The two common ACEs were parental mental health problems (35.4%) and parental separation or divorce (32.1%). The proportion of children who experienced physical punishment was 22.2% while 9.1% of the children experienced domestic violence (Marryat & Frank, 2019).

2.2.2 Prevalence in developing countries

Another cohort study conducted by Soares et al., (2016) among 3951 adolescents in Brazil showed that 42% (95% CI = 40.4 - 43.5) adolescents experienced parental separation, followed by 19.7% (95% CI = 18.5 - 21.0) of adolescents who experienced emotional neglect and 10.1% (95% CI = 9.2 - 11.1) of adolescents who suffered from domestic violence.

In a research conducted by Zhang among 2072 Chinese medical college students in China, over two-thirds (68.9 %) of participants reported at least one of ten ACEs, with the most prevalent of which were physical neglect (26.9 %), physical abuse (26.7 %), and household mental illness (23.0 %) (Zhang et al., 2020).

2.2.3 Prevalence in Malaysia

Based on studies on prevalence of child maltreatment in Malaysia, parental conflict was reported by 13.5% of the respondents, parental drinking by 8.9% and parental drug abuse by 1.7%. Three quarters of 10- to 12-year-old students in Selangor were also found to have experienced one

or more forms of child maltreatment, while 43% were found to have suffered at least 2 forms. A minority of 2.6% reported experiencing all 4 types of child maltreatment (Ahmed et. al., 2015). In another cross-sectional study conducted by Choo et al., (2011) among 1870 adolescents aged from 15 to 17 years in Malaysia, 10% reported witnessing parental domestic violence, 4% reported parental alcoholism, and almost 2% reported parental mental illness.

2.3 Impacts of Adverse Childhood Experiences

2.3.1 Mental health implications

2.3.1.1 Suicidal behaviour

According to a cohort study by Dube et. al (2001) among 17,337 adults in United States, an adjusted odds ratio (ORs) of 31.1 (95% CI: 20.6- 47.1) were obtained from logistic regression models that estimated the probability of attempting suicide by each of the 8 categories of ACEs (emotional abuse, physical abuse, sexual abuse, battered mother, household alcohol/drug abuse, mental illness in household, parental separation or divorce and incarcerated household member). It was found that each of the 8 ACEs raised the risk of ever attempting suicide from 2- to 5-fold ($P < 0.001$) because these experiences are closely interrelated and seldom exist in isolation.

This is supported by a cross-sectional, population-based survey of 22,559 respondents aged 18 or older from Fuller Thomson et. al (2016), who revealed that the prevalence of suicide attempts is higher among those who reported childhood physical abuse compared to those with no childhood physical abuse (12.40% vs. 1.93%, $P < 0.001$), among those who reported childhood sexual abuse compared to those with no childhood sexual abuse (16.89% vs. 2.09%, $P < 0.001$) and among those who witnessed parental domestic violence compared to those who did not experience parental

domestic violence (17.34% vs. 2.32%, $P < 0.001$). The three ACEs are associated with higher suicidal behaviour.

2.3.1.2 Depression

In a 25-state population study conducted by the US Department of Health and Human Services among 144,017 adults, it was found that adults exposed to more than 4 types of ACEs had adjusted odds of 5.3 (95% CI= 4.9-5.7) times higher of falling into depression compared to adults exposed to 2 to 3 types of adverse childhood experience (AOR: 2.6, 95% CI= 2.4-2.8) (Merrick et al., 2019).

According to a study conducted by Chapman et al., (2004) among 9460 adults, the prevalence of a lifetime history of depressive disorders and recent depressive disorders was the highest among women with ACE score ≥ 5 , (AOR=5.0, 95% CI= 3.7 – 6.7) and (AOR=4.4, 95% CI = 3.2-6.1) respectively compared to those with ACE score 0. One possible explanation could be due to the presence of a mentally ill household member, hence the genetic influences of depression on the respondent could be a potential reason for the higher odds of depression. (Chapman et al., 2004).

Another study carried out by Cheong et al., (2017) among 302 adults aged between 50 to 69 years showed that 16.1% (95%CI= 14.4 - 17.7) of the adults who experienced ACEs reported depressive symptoms. This was supported by the CES-D score (indicative of major depression) which was significantly higher among respondents who experienced ACEs compared to those who did not (14.1% vs 6.0%, $p \leq 0.001$). The odds of depressive symptoms were higher among individuals who with a greater ACE score and low perceived social support (PSS). For instance, the odds were 5 times higher (OR= 5.33, 95% CI= 2.56 - 11.10) for adults who had an ACE score of 3+ and poor PSS to experience depressive symptoms compared to adults with no ACEs.

In another study conducted Chang et al., (2019) among 1501 adults aged 18 to 59 years, individuals with depression in adulthood was significantly associated with sexual abuse (AOR = 3.05, 95% CI: 1.82– 5.12) and family mental disorder (AOR = 3.91, 95% CI: 1.46– 10.47) compared to those who did not experience sexual abuse or family mental health disorders. One possible explanation is that abuse leads to emotional dysregulation and an increase in cortisol levels, which are the physiological effects of depression (Blane et al., 2013).

2.3.2 Problematic alcohol abuse

In another study conducted Chang et al., (2019) among 1501 adults aged 18 to 59 years, current-drinkers were more likely to experience domestic violence (AOR = 1.68, 95% CI= 1.13– 2.50) during childhood than non-drinkers. The presence of lifetime drinking in adults was also significantly associated with family drug abuse (AOR= 2.07, 95%CI= 0.77 - 5.55); family mental disorder (AOR= 2.78, 95%CI= 0.91 - 1.11) compared to those with no family drug abuse or mental disorders.

In another study conducted by Brajović et al., (2019) among 3283 students, students who experienced physical abuse such as frequently being pushed, grabbed, by somebody showed 2 times odds of alcohol consumption (AOR= 2.42, 95% CI= 1.25 - 4.67) compared to those who did not experience physical abuse. Students who experienced emotional abuse such as frequently being afraid of getting physically hurt also showed 2 times odds of alcohol use (AOR= 2.41, 95%CI= 1.29 - 4.52) compared to those who did not experience emotional abuse. Students showed more than 2 times odds of alcohol consumption when they lived with a problematic drinker (AOR= 2.06, 95%CI= 1.57 - 2.69); lived with somebody mentally ill (AOR= 2.21, 95%CI= 1.48 - 3.28); and had separated parents (AOR= 2.81, 95%CI= 1.50 - 5.26). This is probably because physical abuse increases the risk of psychological, behavioural, and social adjustment as an adult. Hence to cope

with the trauma and various psychopathological disorders caused by the adverse experiences, the adolescents would be compelled to consume alcohol. This category of drinking has been labelled “drinking to cope” and is defined as the tendency to use alcohol to escape, avoid, or regulate unpleasant emotions. (Dube et al., 2002.)

2.3.3 Chronic health conditions

According to a 25-state population study conducted by the US Department of Health and Human Services among 144,017 adults, those who had ACE score of +4 had higher odds of having chronic health conditions, with adjusted odds ratio of 2.1 (95% CI = 1.7–2.5) for stroke, odd ratio of 2.2 (95% CI = 2.0–2.4) for asthma and 2.8 (95% CI = 2.5–3.1) for COPD. (Merrick et al., 2019). It is found that ACEs can affect people’s health and wellbeing not only at the time the ACEs is experienced, but also later in life (Fosco & Grych, 2010).

According to a study conducted by Bellis et al., (2015) among 3885 adults aged 18 to 69 years, it was found that individuals with more than 4 types of ACEs (versus no ACEs) had higher hazard ratios of developing non-communicable diseases (NCDs), namely cancer, 2.38 (95% CI = 1.48 – 3.83); diabetes, 2.99 (95% CI = 1.90–4.72); cardiovascular diseases, 3.11 (95% CI = 1.56 – 6.24); respiratory diseases, 3.50 (95% CI = 2.07 – 5.91); and stroke, 5.79 (95% CI = 2.43– 13.80), all $P < 0.001$. The development of NCDs could be due to the increase in substance abuse such as alcohol, smoking and drug use which is strongly associated with ACE exposure.

In another study conducted Chang et al., (2019) among 1501 adults aged 18 to 59 years, the presence of chronic diseases in adults was significantly associated with childhood emotional abuse (AOR = 1.65, 95% CI: 1.18–2.31, $P < 0.01$); childhood physical abuse (AOR = 1.81, 95%

CI: 1.28–2.56, $P < 0.01$), being bullied (AOR = 2.82, 95% CI: 1.40–5.65, $P < 0.01$), and family drug abuse (AOR = 3.40, 95% CI: 1.38–8.36, $P < 0.01$). These effects are probably due to physiological reactions and psychosocial stress (toxic stress), which accumulates and leads to damage of metabolic, cardiovascular, immune, and nervous systems (Blane et al., 2013).

2.4 Factors Associated with Adverse Childhood Experiences

2.4.1 Socio-demographic Factors

2.4.1.1 Age

According to a study conducted by the US Department of Health and Human Services 144,017 adults, it was found that younger adults reported exposure to more ACEs compared to older adults, especially those aged above 65 years. In the study population of 63,365 respondents, 21.8% (95% CI = 20.5 - 23.1) of the younger age group ranging between 25 to 34 years reported more than 4 adverse childhood experiences (physical abuse, emotional abuse, and sexual abuse, household member substance misuse, incarceration, mental illness, parental divorce, or witnessing intimate partner violence) compared to 7.3% of the older age group aged above 65 years (95% CI = 6.8 - 7.7) (Merrick et al., 2019). A possible explanation to the higher risk among younger groups could be due to their willingness to disclose or being able to recall adverse childhood experiences better (Merrick et al., 2019).

Another study carried out among 211,376 adults in 34 states by Giano et al., (2020) showed that the age group between 25 to 34 years had a significantly higher ACE mean score of 1.98 (95%CI=1.93–2.04) compared to the 64 and over age group which had a significantly lower ACE mean score of 0.94 (95%CI =0.92–0.96). The age group between 25 to 34 years was also significantly associated with emotional abuse (Mean: 40.05, 95%CI= 38.73 - 41.39); parental

separation or divorce (Mean: 40.72, 95%CI= 39.39 - 42.06).

2.4.1.2 Gender

In a 25-state population study conducted by the US Department of Health and Human Services among 144,017 adults, there was higher prevalence of four or more types of ACEs (physical abuse, emotional abuse, and sexual abuse, household member substance misuse, incarceration, mental illness, parental divorce, or witnessing intimate partner violence) among women with a percentage of 17.1% (95% CI= 16.6 - 17.7) compared to men 13.9% (95% CI= 13.4 - 14.5) (Merrick et al., 2019).

A cohort study conducted by Soares et. al, (2016) among 3,951 adolescents aged up to 18 years old, found that almost 20% of the adolescents reported experiencing emotional neglect, which was about 2.2 times higher among females 26.8% (95%CI = 24.9 - 28.7) than males 12.2% (95%CI = 10.8 - 13.7). Parental separation was reported by 42% of the participants, with almost similar prevalence across males 40.9% (95%CI = 38.8 - 43.1) and females 42.9% (95%CI = 40.8 - 45.1). Domestic violence was prevalent in 10% of adolescents, which was more frequent in females 12.7% (95%CI = 11.3 - 14.2) than in males 7.8% (95%CI = 6.7 - 9.1).

In another prospective cohort study carried out among 3119 Scottish children, it was found that males were more likely to experience more than 3 ACEs, with odds of 1.51 (95% CI = 1.15 - 1.98) compared to females. This is possibly due to the two of the variables that were unable to be measured in this study which were sexual abuse and emotional abuse, since both of which are most likely experienced by females (Marryat & Frank, 2019).

In another cross-sectional study conducted by Choo et al., (2011) among 1870 adolescents aged from 15 to 17 years in Malaysia, males had three times the odds of experiencing physical abuse (OR= 3.28, 95%CI = 2.38–4.51). A cross sectional study conducted by Ahmed et al., (2015)

among 3509 students between 10 to 12 years old in Malaysia also found that the odds were 2 times higher for males who experienced teacher-inflicted physical abuse (OR= 2.89, 95%CI = 2.25–3.71).

2.4.1.3 Ethnicity

In a cross-sectional study conducted by Ahmed et al., (2015) among 3509 students between 10 to 12 years old in Malaysia, it was found that the odds of parental emotional abuse were 3 times higher in Chinese children (OR=3.08, 95%CI = 2.14 – 4.44) compared to Indian children (OR=1.19, 95%CI = 0.80–1.78). However, Indian children have higher odds of parental physical abuse (OR=1.70, 95%CI = 1.23–2.37) compared to Chinese children.

A study conducted by the Faculty of Public Health, England among 3885 adults aged 18 to 69 years, showed that the Asian ethnicity was reported to have a lower occurrence of having more than 4 types of ACEs (5.2%, $p<0.001$) compared to whites (8.3%, $p<0.001$). A possible explanation is that the Asian community primarily has lower parental separation rates (Bellis et al., 2015).

A 25-state population study carried out by the US Department of Health and Human Services among 144,017 adults showed that Alaska Natives, blacks, and other racial groups have significantly higher prevalence of ACEs than white people. About 28.3% (95% CI= 24.1- 32.6) of Alaska Natives, 17.7% (95% CI = 16.3-19.0) of blacks and 28% (95% CI = 24.7 - 31.4) of other racial groups showed four or more types of ACEs compared to whites. These racial groups have higher prevalence possibly due to living in under-developed neighbourhoods and from ongoing trauma from systematic racism (Merrick et al., 2019).

2.4.1.4 Household Income

According to a cohort study in 2019 among 3119 Scottish respondents, it was reported that ACEs varied by household income quintiles: 1% of children in households in the top income quintile (£≥£33 571) had 4+ ACEs, compared with 10.8% in the lowest income group (£<£8410) ($p<0.001$). Children having the highest level of ACEs at age 8 were from lower income groups, particularly those from the lowest income quintile (£<£8410), where the odds were 5.7 times (95% CI: 2.82 - 11.64) greater than the higher income groups (Marryat & Frank, 2019).

Another study conducted by Bellis et al., (2015) showed that all types of child abuse, for instance physical abuse had a higher occurrence (18.5%, $p<0.001$) in children living in the most deprived quintile of income group, and this is also associated with more than 4 types of ACEs experienced by the children by 12.7% ($p<0.001$). In contrast, children living in the least deprived quintile of income group had the lowest occurrence of physical abuse, 10.4% ($p<0.001$), associated with only 4.3% of children with ACE score of +4. The prevalence of household dysfunction such as living with an alcoholic family member in childhood also doubles from 5.2% to 12.5% from the richest to poorest quintiles, ($p<0.001$).

2.4.1.5 Residence area (urban/rural)

A cross-sectional study conducted across 34 states by the University of South Carolina, Columbia showed that 33.3% of rural children experienced 1 to 3 ACEs compared to 30.1% of urban children ($P < .0001$). Rural children also tend to have exposure to more than 4 ACEs than their urban counterparts (6.9% vs 3.8%, $P < .0001$). For instance, rural children had higher rates of exposure to most of the ACEs studied; parental separation/divorce (30.6% vs 23.4%, $p < .001$), parental death (5.0% vs 3.1%, $p=.0038$), economic hardship (30.2% vs 25.0%, $p= .0002$) and household

substance abuse (12.3% vs 8.4%, $p < .0001$) (Crouch et al., 2020).

In another prospective cohort study carried out among 3119 Scottish respondents, children who lived in the urban area were shown to have had more than 3 ACEs, where the odds were 1.82 times (95% CI = 1.14 – 2.92) higher compared to those in rural areas. One possible explanation would be because living in an urban area is associated with higher levels of child abuse, drug abuse and heavy alcohol use. For children living in areas with higher levels of deprivation, the odds were also 5.3 times higher as the children seem to experience more than 4 ACEs (physical abuse, domestic violence, substance abuse, mental illness, parental separation, parental incarceration, and emotional neglect) (Marryat & Frank, 2019).

2.4.1.6 Number of siblings of respondent

A study conducted by Bellis et al., (2015) among 3424 respondents reported that individuals with more than one sibling in childhood had significantly more ACEs (physical, verbal, and sexual abuse; parental separation; exposure to domestic violence and growing up in a household with mental illness, alcohol abuse, drug abuse or incarceration) (ACEs, mean siblings; 0, 2.11; 1, 2.10; 2–3, 2.26; 4, 2.73; $F_{1/4} 10.194$, $P < 0.001$).

A cohort study among 3,951 adolescents in Brazil carried out by Soares et. al (2016) showed that there was low significance between the number of siblings and its association with ACEs. For instance, an adolescent living with 2 siblings (OR= 1.3, 95%CI = 0.9 - 2.1) experienced similar odds of having an ACE score of +4 as compared to having no siblings.

2.4.2 Parental factors

2.4.2.1 Parents Education Level

A prospective cohort study carried out among 3119 Scottish respondents showed that a mother with lower educational qualifications (OR = 1.72, 95% CI = 1.07 - 2.78) has a significant association with their children having more than 1 ACE compared to a mother with higher educational qualification (OR= 1.07, 95%CI = 0.67 - 1.73) (Marryat & Frank, 2019).

According to a cohort study among 3,951 adolescents in Brazil, it was found that an inverse relationship was observed for maternal schooling with the number ACEs experienced: the lower the mother's level of education at the time of adolescent birth, the higher the number of ACEs. For instance, a mother who has had schooling for less than 4 years is associated with 6 times higher odds (95%CI = 2.5 - 14.8) of her child experiencing more than 4 ACEs compared to a mother who has had schooling for more than 12 years (Soares et. al, 2016).

2.4.2.2 Age of mother at birth of respondent

A cohort study among 3,951 adolescents in Brazil carried out by Soares et. al (2016) found that an inverse relationship was observed for mother's age with the number of ACEs experienced, the lower the mother's age at the time of the adolescent's birth, the higher the number of ACEs. For instance, the odds were 3 times higher for an adolescent with an ACE score of +4 when the mother's age at birth was below 20 years compared to when the mother's age is more than 35 years.

Another cohort study carried out among 3119 Scottish respondents also showed that having a mother who was under 20 at the birth of her first child increased the odds 2.2 times (95% CI = 0.45 - 10.57) higher for their children to experience more than 3 ACEs. (Marryat & Frank, 2019).

The rationale behind this is that older women are more likely to have more knowledge and experience as well as have better parenting abilities compared to younger mothers.

2.4.2.3 Parental employment

A cross-sectional study among 1223 young adults aged between 22 and 23 years, showed that 43% ($p = 0.01$) of adults with parental unemployment had experienced at least one ACE (Manyema et al., 2018). Another cross-sectional study by Ahmed et al., (2015) also found that fathers who were unemployed had the odds that were 1.93 times higher for parental neglect ($OR = 1.93$, $95\%CI = 1.11-3.36$) compared to fathers who were employed.

In another cross-sectional study conducted by Choo et al., (2011) among 1870 adolescents aged from 15 to 17 years in Malaysia, it was reported that the odds of sexual abuse were two times higher when the adolescent's mother is self-employed or has her own business.

A cohort study conducted among 3,951 respondents by Soares et al., (2016) showed that an unemployed household member at 11 and 15 years had 2 times the odds for adolescents to experience more than 4 types of ACEs compared to no unemployed household members.

2.4.2.4 Parental smoking

Parental smoking is related to the persistence of adolescent smoking (Flay, Hu, & Richardson, 2000). Other than that, because tobacco dependence shows significant heritability, parental smoking may reflect important genetic influence on adolescents. (Heath & Madden, 1995).

A cohort study conducted among 3,951 respondents by Soares et al., (2016) showed that maternal smoking during pregnancy did not have a significant association with ACEs experienced by adolescents as adolescents with maternal smoking who had ACE score of +4 had similar odds ($OR = 1.9$, $95\%CI = 1.4 - 2.7$) to adolescents without maternal smoking association.

2.4.2.5 Parental conflict

According to a study conducted by Brown et. al., (1998) among 644 families, it was reported that the odds of children who experienced neglect while experiencing parental conflict were 2.44 times (95% CI = 1.24 – 4.81) higher compared to children who did not experience any parental conflict.

Conflict in the family due to parental separation was almost twice the prevalence found in some studies performed in England and the United States that was associated with ACE (42% compared to circa 22%) (Bellis et al., 2014; Bethell et al., 2014; Cunningham et al., 2014).

Another longitudinal study done among 171 adolescents aged 14 to 19 years showed that adolescents who reported being exposed to more intense, frequent, and poorly resolved interparental conflict also reported greater levels of threat ($\beta = 0.45$), self-blame ($\beta = 0.21$) and lower levels of coping efficacy ($\beta = -0.43$) compared to adolescents who did not experience any parental conflict (all $P < 0.01$). One possible explanation is that being caught in the middle of a parental disagreement often puts adolescents in a tough situation where they are pressured to take sides and choose between their parents (Fosco & Grych, 2010).

2.4.2.6 Mother's mental health

A cohort study conducted among 3,951 respondents by Soares et al., (2016) showed that mothers who had common mental disorders had odds that were 3.5 times higher for adolescents to experience more than 4 types of ACEs compared to those with no common mental health disorders.

According to a study conducted by Brown et. al., (1998) among 644 families, it was reported that the odds of children with maternal sociopathy were 6.27 times (95% CI = 2.31–17.06) higher in suffering from sexual abuse compared to children with mothers who had no mental health disorders.

2.4.2.7 Parent-adolescent relationship

Another longitudinal study done among 171 adolescents aged 14 to 19 years at 2 time points showed that adolescents who reported less closeness with their mothers ($\beta = -0.36$) and fathers ($\beta = -0.39$) were also exposed to greater levels of interparental conflict compared to those who had close parent-adolescent relationship. (all $P < 0.05$) (Meinck & Steinert, 2016).

According to a study conducted by Brown et. al., (1998) among 644 families, it was reported that low maternal involvement (OR: 2.68, 95% CI = 1.17–6.12), low paternal involvement (OR: 3.18, 95%CI = 1.34–7.84), and low paternal warmth (OR: 3.24, 95%CI = 1.56–6.45) had higher odds of children reporting with child neglect compared to children who had adequate parental involvement and paternal warmth.

2.4.2.8 Parental separation and parental death

According to a prospective cohort study among 3,119 Scottish respondents by Marryat and Frank (2019) reported that the most common ACEs were parental mental health problems (35.4%) and having parents who were separated or divorced (32.1%).

In another cohort study conducted among 1926 adults, individuals who had experienced ACEs were divorced or separated individuals (11.6%, $p \leq 0.001$), and single individuals (10%, $p \leq 0.001$). Meanwhile, 80.6% ($p \leq 0.001$) of married individuals and 6.4% ($p \leq 0.001$) of widowed individuals did not experience any ACEs (Cheong et al., 2017). Parental separation could most likely be due to parents spending less time with their child because they have remarried, relocated or there are relationship difficulties (Kelly, 2007).

2.4.2.9 Parental alcohol consumption

In a retrospective cohort study by Anda et. al, (2002), 9,346 adults who visited a primary care clinic of a large health maintenance organization completed a survey about ACEs. In comparison to adults who reported no history of parental alcohol abuse, those who had grown up with at least one alcohol-abusing parent were two or three times as likely to report childhood histories of, physical abuse and sexual abuse. For instance, among 2814 adults who had experienced physical abuse, parental alcohol abuse was reported by 30.1% of respondents: mother only (AOR: 1.8, 95%CI = 1.4-2.4), father only (AOR: 2.0, 95%CI = 1.7-2.2), and both parents (AOR: 2.5, 95%CI = 1.9-3.2) compared to 26.4% of adults who did not experience physical abuse. Among 1874 adults who had experienced sexual abuse, 20.5% of them reported parental alcohol abuse: mother only (AOR: 2.3, 95%CI = 1.7-3.0, father only (AOR: 1.6, 95%CI = 1.4-1.9), and both parents (AOR: 2.6, 95%CI = 2.0-3.4)

In another cohort study conducted among 1926 adults, it was also reported that individuals who experienced ACEs were moderate alcohol drinkers (65.6%, $p=0.22$) and heavy drinkers (16.7%, $p=0.22$) respectively. (Cheong et al., 2017). A cross sectional study by Ahmed et al., (2015) reported that parental alcohol abuse led to odds of 1.95 times higher of children experiencing more than 2 types of abuse. (95% CI= 1.29–2.93). Parental alcohol abuse also showed higher odds of causing child maltreatment in the form of emotional abuse. (OR: 1.96, 95% CI = 1.35–2.86).

A cohort study conducted among 3,951 respondents by Soares et al., (2016) showed that maternal alcohol consumption during pregnancy had 2 times the odds (OR= 2.7, (95%CI= 1.4 - 5.3) for the adolescents to experience more than 4 types of ACEs. One possible explanation is that alcohol is a common coping mechanism used to handle stress by the mother. In another cross-sectional study conducted by Choo et al., (2011) among 1870 adolescents aged from 15 to 17 years

in Malaysia, it was found that parental alcohol abuse showed odds that were three times higher for physical abuse (OR= 3.28, 95%CI = 2.38 – 4.51) and sexual abuse (OR= 3.36, 95% CI= 1.73 – 6.53) among adolescents.

2.4.3 Other factors

2.4.3.1 Teacher-inflicted abuse

A cross-sectional study by Ahmed et al., (2015) reported that 29.9% of the population experiences teacher-inflicted physical abuse (95% CI = 27.1–31.5). It is also shown that the odds of teacher inflicted physical abuse were higher in urban areas (AOR: 0.71, 95%CI = 0.56–0.91) compared to rural areas. The odds of being physically maltreated by teachers at school were also two times higher for children who were physically maltreated at home. This could be because children who witness violence at home, negatively influence their behavior at school and are more likely to manifest behavioral problems and aggression at school. This makes them easy targets of physical punishment by teachers in school. (Ba-Saddik & Hattab, 2012)

2.4.3.2 Peer Violence

A recent study by Forster et al., (2020) showed that an increase from 0 to 6 ACEs was associated with 64% (95% CI = 0.47- 0.77) higher probability of bullying perpetration and a 42% (95% CI = 0.27-0.56) higher probability of being a victim of bullying among boys. However, among the girls, an increase from 0 to 6 ACEs was associated with a 34% (95% CI = 0.29-0.38) and a 27% (95% CI = 0.23-0.32) increase in the probability of bullying perpetration and victimization, respectively. Apart from that, boys who experience ACEs were associated with 31% (95% CI = 0.26 -0.37) higher probability of being a victim of theft or vandalism compared to a 21% increase (95% CI = 0.16-0.25) among girls. (Forster et al., 2020)

A person who commits criminal behavior during early stages of life, as a response to social pressures such as peer influence or the maturity gap that they faced before desisting in early adulthood. From a DLC research, it is suggested that neuropsychological deficits and negative environmental influences such as childhood abuse and trauma occur at higher rates among the serious, violent, and chronic (SVC) offenders. Hence, it is expected that the more serious, violent, and chronic juvenile offenders are more likely to experience childhood trauma than their less criminogenic counterparts. (Fox et al, 2015).

2.5 Study Instrument

2.5.1 Adverse Childhood Experiences

To assess the adverse childhood experiences in adults, there are 3 types of measures that can be used.

1) CDC-Kaiser Permanente Adverse Childhood Experiences (ACE) Study

One of the largest investigations of childhood abuse and neglect as well as household challenges. Primary purpose is for research. Participant demographic information is available by gender, ethnicity, age, and education. The questionnaire consists of 28 questions, 10 topics and is divided into 3 domains: abuse, neglect, and household challenges. Abuse is divided into emotional abuse, physical abuse, sexual abuse while neglect is divided into emotional neglect and physical neglect. Household challenges are divided into substance abuse in household, mental illness in household, parental separation or divorce, incarcerated household members and mother being treated violently. The prevalence of ACE is calculated by category for CDC-Kaiser ACE Study Participants by sex. To determine ACE prevalence, the ACE score is categorized into 0, 1, 2, 3 and 4 or more adversities due to low prevalence of more than 4 ACEs. Study questionnaires include Family Health History Questionnaire (gender-based) and Health Appraisal Questionnaire to collect information child abuse and neglect, household challenges, and other socio-behavioural factors.

2) World Health Organization's (WHO) ACEs International Questionnaire (ACE-IQ)

Questionnaire designed for people aged 18 years and older, which is intended to measure ACEs in all countries and its association with risk behaviours. Primary purpose is for program planning and international comparisons. The questionnaire consists of 29 questions and 13 topics.

The questions from the ACE-IQ about childhood experience is divided into 13 categories; emotional abuse; physical abuse; sexual abuse; violence against household members; living with household members who were substance abusers; living with household members who were mentally ill or suicidal; living with household members who were imprisoned; having one or no parents, parental separation or divorce; emotional neglect; physical neglect; bullying (peer violence); community violence; collective violence. To determine ACE prevalence, the ACE cumulative score ranges from 0 to 13. ACE score can be calculated through binary or frequency scoring in which only some “yes” responses are taken into the count. This study will use this instrument to measure ACEs.

3) Behavioural Risk Factor Surveillance Survey (BRFSS) ACEs module

It is an annual, state-based, random-digit-dial telephone survey that collects data from adults of the United States regarding health conditions and risk factors (Hu, et al, 2011). Primary purpose is used for state policy and practice. The module has been adapted from the original CDC-Kaiser ACE Study and consists of 11 questions and 8 topics. Participant demographic information is available by gender, ethnicity, age, and education. ACEs are categorized into three groups in the BRFSS ACE module: abuse, neglect, and household challenges like the original CDC-Kaiser Study. Abuse questions are modified from the original CDC-Kaiser ACE Study to appear more suitable for a telephone survey. To determine ACE prevalence, the ACE score is categorized into 0, 1, 2, 3 and 4 or more adversities due to low prevalence of more than 4 ACEs.

2.6 Conceptual Framework of Factors Associated with Adverse Childhood Experiences

The proposed cross-sectional study includes the prevalence and factors that are associated with Adverse Childhood Experiences (ACEs) among undergraduate medical students in Universiti Putra Malaysia (Serdang Campus). In this study, the dependent variable refers to adverse childhood experiences among undergraduate medical students while the independent variables consisted of socio-demographic factors and parental factors. Firstly, the sociodemographic factors that would be studied are age, gender, ethnicity, household income, residence area and number of siblings. This study also examines the parental factors associated with ACEs which are the education level of the respondent's parent, the age of the mother at birth of the respondent, parental employment, and parental smoking. We would like to determine how strongly are these factors associated with ACEs among the undergraduate medical students. Factors and impacts which were not analyzed in the present study are included in this framework.

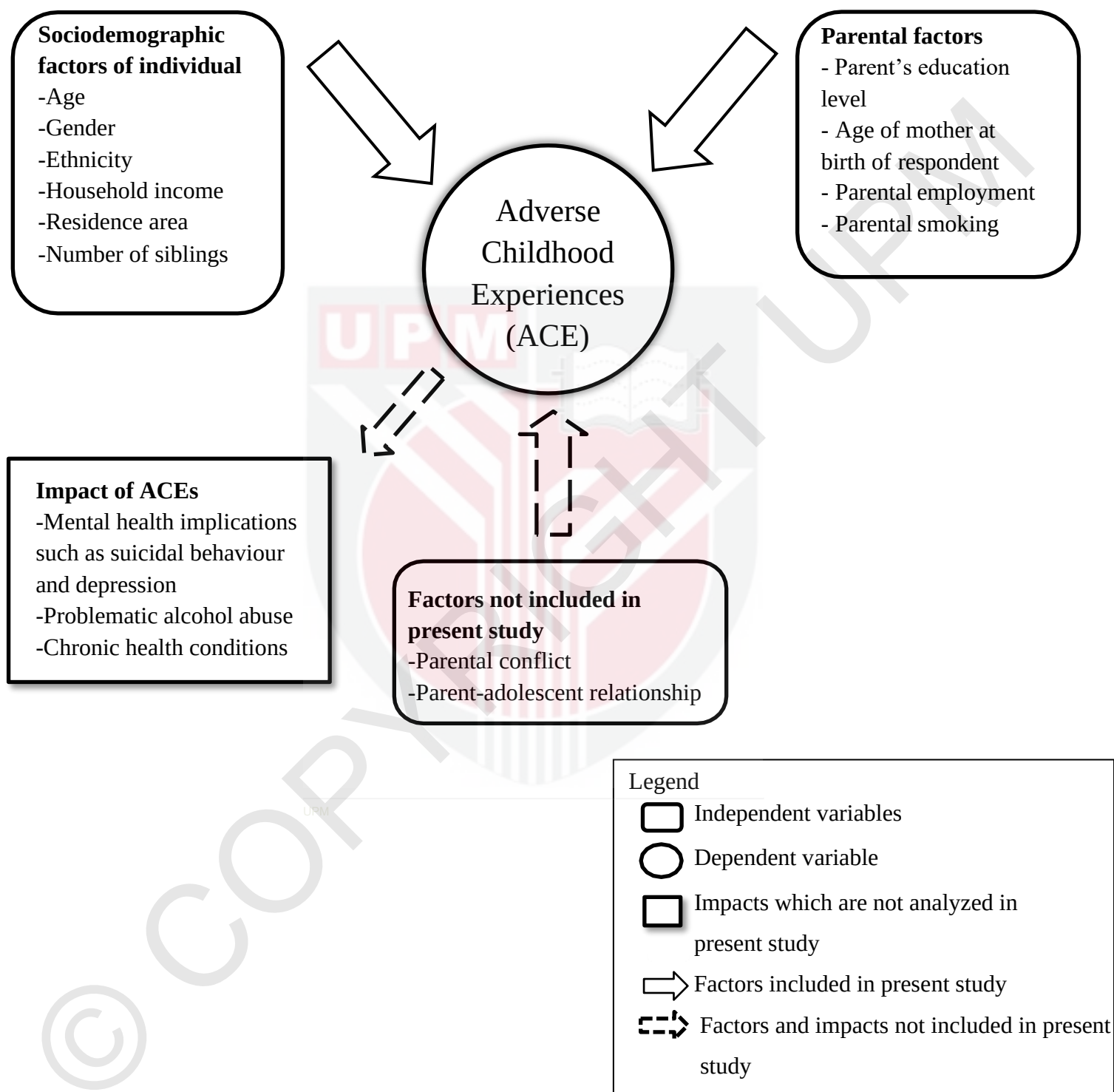


Figure 1: Conceptual Framework of study on prevalence of adverse childhood experiences and its associated factors among undergraduate medical students, Universiti Putra Malaysia.

CHAPTER 3: METHODOLOGY

3.1 Study Location

The study was conducted at the Faculty of Medicine and Health Sciences, University Putra Malaysia.

3.2 Study Design

The study design chosen was cross-sectional study design. Cross sectional study is a type of observational study where data from a population, or a representative subset, is analysed at a specific point in time.

3.3 Study Duration

The study duration was carried out from 20th December 2020 until 31st May 2021.

3.4 Sampling

3.4.1 Study Population

Undergraduate medical students from the Faculty of Medicine and Health Sciences in UPM.

3.4.2 Sampling Population

Undergraduate medical students from the Faculty of Medicine and Health Sciences in UPM in 2021.

3.4.2.1 Inclusion Criteria

Undergraduate medical students from year 1 until year 4 in UPM.

3.4.2.2 Exclusion Criteria

Undergraduate students who do not have access to Internet during data collection.

3.4.3 Sampling Frame

The name list of all undergraduate medical students from the Faculty of Medicine and Health Sciences, was obtained from the respective class representatives.

3.4.4 Sampling Unit

An undergraduate medical student from year 1 to year 4.

3.4.5 Sampling size calculation

The sample size (n) for this study was calculated using the two proportions formula.

(Lwanga and Lomeshow, 1991):

$$n = \frac{(Z_{1-\alpha} \sqrt{2\bar{P}(1-\bar{P})} + Z_{1-\beta} \sqrt{P_1(1-P_1) + P_2(1-P_2)})^2}{(P_1 - P_2)^2}$$

$$n = \frac{(1.96 \sqrt{2(0.263)(1-0.263)} + 0.842 \sqrt{0.192(1-0.192) + 0.333(1-0.333)})^2}{(0.192 - 0.333)^2}$$

$$N = 151.7$$

$$N = 152$$

$$Z_{\alpha/2} = \text{standard error associated with 95\% confidence interval} = 1.96$$

$$Z_{1-\beta} = \text{standard error associated with 80\% power} = 0.842$$

P1= proportion of ACEs among respondents with high parental education level, P1= 0.192
(Marryat & Frank, 2019)

P2 = proportion of ACEs among respondents with low parental education level, P2= 0.333
(Marryat & Frank, 2019)

$$P = (P_1 + P_2)/2 = 0.263$$

The sample size was multiplied by 2 adjusting for the design effect for cluster sampling. The non-respondents will be taken into consideration and were estimated to be 35% (Atif and Richard, 2012), hence 106 additional respondents were added to the final sample size.

$$n = 152 \times 2 + 106 = 410$$

Table 3.1 Estimated minimum sample size for other independent variables.

References	Proportion	Factors and sample size(n)
(Halfon et al., 2017)	P1= Proportion of ACEs in respondents with low household income P1=0.349 P2=Proportion of ACEs in respondents with high household income, P2=0.097	Household income n= 112
Manyema et al., 2018)	P1= proportion of ACEs among respondents with employed parent, P1: 0.57 P2= proportion of ACEs among respondents with unemployed parent, P2: 0.43	Parental employment n= 539
(Anda et al.,1999)	P1= proportion of ACEs among respondents with parent who smoke, P1=0.683 P2 = proportion of ACEs among respondents with parents who do not smoke, P2=0.317	Parental smoking n= 75
(Marryat & Frank, 2019)	P1= Proportion of ACEs in respondents living in urban area P1= 0.674 P2=Proportion of ACEs in respondents living in rural area P2= 0.537	Residence area n= 536
(Heard-Garris et al., 2018)	P1= Proportion of ACEs in respondents with 1 sibling, P1= 0.226 P2=Proportion of ACEs in respondents with more than 1 siblings, P2= 0.378	Number of siblings n= 383

(Soares et al., 2016)	P1 = proportion of adverse childhood experiences among male, $P1 = 0.122$ P2= proportion of adverse childhood experiences among female, $P2 = 0.268$	Gender n= 309
(Soares et al., 2016)	P1= proportion of young maternal age at birth of respondents who experience ACEs, $P1=0.17$ P2= proportion of older maternal age at birth of respondents who experience ACEs, $P2=0.3$	Maternal age at birth of respondent n= 449

3.4.6 Sampling Technique

The sampling used was universal sampling. It is a sample selection where not all the people in the population have the same probability of being included in the sample and the probability of selecting each one of them is unknown. The name list of undergraduate medical students from first to fourth year at Faculty of Medicines and Health Sciences, Universiti Putra Malaysia was obtained. The questionnaire was distributed as a Google Form via WhatsApp to the class representatives of each year, which was then distributed to all the students of the batch to be answered. The total number of undergraduate medical students in the Faculty of Medicine and Health Science was 445 students.

3.5 Variables

3.5.1 Dependent variable

For our study, the dependent variable is ACEs which include emotional abuse, physical abuse, sexual abuse, violence against household members, living with household members who were substance abusers, living with household members who were mentally ill or suicidal, living with household members who were imprisoned, having one or no parents and parental separation or divorce, emotional neglect, physical neglect, bullying, community violence and collective violence (World Health Organization, 2018).

3.5.2 Independent variable

1. Sociodemographic factors of individual (age, gender, ethnicity, household income, residence area and number of siblings)
2. Parental factors (parents education level, age of mother at birth of respondent, parental employment, and parental smoking)

3.6 Instruments and Data collection

3.6.1 Questionnaire/Instruments

Data collection for this research was conducted using an online platform. This study was carried out online because of the COVID-19 pandemic, to ensure there was limited interaction with people and practiced social distancing. In comparison, online channels were more accessible and versatile for respondents. The questionnaire was prepared through a Google form.

The questionnaire consists of a consent form, followed by Section A, B, and C. To form our adapted questionnaire, two questionnaires were used for our study which were the Adverse

Childhood Experiences International Questionnaire (ACE-IQ) (Geneva: WHO, 2018) and the adapted questionnaire from UNICEF (2019), Adverse Childhood Experiences Research in Serbia (ACE study). Belgrade: UNICEF, 2019. (Milovančević & Tošković, 2019).

Section A consists of a socio-demographic questions which includes the age of respondents, gender, ethnicity, household income, residence area and number of siblings. The questionnaire used to assess socio-demographic factors such as household income, residence area and number of siblings is from UNICEF (2019), (Milovančević & Tošković, 2019).

Section B consists of parental factors such as parental education level, age of mother at birth, and parental employment, and parental smoking. The questionnaire used to assess parental smoking is from UNICEF (2019), (Milovančević & Tošković, 2019). Based on a previous study, the ACE-IQ questionnaire was shown to have good internal consistency with Cronbach's alpha of 0.854 (Christoforou et al., 2020). Pearson Correlation Coefficient also showed good convergent validity while linear regression showed good predictive validity (for non-suicidal self-injury) for ACE-IQ (Christoforou et al., 2020).

According to World Health Organization (2018), two methods can be used to calculate the ACE score were the binary and frequency method. To calculate ACE based on binary version, an affirmative answer by the participants (whether with once, a few times, or many times) was counted as a “yes”, so that response was circled, and a score of 1 was placed in the final column. For frequency version, if the participants’ answers exactly match the written question in the table, then “yes” was circled and a score of 1 is placed in the final column. For both methods, the cumulative score for all 13 ACEs is obtained. The ACE score range was 0-13 with minimum score of 0 and maximum score of 13. The ACE-score is then categorized into 2 which are 4 and more ACE score and less than 4 scores of ACEs. (Children’s Bureau, 2020). The ACE was also

categorized into 4 categories such as abuse, neglect, household dysfunction and violence. (Chang et al., 2019).

The table below shows the response categories of ACEs and the factors associated with ACEs. For the ACEs, numerical codes are ascribed to each possible response question to be easily processed during data analysis. In all cases, [88] is the code for "refused" (WHO, 2018). In some cases, [3] is the code for "not applicable" and "don't know/not sure".

	Factors	Written Question	Response categories
Section A	Socio-demographic factors	Gender	Male [1] Female [2]
		Ethnicity	Malay [1] Chinese [2] Indian [3] Others
		Age	-
		Household income	-
		Residence area	Urban [1] Rural [2]
		Number of siblings	-
Section B	Parental education level	What is the educational level of your mother? Or What is the educational level of your father?	No formal education [1] Primary school [2] Secondary school [3] College/university graduate [4] Masters/PHD [5]
	Age of mother at birth of respondent	How old was your mother when you were born?	-

	Parental employment	Was your mother unemployed during the first 18 years of your life? Or Was your father unemployed during the first 18 years of your life?	Yes [1] No [0]
	Household members who smoke	Does your mother ever smoke? Or Does your father ever smoke?	Yes [1] No [0]
	Physical abuse	Did a parent, guardian or other household member spank, slap, kick, punch or beat you up?	Never [1] Once [2] A few time [3] Many times [4] Refused [88]
	Emotional abuse	Did a parent, guardian, or other household member yell, scream, or swear at you, insult or humiliate you?	Never [1] Once [2] A few times [3] Many times [4] Refused [88]
	Sexual abuse	Did someone touch or fondle you in a sexual way when you did not want them to?	Never [1] Once [2] A few times [3] Many times [4] Refused [88]
	Household member treated violently	Did you see or hear a parent or household member in your home being yelled at, screamed at, sworn at, insulted or humiliated?	Never [0] Once [1] A few times [2] Many times [3] Refused [88]

	Physical neglect	How often did your parents/ guardians not give you enough food even when they could easily have done so? Or Were your parents/guardians too drunk or intoxicated by drugs to take care of you?	Never [1] Once [2] A few times [3] Many times [4] Refused [88]
	Emotional neglect	Did your parents/guardians understand your problems and worries?	Never [1] Rarely [2] Sometimes [3] Most of the time [4] Always [5] Refused [88]
	Alcohol and/or drug abuser in the household	Did you live with a household member who was a problem drinker or alcoholic? Or Did you live with a household member who misused street or prescription drugs?	Yes [1] No [0] Refused [88]
			Yes [1] No [0] Refused [88]
	One or no parents, parental separation, or divorce	Were your parents ever separated or divorced? Or Did your mother, father or guardian die?	Yes [1] No [0] Not applicable [3] Refused [88]
			Yes [1] No [0] Not sure [3] Refused [88]

	Incarcerated household member	Did you live with a household member who was ever sent to jail or prison?	Yes [1] No [0] Refused [88]
	Someone chronically depressed, mentally ill, institutionalized, or suicidal	Did you live with a household member who was depressed, mentally ill or suicidal?	Yes [1] No [0] Refused [88]
Section C	Peer violence	How often were you bullied? Or	Never [1] Once [2] A few times [3] Many times [4] Refused [88]
		How were you bullied most often?	1: I was hit, kicked, pushed, shoved around, or locked indoors. [1] 2: I was made fun of because of my race, nationality or colour. [2] 3: I was made fun of because of my religion.[3] 4: I was made fun of with sexual jokes, comments, or gestures. [4] 5: I was left out of activities on purpose or completely ignored.[5] 6: I was made fun of because of how my body or face looked. [6] 7: Not applicable [7] 8. I was bullied in some other way [8]

	Teacher-inflicted abuse	How frequently during your schooling did a teacher insult you, threaten you or hit you?	Never [1] Rarely [2] Commonly [3] Very frequently [4]
	Community violence	Did you see or hear someone being beaten up in real life? Or Did you see or hear someone being threatened with a knife or gun in real life?	Never [1] Once [2] A few times [3] Many times [4] Refused [88]
	Collective violence	Were you forced to go and live in another place due to any of these events? Or Did you experience the deliberate destruction of your home due to any of these events?	Never [1] Once [2] A few times [3] Many times [4] Refused [88]

3.6.2 Data Collection Technique

The questionnaire was disseminated during the data collection period via Whatsapp to the class representatives of year 1 to year 4 which was then distributed to all the medical students of year 1 to year 4. The study was briefly explained to the participants to let them know about the purpose of our research. Consent form was included in the Google form to gain the participants' voluntary participation for this research.

3.6.3 Quality Control

Face validity was done among undergraduate students to ensure that the questionnaire was well understood by students. The questionnaire was pre-tested for internal consistency among 11 non-medical undergraduate students of College 17. All students had found the questionnaire simple to understand and the instructions were clear. Besides, content validity was done by a public health physician. Corrections were made after receiving feedback. Based on a previous study, the ACE-

IQ questionnaire was shown to have good internal consistency with Cronbach's alpha of 0.854 and good predictive validity (Christoforou et al., 2020).

3.7 Study ethics

Prior to the study, ethical clearance and approval letter was obtained from:

1. Ethics Committee for Research Involving Human Subjects (JKEUPM)

Consent from the student was obtained. Confidentiality of information of all respondents was ensured.

3.8 Data Analysis

Data analysis was carried out using IBM SPSS Statistics version 26. In order to avoid any irrelevant data, the missing data and keying error were checked. Kolmogorov-Smirnov test and histogram were used to assess the normality. For descriptive analysis, categorical data was presented as frequency and percentage. For normally distributed continuous data, mean and standard deviation were presented while for non- normally distributed data, the median interquartile range (IQR) were reported. For inferential statistics, Chi-Square Test/Fisher's Test were used to determine the association between the dependent and independent variables. Multiple logistic regression was used in order to determine the association of ACEs with independent variables that have $p < 0.25$. Variables with $p < 0.05$ were considered statistically significant.

3.9 Operational Definition

3.9.1 Adverse Childhood Experiences

Adverse Childhood Experiences (ACE) refers to intensive and frequently occurring sources of stress that children may suffer early in life. These experiences include various types of abuse, neglect, witnessing violence between parents, other forms of household dysfunction such as substance abuse as well as peer, community, and collective violence. (World Health Organization, 2018).

3.9.2 Gender

Based on the report.

1. Male
2. Female

3.9.3 Age

It is determined by the respondents' birthdate on their IC number.

3.9.4 Ethnic groups

Respondents will be divided into:

1. Malay
2. Chinese
3. Indian
4. Others

3.9.5 Household Income

The household income was based on the report and was later categorized into three categories, the bottom 40% B (40), middle 40% M (40) and also top 20% T (20). This classification is necessary for the government to identify and aid the lower income population with social security schemes and affordable home schemes (Propsocial Publication, 2021). B40 monthly income was RM 3900 and below, M40 monthly income ranged from RM 3900 to RM

8300 and T20 monthly income was RM 8300 and above (Hamid et al., 2019).

3.9.6 Residence Area

Based on the report.

1. Rural
2. Urban

3.9.7 Number of Siblings

Based on the report.

1. 0
2. Less than three
3. More than three

3.9.8 Parent's Education Levels

Parent's education levels of respondent were divided into father's and mother's education level and classified into:

1. No formal education
2. Primary school
3. Secondary school
4. College/university graduate
5. Masters/PhD

3.9.9 Age of mother at birth of respondent

Based on the report.

1. Under 20 years
2. 20-29 years
3. 30-39 years
4. More than 40 years

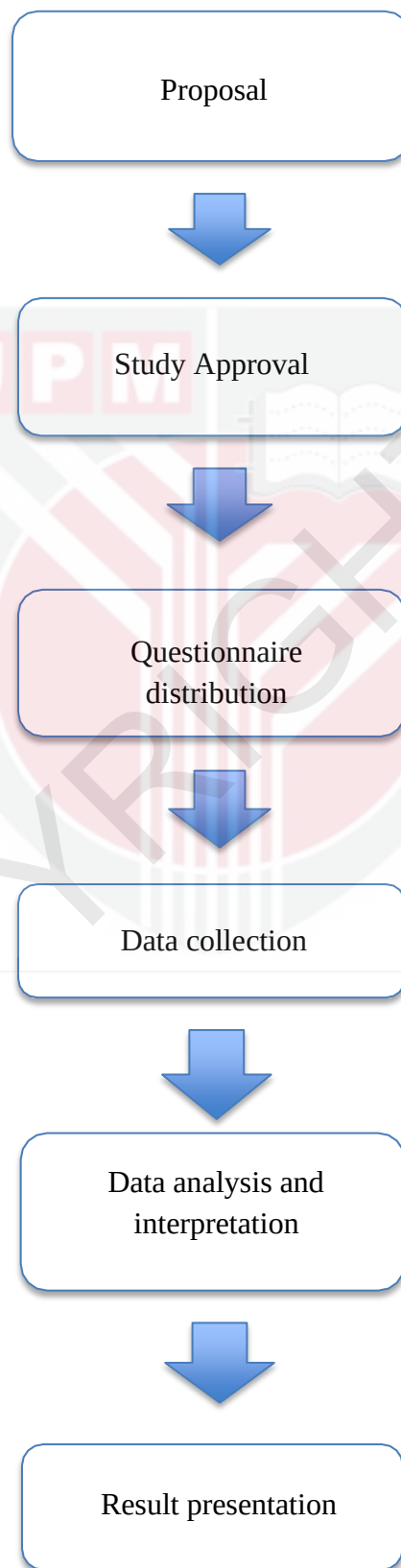
3.9.10 Parental employment

Parental employment in this study was defined as parents who have a job. Parental employment is divided into father's and mother's employment status. (Parcel, 2015)

3.9.11 Parental smoking

For our study, parental smoking was defined as the smoking environment of the victims which are counted either from the family members itself such as father or mother smoking. (Milutin Kostić et. al, 2019)

3.10 Study flow chart



CHAPTER 4: DATA ANALYSIS

4.1 Data

The estimated sample size is 410. However, there are only 336 undergraduate medical students from Universiti Putra Malaysia who are participating in this study.

The response rate for the questionnaire calculated is 81.95%.

$$\frac{\text{Number of total respondents}}{\text{Total sample size}} \times 100$$
$$= \frac{336}{410} \times 100$$
$$= 81.95\%$$

4.2 Normality test on continuous data

Histogram with normal curve (Diagram 4.1), skewness and kurtosis tests (Table 4.1), is used to determine the normality for continuous data, which are age, household income, number of siblings, and maternal age of respondents. The results for skewness show that all of the continuous data are not normally distributed data. The results for kurtosis show that age and maternal age of respondents are normally distributed while household income and number of siblings are not normally distributed data. The results for histogram show that age, maternal age of respondents and number of siblings are normally distributed data while household income is not normally distributed data.

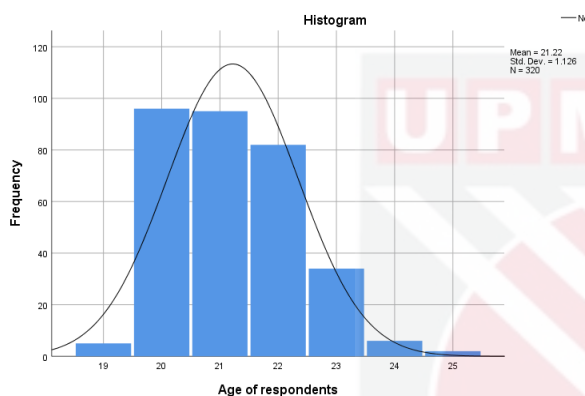
Table 4.1: Normality test for age, household income, number of siblings and maternal age at birth of respondents (skewness, kurtosis)

	Skewness			Distribution	Kurtosis			Distribution
	Statistic	Standard Error	Value		Statistic	Standard Error	Value	
Age	0.528	0.136	3.88	Not normal	-0.103	0.272	-0.379*	Normal
Household income	5.189	0.136	38.154	Not normal	42.331	0.272	155.629	Not normal
Number of siblings	0.961	0.136	7.066	Not normal	1.566	0.272	5.757	Not normal
Maternal age of respondents	0.350	0.136	2.574	Not normal	-0.270	0.272	-0.993*	Normal

Diagram 4.1: Normality test for age, household income, number of siblings and maternal age at birth of respondents (histogram)

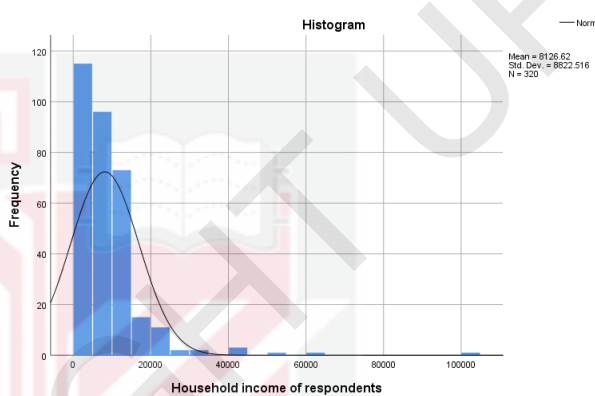
Histogram

Age of respondents



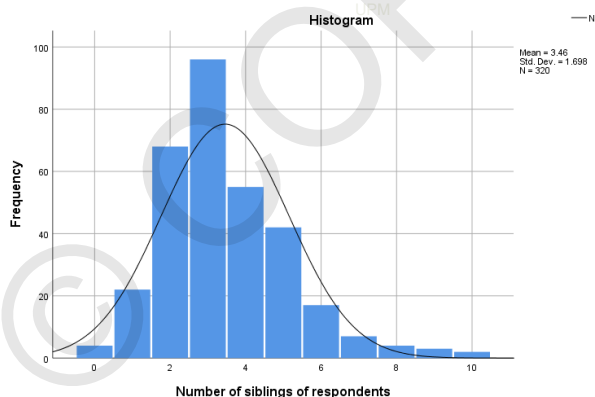
Graph is normally distributed (symmetrical)

Household income



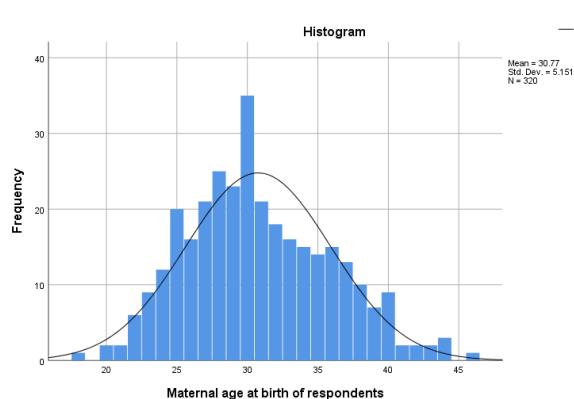
Graph is skewed to the left (not normal distribution)

Number of siblings



Graph is normally distributed (symmetrical)

Maternal age of respondents



Graph is normally distributed (symmetrical)

4.3 Sociodemographic characteristics among respondents

4.3.1 Sociodemographic characteristics (categorical) among respondents

Table 4.2 shows the categorical sociodemographic characteristics among respondents. The majority of respondents are aged 21-22 years old (182, 54.2%), followed by those aged 19-20 years (108, 32.1%) and then those aged 23-25 years old (46, 13.7%). Out of 336 respondents, the majority of respondents are females (234, 69.6%). There are 189 (56.3%) Malay, 63 (18.8%) Chinese, and 78 (23.2%) Indian respondents respectively while 6 respondents come from other ethnicities (1.8%). The highest household income recorded is from T20 income group (119, 35.4%), followed by M40 group (112, 33.3%) and B40 group (89, 26.5%). Out of 336 respondents, 277 (82.4%) come from urban setting compared to rural settings (59, 17.6%). About 238 respondents (70.8%) are reported to have 3 or more siblings. Maternal age at birth of respondents is also found to be highest among the 30-39 age group (172, 51.2%) and lowest among under 20 years age group (1.0, 0.3%).

Table 4.2: Sociodemographic characteristics (categorical) among respondents

Sociodemographic Characteristics	Frequency (N = 336)	Percentage (%)
Age		
19 – 20 years	108	32.1
21 - 22 years	182	54.2
23 - 25 years	46	13.7
Gender		
Male	102	30.4
Female	234	69.6
Ethnicity		
Malay	189	56.3
Chinese	63	18.8
Indian	78	23.2
Others	6	1.8
Household Income		
B40	89	26.5
M40	112	33.3
T20	119	35.4
Refused	16	4.8
Residence Area		
Urban	277	82.4
Rural	59	17.6
Number of siblings		
Less than 3 siblings	98	29.2
3 or more siblings	238	70.8
Maternal age at birth of respondents		
Under 20 years	1	0.3
20 - 29 years	144	42.9
30 - 39 years	172	51.2
Above 40 years	19	5.7

4.3.2 Sociodemographic characteristics (continuous) among respondents

For the normal data, the mean $\pm$ standard deviation for age among 336 respondents is 21.21 years $\pm$ 1.136 years. The mean $\pm$ standard deviation for number of siblings is 3.47 $\pm$ 1.689. For maternal age at birth of respondents, the mean $\pm$ standard deviation recorded is 30.74 years $\pm$ 5.106 years. For not normal distribution, the median $\pm$ interquartile range recorded for household income is RM6000 $\pm$ RM6725.

Table 4.3: Sociodemographic characteristics (continuous) among respondents

	Mean/Median	Standard deviation/IQR
Age	21.21	1.136
Household Income	6000	6725
Number of siblings	3.47	1.689
Maternal age at birth of respondents	30.74	5.106

4.4 Characteristics of parental factors among respondents

There are 164 (48.8%) respondents whose mother's education level is either certificate, diploma, degree while 126 (37.5%) of respondents have mothers who only received secondary school education. Similarly, there are 157 (46.7%) respondents whose father's education level is either certificate, diploma, degree followed by 126 (37.5%) of them who only received secondary school education while 64 (19.0%) of them have fathers who pursued masters or PHD. The majority of respondents reported that their mothers (62.8%) and fathers (87.2%) are employed. About 330 (97.9%) students have mothers who do not smoke while about 105 (31.2%) of them have fathers who smoke.

Table 4.4: Descriptive analysis of parental factors among respondents.

Parental factors	Frequency (N = 336)	Percentage (%)
Mother's education level		
No formal education	4	1.2
Primary School	6	1.8
Secondary school	126	37.5
Certificate/Diploma/Degree	164	48.8
Masters/PHD	36	10.7
Father's education level		
No formal education	1	0.3
Primary School	6	1.8
Secondary school	108	32.1
Certificate/Diploma/Degree	157	46.7
Masters/PHD	64	19.0
Mother's employment		
Yes	211	62.8
No	125	37.2
Father's employment		
Yes	293	87.2
No	43	12.8
Mothers who smoke		
Yes	6	1.8
No	330	97.9
Fathers who smoke		
Yes	105	31.2
No	231	68.5

4.5 Descriptive analysis of ACEs (abuse, neglect) among respondents

Table 4.5 shows that frequency and percentage of ACEs (abuse). There are 64 (19.0%) respondents who were physically abused a few times while 232 (69.0%) of them were never physically abused. Respondents reported to have been emotionally abused once (7.1%), a few times (22.3%) and many times (6.8%) respectively. About 312 (92.9%) of respondents have never been sexually abused while 12 (3.6%) of them have experienced sexual abuse once. Table 4.6 shows the frequency and percentage of ACEs (neglect). Majority of respondents reported that they have not been physically neglected by parents either by not being given enough food (97.3%) or by not being taken care of well (98.2%). However, most of the respondents have experienced emotional neglect by parents most of the time (31.8%) and sometimes (24.3%) respectively.

Table 4.5: Descriptive analysis of ACEs (abuse) among respondents.

ACES (Abuse)	Frequency (N = 336)	Percentage (%)
Physical Abuse		
Once	18	5.3
A few times	64	19.0
Many times	10	3.0
Never	232	69.0
Refused	12	3.6
Emotional Abuse		
Once	24	7.1
A few times	75	22.3
Many times	23	6.8
Never	201	59.8
Refused	13	3.9
Sexual Abuse		
Once	12	3.6
A few times	6	1.8
Many times	2	0.6
Never	312	92.9
Refused	4	1.2

Table 4.6: Descriptive analysis of ACEs (neglect) among respondents.

ACES (Neglect)	Frequency (N = 336)	Percentage (%)
Physical Neglect (Not given enough food)		
Once	1	0.3
A few times	4	1.2
Many times	3	0.9
Never	327	97.3
Refused	1	0.3
Physical Neglect (Not able to take care of children)		
Once	1	0.3
A few times	3	0.9
Many times	2	0.6
Never	330	98.2
Refused	2	0.6
Emotional neglect		
Rarely	46	13.6
Sometimes	82	24.3
Most of the time	107	31.8
Always	82	24.4
Never	16	4.8
Refused	3	0.9

4.6 Descriptive analysis of ACEs (household dysfunction) among respondents.

Table 4.7 shows that frequency and percentage of ACEs (household dysfunction). Most of the respondents have experienced parental death (8.9%), followed by living with household members who are mentally ill (7.1%) and then parental separation or divorce (89.9%). It is also reported that household dysfunctions that were not experienced by respondents are mostly living with incarcerated household members (98.8%) and living with alcohol abusers (98.8%), followed by living with drug abusers (98.5%). Among 336 respondents, 195 (58.0%) respondents stated that they have never witnessed household members being treated violently while 75 (22.3%) of them have witnessed household members being treated violently.

Table 4.7: Descriptive analysis of ACEs (household dysfunction) among respondents.

ACES (Household Dysfunction)	Frequency (N = 336)	Percentage (%)
Parental separation or divorce		
No	302	89.9
Yes	21	6.3
Not applicable	9	2.7
Refused	4	1.2
Parental death		
No	301	89.6
Yes	30	8.9
Not sure	3	0.9
Refused	2	0.6
Alcohol abusers in household		
No	332	98.8
Yes	3	0.9
Refused	1	0.3
Drug abusers in household		
No	331	98.5
Yes	3	0.9
Refused	2	0.6
Someone chronically depressed, mentally ill, institutionalized or suicidal		
No	303	90.2
Yes	24	7.1
Refused	9	2.7
Household members treated violently		
Once	33	9.8
A few times	75	22.3
Many times	21	6.3
Never	195	58.0
Refused	12	3.6
Incarcerated Household member		
No	332	98.8
Yes	2	0.6
Refused	2	0.6

4.7 Descriptive analysis of ACEs (violence) among respondents.

Table 4.8 shows that frequency and percentage of ACEs (violence). Majority of respondents never experienced peer bullying (58.6%) while some of them experienced it a few times (21.7%) and once (15.2%). Most of the respondents never experienced community violence (42.9%) while 128 (38.1%) experienced it a few times. About 109 (32.3%) of them rarely experienced teacher-inflicted abuse while 204 (60.5%) of them have not been abused by teachers. Majority of respondents have reported that they were not forced to live elsewhere (93.5%) while only 10 (3.0%) of them have experienced it once. There are about 314 (93.5%) who did not have any deliberate destruction of their homes too.



Table 4.8: Descriptive analysis of ACEs (violence) among respondents.

ACEs (Violence)	Frequency (N = 336)	Percentage (%)
Peer bullying		
Once	51	15.2
A few times	73	21.7
Many times	10	3.0
Never	197	58.6
Refused	5	1.5
Community Violence		
Once	46	13.7
A few times	128	38.1
Many times	15	4.5
Never	144	42.9
Refused	3	0.9
Collective Violence (teacher-inflicted abuse)		
Rarely	109	32.3
Commonly	20	5.9
Frequently	3	0.9
Never	204	60.5
Collective Violence (forced to live elsewhere)		
Once	10	3.0
A few times	8	2.4
Many times	1	0.3
Never	314	93.5
Refused	3	0.9
Collective Violence (experienced deliberate destruction of home)		
Once	13	3.9
A few times	7	2.1
Many times	1	0.3
Never	314	93.5
Refused	1	0.3

4.8 Descriptive analysis of peer bullying among respondents.

Table 4.9 shows the frequency and percentage of ways of peer bullying among respondents. The majority of respondents are not applicable (59.2%) in the response of ways of peer bullying. The most significant way of peer bullying is those who are being made fun of how their body and face appear (14.3%) followed by those being left out of activities and completely ignored (11.3%), and then by those being made fun of their race and colour (6.3%).

Table 4.9: Descriptive analysis of peer bullying among respondents.

Other Characteristics	Frequency (N = 336)	Percentage (%)
Ways of peer bullying		
Hit, kicked, pushed, shoved around, locked indoors	6	1.8
Made fun of race and colour	21	6.3
Made fun of religion	3	0.9
Made fun of with sexual jokes, comments, gestures	11	3.3
Left out of activities, completely ignored	38	11.3
Made fun of how my body and face looked	48	14.3
Others	10	3.0
Not applicable	199	59.2

4.9 Distribution of ACE group scores among respondents.

Table 4.10 shows distribution between ACE group scores among respondents. Emotional neglect (94.3%) is mostly reported among 336 respondents followed by community violence (56.3%), collective violence (45.2%), peer bullying (40%), household violence (38.4%) and emotional abuse (36.3%).

Table 4.10: Distribution of ACE group scores (Yes/No) among respondents.

ACE's category	<i>n</i>	Prevalence (%)
Abuse		
Emotional	122	36.3
Physical	92	27.4
Sexual	20	6.0
Neglect		
Emotional	317	94.3
Physical	11	3.3
Household dysfunction		
Parental separation, divorce or death	49	14.6
Household substance abuse	6	1.8
Household mental illness	24	7.1
Household violence	129	38.4
Incarcerated household member	2	0.6
Violence		
Bullying	134	39.9
Community violence	189	56.3
Collective violence	152	45.2

Table 4.11 shows distribution between ACE group scores (Many times) among respondents. Neglect (57.7%) is frequently reported among 336 respondents followed by household dysfunction (23.8%), violence (11.9%) and abuse (7.4%).

Table 4.11 Distribution of ACE group scores (Many times) among respondents.

ACE's category	<i>n</i>	(%)
Abuse	25	7.4
Neglect	194	57.7
Household dysfunction	80	23.8
Violence	40	11.9

4.10 Distribution of individual ACE scores among respondents.

Table 4.12 shows distribution of individual ACE scores among respondents. About 52% respondents reported to have experienced 4 ACEs and more. Only 9 (2.7%) respondents reported to have no ACEs.

Table 4.12: Distribution of ACE scores (Yes/No) among respondents.

Total ACE Score	Frequency (N = 336)	Percentage (%)
0 ACE	9	2.7
1 ACE	42	12.5
2 ACEs	55	16.4
3 ACEs	58	17.3
4 ACEs	59	17.6
5 ACEs	50	14.9
6 ACEs	36	10.7
7 ACEs	13	3.9
8 ACEs	9	2.7
9 ACEs	2	0.6
10 ACEs	0	0
11 ACEs	2	0.6
12 ACES	1	0.3
13 ACEs	0	0

4.11 Association between sociodemographic factors and ACEs among respondents

Table 4.13 and table 4.14 shows association between sociodemographic factors and ACEs among respondents. Chi-square test and Fishers Exact test are used. The results show that all six sociodemographic factors (age, gender, ethnicity, household income, residence area and number of siblings) are not significantly associated with any of the 4 ACE categories (abuse, neglect, household dysfunction, violence) among respondents.

Table 4.13: Association between sociodemographic factors and ACEs (Abuse, Neglect)

Sociodemographic factors	N	Abuse			Neglect		
		Many times (%)	Few times and below (%)	p value	Many times (%)	Few times and below (%)	p value
Age							
19 – 22 years	290	23 (7.9)	267 (92.1)	0.551 ^a	169 (58.3)	121 (41.7)	0.616
23 – 25 years	46	2 (4.3)	44 (95.7)		25 (54.3)	21 (45.7)	
Gender							
Male	102	11 (10.8)	91 (89.2)	0.123	57 (55.9)	45 (44.1)	0.649
Female	234	14 (6.0)	220 (94.0)		137 (58.5)	97 (41.5)	
Ethnicity							
Malay	189	11 (5.8)	178 (94.2)	0.199	109 (57.7)	80 (42.3)	0.978
Chinese, Indians & Others	147	14 (9.5)	133 (90.5)		85 (57.8)	62 (42.2)	
Household Income							
B40 & Refused	105	10 (9.5)	95 (90.5)	0.612	63 (60.0)	42 (40.0)	0.413
M40	112	7 (6.3)	105 (93.8)		59 (52.7)	53 (47.3)	
T20	119	8 (6.7)	111 (93.3)		72 (60.5)	47 (39.5)	
Residence Area							
Urban	277	22 (7.9)	255 (92.1)	0.590 ^a	159 (57.4)	118 (42.6)	0.786
Rural	59	3 (5.1)	56 (94.9)		35 (59.3)	24 (40.7)	
Number of siblings							
Less than 3 siblings	98	9 (9.2)	89 (90.8)	0.435	62 (63.3)	36 (36.7)	0.188
3 or more siblings	238	16 (6.7)	222 (93.3)		132 (55.5)	106 (44.5)	

^a denotes Fishers Exact Test

Table 4.14: Association between sociodemographic factors and ACEs (Household dysfunction, Violence)

Sociodemographic factors	N	Household dysfunction			Violence		
		Many times (%)	Few times and below (%)	p value	Many times (%)	Few times and below (%)	p value
Age							
19 – 22 years	290	68 (23.4)	222 (76.6)	0.696	36 (12.4)	254 (87.6)	0.469
23 – 25 years	46	12 (26.1)	34 (73.9)		4 (8.7)	42 (91.3)	
Gender							
Male	102	22 (21.6)	80 (78.4)	0.524	17 (16.7)	85 (83.3)	0.075
Female	234	58 (24.8)	176 (75.2)		23 (9.8)	211 (90.2)	
Ethnicity							
Malay	189	41 (21.7)	148 (78.3)	0.302	19 (10.1)	170 (89.9)	0.235
Chinese, Indians & Others	147	39 (26.5)	108 (73.5)		21 (14.3)	126 (85.7)	
Household Income							
B40 & Refused	105	33 (31.4)	72 (68.6)	0.075	15 (14.3)	90 (85.7)	0.621
M40	112	21 (18.8)	91 (81.3)		13 (11.6)	99 (88.4)	
T20	119	26 (21.8)	93 (78.2)		12 (10.1)	107 (89.9)	
Residence Area							
Urban	277	66 (23.8)	211 (76.2)	0.987	36 (13.0)	241 (87.0)	0.181
Rural	59	14 (23.7)	45 (76.3)		4 (6.8)	55 (93.2)	
Number of siblings							
Less than 3 siblings	98	27 (27.6)	71 (72.4)	0.301	13 (13.3)	85 (86.7)	0.621
3 or more siblings	238	53 (22.3)	185 (77.7)		27 (11.3)	211 (88.7)	

4.12 Association between parental factors and ACEs among respondents

Table 4.15 and table 4.16 shows association between parental factors and ACEs among respondents. Chi-square test and Fishers Exact test are used. The results show that there is a significant association between father's education level and being abused many times ($p=0.046$). Another significant association is reported to be between father's employment and being neglected many times ($p=0.003$). Mother's employment is significantly associated with experiencing household dysfunction ($p=0.041$) and violence ($p=0.002$) many times respectively. Father's employment is also significantly associated with experiencing violence many times ($p=0.004$) while mothers smoking is significantly associated with experiencing household dysfunction ($p= 0.003$) many times.

Table 4.15: Association between parental factors and ACEs (Abuse, Neglect)

Parental factors	N	Abuse			Neglect		
		Many times (%)	Few times and below (%)	p value	Many times (%)	Few times and below (%)	p value
Maternal age at birth of respondents							
Less than 29 years	145	10 (6.9)	135 (93.1)	0.315	84 (57.9)	61 (42.1)	0.908
30 - 39 years	172	14 (8.1)	158 (91.9)		101 (58.7)	71 (41.3)	
Above 40 years	19	1 (5.3)	18 (94.7)		9 (47.4)	10 (52.6)	
Mother’s education level							
No formal education/ Primary school/ Secondary school	136	9 (6.6)	127 (93.4)	0.636	70 (51.5)	66 (48.5)	0.055
Certificate/ Diploma/ Degree / Masters/ PHD	200	16 (8.0)	184 (92.0)		124 (62.0)	76 (38.0)	
Father’s education level							
No formal education/ Primary school/ Secondary school	115	4 (3.5)	111 (96.5)	0.046*	65 (56.5)	50 (43.5)	0.745
Certificate/ Diploma/ Degree /Masters/ PHD	221	21 (9.5)	200 (90.5)		129 (58.4)	92 (41.6)	
Mother’s employment							
Yes	211	13 (6.2)	198 (93.8)	1.348	125 (59.2)	86 (40.8)	0.525
No	125	12 (9.6)	113 (90.4)		69 (55.2)	56 (44.8)	
Father’s employment							
Yes	293	22 (7.5)	271 (92.5)	1.000 ^a	169 (57.7)	124 (42.3)	0.003*
No	43	3 (7.0)	40 (93.0)		25 (58.1)	18 (41.9)	
Mothers who smoke							
Yes	6	1 (16.7)	5 (83.3)	0.373 ^a	3 (50.0)	3 (50.0)	0.700
No	330	24 (7.3)	306 (92.7)		191 (57.9)	139 (42.1)	
Fathers who smoke							
Yes	105	9 (8.6)	96 (91.4)	0.284	69 (65.7)	36 (34.3)	3.982
No	231	16 (6.9)	215 (93.1)		125 (54.1)	106 (45.9)	

^a denotes Fishers Exact Test

Table 4.16: Association between parental factors and ACEs (Household dysfunction, Violence)

Parental factors	N	Household dysfunction			Violence		
		Many times (%)	Few times and below (%)	p value	Many times (%)	Few times and below (%)	p value
Maternal age at birth of respondents							
Less than 29 years	145	33 (22.8)	112 (77.2)	9.290	16 (11.0)	129 (89.0)	3.361
30 - 39 years	172	37 (21.5)	135 (78.5)		24 (14.0)	148 (86.0)	
Above 40 years	19	10 (52.6)	9 (47.4)		0	19 (100.0)	
Mother’s education level							
No formal education/ Primary school/ Secondary school	136	38 (27.9)	98 (72.1)	0.143	18 (13.2)	118 (86.8)	0.535
Certificate/ Diploma/ Degree / Masters/ PHD	200	42 (21.0)	158 (79.0)		22 (11.0)	178 (89.0)	
Father’s education level							
No formal education/ Primary school/ Secondary school	115	27 (23.5)	88 (76.5)	0.918	14 (12.2)	101 (87.8)	0.912
Certificate/ Diploma/ Degree / Masters/ PHD	221	53 (24.0)	168 (76.0)		26 (11.8)	195 (88.2)	
Mother’s employment							
Yes	211	51 (24.2)	160 (75.8)	0.041*	25 (11.8)	186 (88.2)	0.002*
No	125	29 (23.2)	96 (76.8)		15 (12.0)	110 (88.0)	
Father’s employment							
Yes	293	61 (20.8)	232 (79.2)	11.286	35 (11.9)	258 (88.1)	0.004*
No	43	19 (44.2)	24 (55.8)		5 (11.6)	38 (88.4)	
Mothers who smoke							
Yes	6	75 (22.7)	255 (77.3)	0.003^a	0.00	6 (100)	1.000 ^a
No	330	5 (83.3)	1 (16.7)		40 (2.1)	290 (87.9)	
Fathers who smoke							
Yes	105	30 (28.6)	75 (71.4)	1.909	14 (13.3)	91 (86.7)	0.297
No	231	50 (21.6)	181 (78.4)		26 (11.3)	205 (88.7)	

^a denotes Fishers Exact Test

4.13 Association between sociodemographic factors and number of ACEs among respondents

Table 4.17 shows association between sociodemographic factors and number of ACEs among respondents. Chi-square test and Fishers Exact test are used. The results show that gender is significantly associated with having more than 4 ACEs ($X^2 = 9.210$, $p = 0.002$). However, age ($X^2 = 0.213$, $p = 0.645$), ethnicity ($X^2 = 0.366$, $p = 0.545$), household income ($X^2 = 2.534$, $p = 0.282$), residence area ($X^2 = 0.844$, $p = 0.358$) and number of siblings ($X^2 = 0.463$, $p = 0.496$) are not significantly associated with having 4 ACEs or more among respondents.

Table 4.17: Association between sociodemographic factors and number of ACEs among respondents (N=336)

Sociodemographic factors	Number of ACEs		X ² (d.f)	p value
	More than 4 (%)	Less than 4 (%)		
Age				
19 – 22 years	147 (50.7)	143 (49.3)	0.213 (1)	0.645
23 – 25 years	25 (54.3)	21 (45.7)		
Gender				
Male	65 (63.7)	37(36.3)	9.210 (1)	0.002*
Female	107 (45.7)	127 (54.3)		
Ethnicity				
Malay	94 (49.7)	95 (50.3)	0.366 (1)	0.545
Chinese, Indians & Others	78 (53.1)	69 (46.9)		
Household Income				
B40 & Refused	60(57.1)	45 (42.9)	2.534 (2)	0.282
M40	52 (46.4)	60 (53.6)		
T20	60 (50.4)	59 (49.6)		
Residence Area				
Urban	145 (52.3)	132 (47.7)	0.844 (1)	0.358
Rural	27 (45.8)	32 (54.2)		
Number of siblings				
Less than 3 siblings	53 (54.1)	45 (45.9)	0.463 (1)	0.496
3 or more siblings	119 (50)	110 (50)		

4.14 Association between parental factors and number of ACEs among respondents

Table 4.18 shows association between parental factors and number of ACEs among respondents. Chi-square test and Fishers Exact test are used. The results show that all 7 parental factors (maternal age at birth of respondents, mother's education level, father's education level, mother's employment, father's employment, mothers who smoke, fathers who smoke) are not significantly associated with having 4 ACEs or more among respondents.

Table 4.18: Association between parental factors and number of ACEs among respondents (N=336)

Parental factors	Number of ACEs		X ² (d.f)	p value
	More than 4 (%)	Less than 4 (%)		
Maternal age at birth of respondents				
Less than 29 years	75 (51.7)	70 (48.3)	0.058 (2)	0.971
30 - 39 years	87 (50.6)	85 (49.4)		
Above 40 years	10 (52.6)	9 (47.4)		
Mother’s education level				
No formal education/ Primary school/ Secondary school	60 (44.1)	76 (55.9)	2.103 (1)	0.156
Certificate/ Diploma/ Degree / Masters/ PHD	104 (52.0)	96 (48.0)		
Father’s education level				
No formal education/ Primary school/ Secondary school	56 (48.7)	59 (51.3)	0.001 (1)	0.976
Certificate/ Diploma/ Degree / Masters/ PHD	109 (48.9)	113 (51.1)		
Mother’s employment				
Yes	105 (49.8)	106 (50.2)	0.463 (1)	0.496
No	67 (53.6)	58 (46.4)		
Father’s employment				
Yes	145 (49.5)	148 (50.5)	2.656 (1)	0.103
No	27 (62.8)	16 (37.2)		
Mothers who smoke				
Yes	4 (66.7)	2 (33.3)	0.586(1)	0.444
No	168 (50.9)	162 (49.1)		
Fathers who smoke				
Yes	53 (50.5)	52 (49.5)	0.031 (1)	0.860
No	119 (51.5)	112 (48.5)		

4.15 Multiple logistic regression for factors associated with ACEs (Abuse) among respondents

Table 4.19 shows the multiple logistic regression for factors associated with ACEs, the abuse category. There are three variables in the abuse category with $P < 0.25$ which are gender, ethnicity and father's education level. These variables are tested with multiple logistic regression. It is found that respondents whose fathers have lower education level are 3 times more likely to have been abused either physically, emotionally, or sexually compared to the respondents whose fathers have higher education level. (OR = 3.046, 95% CI: 1.014 - 9.152, $p = 0.047$). Gender and ethnicity are not significantly associated with abuse.

Table 4.19: Multiple logistic regression for factors associated with ACEs (Abuse) among respondents

Variables							95% C.I. for Exp(B)	
	β	S.E	Wald	df	p-value	AOR	Lower	Upper
Gender								
Male	0.644	0.427	2.272	1	0.132	1.904	0.824	4.399
Female	Ref							
Ethnicity								
Malay	-0.520	0.424	1.501	1	0.220	0.595	0.259	1.366
Chinese, Indians & Others	Ref							
Father's education level								
No formal education/ Primary school/ Secondary school	1.114	0.561	3.938	1	0.047*	3.046	1.014	9.152
Certificate/Diploma/ Degree / Masters/ PHD	Ref							
Constant	-3.328	0.580	32.903	1	0.000	0.036		

Enter variable selection method was used

Cox & Snell $R^2 = 2.5\%$; Nagelkerke $R^2 = 6.0\%$

Omnibus Tests of Model Coefficients: $p = 0.038$

Classification percentage = 92.6%

OR - Odds ratio, B - Beta coefficient, S.E. - Standard error, CI - Confidence interval (*) - $P \leq 0.05$

4.16 Multiple logistic regression for factors associated with ACEs (Neglect) among respondents

Table 4.20 shows the multiple logistic regression for factors associated with ACEs, the neglect category. Three variables with $P < 0.25$ which are numbers of siblings, father's employment and mother's education level are further tested with multiple logistic regression. However, all these three variables are not significantly associated with neglect.

Table 4.20: Multiple logistic regression for factors associated with ACEs (Neglect) among respondents

Variables	β	S.E	Wald	df	p-value	AOR	95% C.I. for Exp(B)	
							Lower	Upper
Number of siblings								
Less than 3 siblings	0.312	0.248	1.578	1	0.209	1.366	0.840	2.221
3 or more siblings	Ref							
Father's employment								
Yes	-0.088	0.335	0.069	1	0.792	0.915	0.474	1.767
No	Ref							
Mother's education level								
No formal education/Primary school/ Secondary school	Ref							
Certificate/ Diploma/ Degree /Masters/ PHD	0.429	0.227	3.570	1	0.059	1.535	0.984	2.395
Constant	0.048	0.334	0.021	1	0.886	1.049		

Enter variable selection method was used

Cox & Snell $R^2 = 1.6\%$; Nagelkerke $R^2 = 2.1\%$

Omnibus Tests of Model Coefficients: $p = 0.149$

Classification percentage = 58.3%

OR - Odds ratio, B - Beta coefficient, S.E. - Standard error, CI - Confidence interval (*) - $P \leq 0.05$

4.17 Multiple logistic regression for factors associated with ACEs (Household Dysfunction) among respondents

Table 4.21 shows the multiple logistic regression for factors associated with ACEs, the household dysfunction category. Four variables with $P < 0.25$ which are mothers who smoke, mother's employment, mother's education level and household income are tested with multiple logistic regression. It is found that respondents with mothers who smoke are nearly 17 times more likely to experience household dysfunction compared to those who have mothers who do not smoke (OR:16.815, 95% CI: 1.822 - 150.220, $p = 0.012$). Mother's employment, mother's education level and household income are not significantly associated with household dysfunction.

Table 4.21: Multiple logistic regression for factors associated with ACEs (Household Dysfunction) among respondents

Variables	β	S.E	Wald	df	p-value	AOR	95% C.I. for Exp(B)	
							Lower	Upper
Mothers who smoke								
Yes	2.822	1.117	6.381	1	0.012*	16.815	1.822	150.220
No	Ref							
Mother's employment								
Yes	0.495	0.325	2.328	1	0.127	1.641	0.869	3.099
No	Ref							
Mother's education level								
No formal education/ Primary school/ Secondary school	0.381	0.325	1.378	1	0.240	1.464	0.775	2.768
Certificate/ Diploma/ Degree /Masters/PHD	Ref							
Household Income								
B40 & Refused	0.486	0.359	1.837	1	0.175	1.626	0.805	3.284
M40	-0.178	0.345	0.267	1	0.605	0.837	0.425	1.646
T20	Ref							
Constant	-1.812	0.378	23.006	1	0.001	0.163		

Enter variable selection method was used

Cox & Snell $R^2 = 4.9\%$; Nagelkerke $R^2 = 7.3\%$

Omnibus Tests of Model Coefficients: $p = 0.005$

Classification percentage = 77.4 %

OR - Odds ratio, B - Beta coefficient, S.E. - Standard error, CI - Confidence interval (*) - $P \leq 0.05$

4.18 Multiple logistic regression for factors associated with ACEs (Violence) among respondents

Table 4.22 shows the multiple logistic regression for factors associated with ACEs, the violence category. Five variables with $P < 0.25$ which are gender, ethnicity, residence area, mother's employment and father's employment are further tested with multiple logistic regression. However, all these five variables are not significantly associated with violence.

Table 4.22: Multiple logistic regression for factors associated with ACEs (Violence) among respondents

Variables	95% C.I. for Exp(B)							
	β	S.E	Wald	df	p-value	AOR	Lower	Upper
Gender								
Male	0.583	0.347	2.826	1	0.093	1.791	0.908	3.535
Female	Ref							
Ethnicity								
Malay	-0.302	0.343	0.774	1	0.379	0.739	0.377	1.449
Chinese, Indians & Others	Ref							
Residence area								
Urban	0.676	0.564	1.437	1	0.231	1.966	0.651	5.938
Rural	Ref							
Mother's employment								
Yes	0.046	0.352	0.017	1	0.896	1.047	0.526	2.085
No	Ref							
Father's employment								
Yes	0.103	0.523	0.039	1	0.844	1.109	0.398	3.088
No	Ref							
Constant	-2.662	0.624	18.203	1	0.001	0.070		

Enter variable selection method was used

Cox & Snell $R^2 = 1.7\%$; Nagelkerke $R^2 = 3.3\%$

Omnibus Tests of Model Coefficients: $p = 0.326$

Classification percentage = 88.1 %

OR - Odds ratio, B - Beta coefficient, S.E. - Standard error, CI - Confidence interval (*) - $P \leq 0.05$

4.19 Multiple logistic regression for factors associated with number of ACEs among respondents

Table 4.23 shows the multiple logistic regression for factors associated with number of ACEs. Three variables with $P < 0.25$ which are gender, mother's education level and father's employment are tested with multiple logistic regression. It is found that males are twice more likely to have 4 ACEs and more compared to females. (OR: 2.102, 95% CI: 1.298 - 3.403, $p = 0.003$). Mother's education level and father's employment are not significantly associated with number of ACEs.

Table 4.23: Multiple logistic regression for factors associated with number of ACEs among respondents

Variables							95% C.I. for	
							Exp(B)	
	β	S.E	Wald	df	p-value	AOR	Lower	Upper
Gender								
Male	0.743	0.246	9.127	1	0.003*	2.102	1.298	3.403
Female	Ref							
Mother's education level								
No formal education/ Primary school/ Secondary school	0.305	0.228	1.780	1	0.182	1.356	0.867	2.121
Certificate/Diploma/ Degree/ Masters/ PHD	Ref							
Father's employment								
Yes	0.495	0.343	2.088	1	0.149	1.641	0.838	3.212
No	Ref							
Constant	-0.359	0.166	4.685	1	0.030	0.699		

Enter variable selection method was used

Cox & Snell $R^2 = 4.0\%$; Nagelkerke $R^2 = 5.3\%$

Omnibus Tests of Model Coefficients: $p = 0.003$

Classification percentage = 59.2 %

OR - Odds ratio, B - Beta coefficient, S.E. - Standard error, CI - Confidence interval (*) - $P \leq 0.05$

CHAPTER 5: DISCUSSION

This study describes the prevalence of ACEs and its related socio-demographic and parental factors among undergraduate medical students in Universiti Putra Malaysia. The most common ACEs observed were emotional neglect, followed by all types of violence including community violence, collective violence, peer bullying, household violence and emotional abuse.

5.1 Prevalence of ACE

Almost all students in this study had experienced at least one ACE while half of the respondents had experienced at least four ACEs. The prevalence measured in this study is higher than those measured by studies in a systematic review and meta-analysis, with 57% of participants across all studies reporting at least one ACE and 13% reporting at least four (Hughes et al., 2017). This prevalence was also found to be higher compared to developed countries such as Ireland, United Kingdom and Singapore ranging between 23.7% to 63.9% (Cheong et al., 2017, Bellis et al., 2014, Subramaniam et al., 2020) and in developing countries such as in Brazil, South Africa and Thailand ranging between 76% to 88% (Soares et al., 2016, Manyema et al., 2019, Tran et al., 2015). As compared to high-income countries from the meta-analysis and developing or neighbouring countries used in other studies, the spike in prevalence of ACEs in this study could be due to income inequality despite Malaysia being an upper middle-income country (World Bank Group, 2020). It was found that although poverty in Malaysia declined, the proportion of children that live in low income households were consistently high between 2009 to 2014, which increases the risks of abuse, violence, physical neglect among children (Redmond et al., 2016, Ward et al., 2017). There is also a wider range of cultural factors such as difference in ethnicities, stricter parenting practices and socioeconomic differences contributing to ACEs in Malaysia (Yee et al., 2019, Ahmed et al., 2015, Choo et al., 2011).

5.1.1 Abuse

More than a quarter of students experienced physical abuse with one-fifth of them experiencing physical abuse at least a few times. This prevalence was found to be higher compared to previous studies carried out in Brazil, Scotland, and in United States with prevalence ranging from 6.9% to 22.2% (Soares

et al., 2016, Marryat & Frank., 2018, Bellis et al., 2014, Cunningham et al., 2014, Merrick et al., 2018). However, some studies conducted in China, Vietnam, Singapore and two studies in Malaysia itself have reported a much higher prevalence of physical abuse when compared to this study. These values of prevalence range from 33% up to 52.7% and these countries are all within the Asian continent (Chang et al., 2019, Tran et al., 2015, Subramaniam et al., 2020, Ahmed et al., 2015, Choo et al., 2011). This result is consistent with a Malaysian study which showed that factors such as being bullied, being female and coming from ethnic minorities increases the odds of being abused physically (Saminathan et al., 2019). The results support that physical abuse or maltreatment is more prevalent and widely practiced in Asia (Dunne et al., 2008) because of corporal punishment practices embedded in the culture and tradition of Southeast Asian countries. (Fry et al., 2020). For instance, punishment oriented Chinese parenting style as proposed by the Confucian philosophy of parenting, focuses on parents' authority and filial piety to discipline children (Ji et al., 2015).

Furthermore, emotional abuse was prevalent in about one-third of students with about a quarter of them reporting emotional abuse at least a few times. This turned out to be similar to the combined global prevalence (36.7%), and much lower than the prevalence for Asia (41.6%) estimated in a meta-analysis (Stoltenborgh et al., 2012). This prevalence was also found to be lower than a study conducted across eight medical universities in Vietnam, which reported emotional abuse at 42.3 % (Tran et al., 2015). Emotional abuse was also the most commonly reported ACE (34.4%) according to a study conducted across 23 states in the United States which reported similar results as in this study. A study conducted by Yee Tze in Malaysia also supported that there is a strong, positive correlation between mother's authoritarian parenting style and emotional abuse with a high level of authoritarian parenting style by mothers associated with higher levels of emotional abuse in children. (Yee et al., 2019). By definition, authoritarian parenting refers to parents having very high expectations of their children, yet providing very little in the way of feedback and nurturing. Hence, one possibility of the high prevalence of emotional abuse especially in Asian countries could be due to the existence of "tiger parenting" practice which focuses on making children reach high academic achievements and compliance with family obligations (Chua A., 2011). This parenting style is also evident with the existence of the "achievement paradox" observed in Asian American children (Qin, Desiree., 2007). Emotional abuse findings are also supported by excessive parental discipline, over-controlling parents and the lack of emotional support to children as seen in a Singaporean study (Chng et al., 2018).

Sexual abuse was reported at least a few times by less than one-tenth of students. This turned out to be much lower compared to the worldwide prevalence of sexual abuse that ranged from 0 to 69% for girls and 0 to 47% for boys presented by a systematic review and meta-analysis in 2012 (Barth et al., 2012). Sexual abuse appeared to be more prevalent in this study when compared to the prevalence of sexual abuse in a Brazilian cohort at 1.4% but still much lower when compared to a study conducted across 23 states in the United States at 16% (Soares et al., 2016, Merrick et al., 2019). One possible reason for the lower prevalence could be due to the taboo and cultural stigma around sexual abuse in South Asia especially in disclosing abuse experiences (Selengia et al., 2020). Another possibility for the low prevalence recorded in our study is because respondents could feel uncomfortable or embarrassed to report the occurrence of any sexual misconduct events, even when a highly confidential questionnaire was used. The hesitance to disclose ACEs among medical students occurs because of the perception that such disclosure may impede progress in their medical career. It is also highly possible that this ACE might not have been captured fully by the questionnaire. The questionnaire had only used a single item to enquire about sexual abuse (eg. touch or fondle you in a sexual way when you did not want them to). There could have been other ways respondents might be abused sexually which may have been missed by the question, hence underestimating the prevalence.

5.1.2 Neglect

Emotional neglect was experienced by almost all students in this study with four-fifths of them experiencing emotional neglect at least a few times. This prevalence is higher than in both previous studies that were conducted in Brazil and in a cohort study conducted by Taillieu (Soares et al., 2015, Taillieu et al., 2016). This higher prevalence of emotional neglect among respondents might be due to parents having difficulty bonding with a newborn and lacking awareness of child development or having unrealistic expectations (World Health Organization, 2020). These findings are supported by previous study which showed that parents tend to put greater expectations on their children and punish them when expectations are not met (Hua et al., 2014). With the growing economic development, the fast-paced lifestyle often inflicts stress on parents, subsequently affecting parenting practices, leading to neglect (Liao et al., 2011). Apart from that, employed parents who migrate to the city for work often leave their children in the care

of their caretaker or grandparents, increasing the risk of the children being neglected emotionally and physically (Xu et al., 2019).

The prevalence for physical neglect was found to be only 3.3% in this study with 2.1% of respondents not being given enough food and 1.5% were not being taken care of at least a few times. However, this prevalence for physical neglect (3.3%) was observed to be lower than in the previous studies conducted in Brazil and in Malaysia (Soares et al., 2016, Vinitha et al., 2020). One possibility is because this study had a smaller sample size of only 336 respondents compared to other two studies with 3951 and 391 respondents respectively, hence underestimating the prevalence for physical neglect.

5.1.3 Household dysfunction

Parental separation, divorce or death was common in less than one-fifth of students in this study. When compared to this Malaysian study, parental separation was reported at higher prevalence in Brazil compared to this study (Soares et al., 2016). the prevalence of parental separation was almost twice in the studies conducted in England and the United States respectively (Bethell et al., 2014; Cunningham et al., 2014). According to a research on divorce rates in Malaysia, the crude divorce rate (CDR) remained at 1.6% per 1,000 population (Mahidin, 2017) while in England and Wales, there were 7.5% divorces per 1,000 married men and women reported (Kanak Ghosh, 2018). Other than that, parental separation may appear less significant in Asian cultures where there are still relatively low rates of cohabiting, divorce, or single parenthood (Choo et al., 2011). For example, Choo found no association between rates of parental divorce, single parents or step-parenting, or parental drug use with different types of abuse. Next, substance abuse in this study was only present in 6 students. This prevalence is significantly lower than in previous studies by Crouch and Anda, in which household substance abuse was 12.3% and 28.2% respectively. (Crouch et. al, 2019, Anda et al., 2004). The low prevalence is influenced by sociodemographic characteristic of this study population, with majority of students coming from the Malay ethnicity and the religious prohibition on alcohol drinking among Muslim Malays (Ahmed et. al, 2015). When compared to another study carried out in Malaysia, parental drinking was mainly reported by children among the Chinese and Indian ethnicities as opposed to Malays (Ahmed et. al, 2015).

In this study, prevalence for household mental illness was 7.1%, which was lower when compared to previous studies carried out by Crouch, in which prevalence of household mental illness was reported at 9.4% (Crouch et. al, 2019). However, another study conducted found significantly higher prevalence of household mental health problems at 37.8 % (Afifi et. al, 2020). A study in India had also shown a higher prevalence that 71% percent had reported either a parent or a sibling with a psychiatric disorder (Behere et al., 2017). According to research in America, about 26% of Americans aged 18 and above suffer from a diagnosable mental disorder in a given year. Another study showed that in the United States, income inequality was associated with mental health effects such as depression, poor self-reported mental health, drug overdose mortality, incidence of schizophrenia, child mental health problems, juvenile homicides, and adverse child educational outcomes (Simon et. al, 2018). Based on these studies, we can justify that income inequality has caused an increase of prevalence for household mental illness in the other countries.

Based on the results, household violence was common in among two-fifths of students. This prevalence is higher than the studies conducted in Nevada and Scotland, in which the prevalence of ACEs in children witnessing domestic violence was 20.4% and 9.1% respectively (Frankenberger et. al, 2015, Marryat & Frank, 2018). The high prevalence of household violence in this study is supported by a 2018 statistics by Royal Malaysian Police Force, which revealed an escalating trend in domestic violence cases from 3173 cases in 2010 to 5796 cases in 2016 (Royal Malaysia Police Force, 2021). This is also supported by another Malaysian study which reported similar rates of intimate partner violence (Shahar et al., 2020). High rates of household violence in Malaysia are possibly caused by low educational level of perpetrators and victims, low household income, substance abuse and women's attitude that condones patriarchal supremacy (Shahar et al., 2020).

According to the study, the prevalence for incarcerated household members (0.6%) is lower than the prevalence of incarcerated household members (0.45%) found in a study conducted in Scotland (Marryat & Frank, 2018). However, the statistics of crime cases in Malaysia and Scotland shows that there is a huge difference in the crime rate in Scotland being 45.1 crimes per 1,000 people (Clark, 2020) and the crime index ratio per 100,000 population for Malaysia in 2019 being 256.6 (Mahidin, 2019). Apart from that, the results observed in this study are different from the statistics as it might be influenced by respondents who refuse to disclose about incarcerated household members or possibly because the single item that was questioned on incarcerated household members was not enough to estimate the overall prevalence of the ACE.

5.1.4 Violence

It was observed that the prevalence for bullying among respondents in this study was 39.9% with 21.7% respondents experiencing it a few times, which is higher than a previous study conducted in Canada (Afifi et al., 2020). The prevalence in this study was higher than the prevalence of bullying among students in the United States, probably due to students suffering from depression or stress-related conditions being more likely to be bullied, further aggravating the condition. (Tsaousis, 2016).

More than half of the students experienced community violence in this study with two-fifth of them experiencing it at least a few times. This prevalence is higher than in previous studies carried out in Brazil and in the United States (Faus et al., 2019, Desmarais et al., 2014) but much lower than in Indonesia (99.4%) (Fausiah et al., 2019). Unlike in Malaysia, the high community violence in Indonesia could be due to the social and cultural acceptance of violence especially in Ambonese minorities (Ribeiro et al., 2009). There are differences in living conditions between Malaysia, Brazil as developing countries and the United States as a developed country. Children from developing countries may suffer from a lack of economic capital, and limited access to commodities, hence these children may witness higher community violence in developing countries (Bornstein et al., 2012).

The prevalence for collective violence in this study was reported by more than two-fifth of students with majority experiencing teacher-inflicted abuse at least a few times. The prevalence was lower compared to previous studies (Theoklitou et al., 2011, Lee., 2015) but higher when compared to another Malaysian study (Ahmed et al., 2015). This is also supported by the 2020 statistics, which revealed the crime index of Malaysia to be 58.55. (Crime Index Country, 2020). This might be due to some of these events in collective violence occurring later in young adults and therefore these ACEs may have not been captured entirely in this study. Besides, although the students had been assured that their responses would be confidential, it is possible that they were reluctant to reflect on their personal experiences as they did not want to reveal that they have been abused by teachers for instance (D. Theoklitou et al., 2011).

5.2 Number of ACEs

In this study, it was observed that male students were twice more likely to have more than 4 ACEs than female students. This is supported by another study conducted in Malaysia, in which males had about 3 times the odds of experiencing 2 or more types of abuse compared to females (Ahmed et al.,

2015). In Malaysia, males are given more freedom to roam alone at an early age and their activities are not scrutinized as deeply as with females, who are more likely to be questioned about their activities (Choo et al., 2011). Hence, this may justify the higher prevalence of ACEs among males as found in this study. A study in Scotland and Arabia also showed that boys were more likely to experience 3 to 4 or more ACEs compared to girls (Marryat & Frank, 2019, Maha Almuneef et. al, 2017). On the contrary, studies conducted in Bangkok found that females were more likely than males to report a range of ACEs. (Thepthien et al. 2015). Similarly, a study by Merrick showed that female respondents reported a greater prevalence of child sexual abuse, household substance abuse, and household mental illness compared to males (Merrick et al., 2019).

5.2.1 Type of ACEs

5.2.1.1 Abuse

This study found that an odd of three times of experiencing abuse was reported among students whose fathers had low education level ranging from no formal education to secondary school education compared to those who had fathers with high education level ranging from diploma to PHD. Another study conducted in China also supported that student whose fathers have education level lower than primary schooling were almost 4 times more likely to have experienced sexual abuse and physical abuse (Leung et al., 2008). It is thought that child abuse occurs when parents lack knowledge and awareness on proper parenting skills, thus relying on physical punishment to ensure the child is obedient (Xu et al., 2019). It was also found that parents with higher educational achievement served as a protective factor against maltreatment (Sidebotham et al., 2001). Another study conducted in Chicago also found that a father's education level can predict maternal physical child abuse proxies. This is because fathers who are college-educated or higher were associated with lower risk of mother's physical aggression towards her child. (Guterman et al., 2009). This shows that a father's education plays an important role in ensuring the wellbeing of the child. Another study carried out in the United Kingdom concluded that parents with lower educational attainment were at more risk of having a neglected child owing to the lack of knowledge, awareness and appreciation of the child's needs (Sidebotham et al., 2001). Based on the previous study, it is justified that an educated father is important for the wellbeing of the children and to prevent them from maltreatment.

5.2.1.2 Household Dysfunction

It is observed that students whose mothers smoked were 17 times more likely to experience household dysfunction compared to those students who have mothers that did not smoke in this study. One possibility for higher probability of ACEs is maternal smoking has been associated with impaired child-rearing behaviours and higher risk of household problems (Cnattingius, 2004). This can be supported by previous studies which showed higher odds for extreme child emotional and behaviour problems if the mother smoked in the family (Weitzman et al., 1992, Salvo et al., 2010). It was also found that children's recurrent exposure to cigarette smoke is thought to be a form of child abuse, due to intentional secondhand smoke exposure that can cause fatalities in children (Goldstein, 2015). Studies have also shown that smoking is a coping mechanism for females to deal with intense anxiety and stress, relating maternal smoking to stressful family conditions, and thus more occurrence of household dysfunction (Torres and O'Dell, 2015, Soares et al., 2016).

This study showed that mother's employment was significantly associated with household dysfunction and violence among participants. However, there was no significant association after multiple logistic regression which could be due to type II error as the sample size was calculated based on parental education level. This is because mother's employment may deprive children of consistency in child care, and attention resulting in higher ACEs among children in the family (Huerta et al., 2011). This is supported by another Malaysian study, in which the odds of sexual abuse among adolescents were two times higher when the adolescent's mother is self-employed or has her own business (Choo et al., 2011). On the contrary, maternal employment was found to have a protective effect in the occurrence of child maltreatment in a study done by Sidebotham (Sidebotham et al., 2006). This means that an employed mother reduces the risk of her child having ACEs such as abuse or neglect while having an unemployed mother is linked to a higher risk of ACEs for the child such as child physical neglect. (Stith et al., 2009).

Based on our study, it was shown that father's employment status had a significant association with number of ACEs. However, there was no significant association after multiple logistic regression which could be due to type II error. Employed fathers who are busy with work may not spend enough time with their children, hence they would not be heavily involved in their children's day-to-day activities, resulting in child neglect. A study has shown that father's involvement in children's lives over an extended time period significantly reduces rates of neglect (Dubowitz et al., 2000). Parental migration due to work

commitments in cities also increases risk of child neglect and abuse by caretakers (Xu et al., 2019). On the contrary, past studies conducted have shown that the presence of any unemployed family member was significantly associated with higher odds ratio of ACEs, specifically parental neglect in a meta-analysis (Stith et al., 2009). Another study conducted in Malaysia also showed that children with unemployed fathers had higher odds of almost two times to be associated with parental neglect. (Ahmed et al., 2015). Another possibility which is supported by the University of Oxford could be due to unemployed parents having limited means to obtain resources essential for a child's basic needs, such as clothing, food, and medical care, leading to neglect (University of Oxford, 2017).

In this study, age did not show any significant association with any ACEs such as abuse, neglect, household dysfunction and violence. However, previous reports have shown age to be a significant factor contributing to ACEs. For example, in a study conducted by the US Department of Health and Human Services, it was found that younger adults reported exposure to more ACEs compared to older adults, especially those aged above 65 years (Merrick et al., 2019). In another study population, 21.8% of the younger age group ranging between 25 to 34 years reported more than 4 ACEs (physical abuse, emotional abuse, and sexual abuse, household member substance misuse, incarceration, mental illness, parental divorce, or witnessing intimate partner violence) compared to 7.3% of the older age group aged above 65 years (Merrick et al., 2019). A possible explanation for the higher risk among younger groups could be their ability to recall adverse childhood experiences better (Merrick et al., 2019). A study carried out in 34 states by Giano showed that the age group between 25 to 34 years had a significantly higher ACE mean score of 1.98 compared to the 64 and over age group which had a lower ACE mean score of 0.94 (Giano et. al., 2020). To conclude, age is not significant in this study possibly due to the limited age range. This study only compared among young people ranged from 19 to 25 and did not compare with older age groups, hence there were no significant findings.

Ethnicity did not show any significant association with abuse, neglect, household dysfunction and violence among students in this study. However, previous studies have shown ethnicity plays a vital part in ACE formation. It was found in another study done in Malaysia that in comparison to their Malay counterparts, Chinese children had three times higher odds of parental emotional abuse, while Indian children had much lower odds of parental neglect. Children of these minority group, Chinese and Indian

ethnicities are more likely than Malay children to report parental drinking which later can lead to ACEs, and this may be related to Muslim Malays' religious restrictions on alcohol intake (Ahmed et al., 2015). Another study also conducted in Malaysia showed that ethnicity is also an influential factor of ACEs as a minority population, Chinese and Indian respondents were less likely to report more than one ACEs or one ACE. The higher rates of abuse in the Malays compared to other ethnicities could be attributed to socioeconomic differences, because ethnic Malays on average experience more poverty. (Choo et al., 2011)

Household income too was found to be insignificant in our study. On the contrary, household income has a significant contribution towards ACEs as shown by multiple studies such as the study conducted in Scotland. The study showed that children who come from low-income families were 6 times more likely to have 4 or more ACEs compared to those who come from high income families. (Marryat & Frank, 2019). This is supported by a study done by Bellis, that showed that all types of child abuse, for instance physical abuse had a higher occurrence (18.5%) in children living in the most deprived quintile of income group, and this is also associated with more than 4 types of ACE (Bellis et al., 2015). In another study conducted in Australia, children brought up in poverty were three times more likely to experience abuse, neglect or being witness to domestic violence. (Doidge et al., 2017). This is mainly because income determines a parent's abilities to provide adequate nutrition, clothing, educational opportunities, decent housing and social activities, therefore poverty or low socioeconomic status indeed impacts on a child's basic care needs and the child's development (Gupta A., 2017).

Maternal age at birth of respondents was also insignificant in our study. However, maternal age at birth of respondents does contribute to formation of ACEs as shown in past studies. A Brazilian study found a strong association between a younger maternal age at birth (below 20 years) which results in 3 times the odds for the respondents to have 4 or more ACEs compared to when the mother's age is more than 35 years. This is supported by another cross-sectional study carried out in Scotland, which also showed mothers below 20 years of age increased the odds 2.2 times higher for their children to experience more than 3 ACEs. (Marryat & Frank, 2019). Older women are more likely to have better parenting abilities than younger mothers, as well as more experience and knowledge, and this could result in a lower association with ACEs in their children while younger mothers with limited parenting abilities tend to

cause physical neglect. Another possibility is that young mothers can be subjected to stress due to low financial or housing resources, leading to abuse and neglect (Sidebotham et al., 2001).

Mother's education level did not show any significant association among the four ACE categories as well. However, past reports have shown mother's education level to play a role in ACE formation. A study in Scotland showed that a mother with lower educational qualifications had 2 times the odds for their children to have more than 1 ACE compared to mothers with higher educational qualification (Marryat & Frank, 2019). A study conducted in Brazil also supported that a mother with less than 4 years of education was associated with 6 times higher odds of her child having more than 4 ACEs compared to mothers with 12 years of education (Soares et. al, 2016). Hence, this association reflects that more educated women are more likely to delay childbearing (Balasch & Gratacos, 2012). Education is indeed important as it provides access to literacy and comprehension of general and health-related knowledge (Braveman et al., 2005). Mothers with lower education levels are at more risk of having a neglected child mainly because of a lack of awareness, knowledge and experience in parenting and recognizing children's needs. Hence, this results in higher risk of abuse and neglect in their children (Sidebotham et al., 2001).

CHAPTER 6: CONCLUSION

6.1 Summary

This study concludes that the prevalence of ACEs among the study population is higher than the regional estimates. The most common ACEs observed were emotional neglect, followed by community violence, collective violence, peer bullying, household violence and emotional abuse. Father's education level was observed to be significantly associated with abuse, father's employment being highly associated with neglect, mothers who smoke are seen significantly associated with household dysfunction and mother's employment was observed highly associated with household dysfunction and violence among respondents. By using multiple logistic regression, it was found that father's education level is highly associated with abuse, mothers who smoke have greater occurrence of household dysfunction and males were more likely to experience more ACEs among respondents in our study population.

6.2 Limitations

In terms of study limitations, the data collection period was conducted using an online platform due to the COVID-19 pandemic. Hence, there was a limited number of respondents because not all medical students had good internet access to answer our questionnaire and only 85% of sample size was achieved. In addition, the findings from this study could not represent all undergraduate students because the study population was restricted to only undergraduate medical students in a public university. Next, recall bias might have occurred due to inability to recall adverse events in childhood through the self-administered questionnaire, thereby underestimating the prevalence of ACEs. There was also reluctance of student participation in the survey where students refused to answer some of the questions despite assurance that the questionnaire is highly confidential.

6.3 Recommendations

In this study, only undergraduate medical students in Universiti Putra Malaysia were selected to participate in this study and thus, the results cannot be generalized to all undergraduates. Therefore, further

research is suggested to involve undergraduates from other faculties and from other universities to obtain better results that can closely represent the undergraduate population.

From this study, the relationship between ACE scores and health outcomes such as mental health risk behaviours and academic performance was not evaluated. Therefore, further study can be conducted to examine the association between ACEs and mental health and resilience among undergraduate students.

This study findings provide insight to the burden of ACEs in the family and community. Hence, public health interventions need to be carried out to minimize ACEs in the family and in the community. For instance, parents are to be educated on good parenting practices to reduce occurrence of ACEs. In addition, the Ministry of Health should implement ACE screening programs to minimize the negative impact of ACEs.

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APPENDICES

Appendix A Budget Plan

There was no budget required throughout the period of this study as no money was spent on the research.

Appendix B Gantt Chart

Topic: Prevalence of Adverse Childhood Experiences among Undergraduate Medical Students and its Associated Factors

Activity	December	January	February	March	April	May	June	July
Proposal Preparation Meeting with Supervisors								
Submission of Proposal								
Preparation and Proposal Presentation								

Preparation of Ethical Approval/ Letters								
Data Collection and Analysis								
Report Writing								
Final Report Submission								
Final Report Presentation								
Submission of Poster and Scientific Articles								
Poster Competition								
Submission of Logbook and Hard Bound Copies of Final Report								



**PREVALENCE OF ADVERSE CHILDHOOD
EXPERIENCES AND ITS ASSOCIATED FACTORS
AMONG UNDERGRADUATE MEDICAL STUDENTS,
UNIVERSITI PUTRA MALAYSIA**

We are pleased to inform that you are randomly selected to participate in this research.
Your cooperation in completing this questionnaire is mostly appreciated

RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1. STUDY TITLE:

PREVALENCE OF ADVERSE CHILDHOOD EXPERIENCES AND ITS ASSOCIATED FACTORS AMONG UNDERGRADUATE MEDICAL STUDENTS, UNIVERSITI PUTRA MALAYSIA.

2. INTRODUCTION:

This study is an undergraduate medical research project that will be conducted from December 2020 till July 2021 among Malaysians. Adverse Childhood Experiences (ACEs) are traumatic events occurring during early life. ACEs include physical and emotional abuse, neglect, substance abuse, parental mental illness, household violence, peer violence and community violence. Our study aims to assess the prevalence of adverse childhood experiences among undergraduate medical students. Besides, this study also aims to assess the factors (sociodemographic characteristics, parental factors, peer violence and teacher-inflicted abuse) associated with ACEs among undergraduate medical students. The estimated number of participants is 410 undergraduate medical students. No funding is received to conduct this study.

3. WHAT WILL YOU HAVE TO DO?

A questionnaire consisting of questions related to adverse childhood experiences is prepared and this questionnaire takes 5 minutes to complete. Respondents are required to fill in the information and consent form as well as the questionnaire. All questions should be answered honestly as each answer will be taken into account.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

This research will be conducted among undergraduate medical students from year 1 to year 4 in University Putra Malaysia only. Hence, anyone who is not a medical student from University Putra Malaysia should not participate in this study.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

This study would be able to help respondents to build understanding on ACEs. Hence, respondents can protect themselves from implications of ACEs including mental health illnesses, chronic health conditions and risks of substance abuse.

(b) TO THE INVESTIGATOR?

Data collected from this research enables the researchers to study the prevalence of ACEs among undergraduate medical students in UPM and the factors that are associated with ACEs. The findings of this study will contribute to the body of knowledge in this field and assist in development of relevant policy and programs to the high-risk community.

6. WHAT ARE THE POSSIBLE RISKS?

There is no potential risk as it does not require any harmful procedure. However, participation is voluntary and you can opt out from this study any time that you wish without any penalty.

7. WILL THE INFORMATION THAT I PROVIDE AND MY IDENTITY REMAIN CONFIDENTIAL?

The information that you provide and your identity will remain confidential as the findings will be produced as collective results. No individual information will be made publicly available. You can have access to the study findings upon request to the researcher.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

1. Dr. Norliza Ahmad: 03-9769 2582
Senior Medical Lecturer
Department of Community Health,
Faculty of Medicine & Health Sciences
Universiti Putra Malaysia
lizaahmad@upm.edu.my
2. Mohamad Izmul Hakem bin Baharun: 017-9787422
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4. Iwana Izah Binti Mohd Deen: 014-5011812
Year 2 Medical Student
Faculty of Medicine & Health Sciences
Universiti Putra Malaysia
204674@student.upm.edu.my

Please add your initial here if you have read and understood the contents of this page_____

9. CONSENT

I Identity Card No.
address.....

.....hereby voluntarily agree to take part in the research stated above
*(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature
(Respondent)

Signature
(Witness)

Date :.....

Name :.....

I/C No. :.....

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date

Signature
(Researcher)



**PREVALENCE OF ADVERSE CHILDHOOD
EXPERIENCES AND ITS ASSOCIATED FACTORS
AMONG UNDERGRADUATE MEDICAL STUDENTS,
UNIVERSITI PUTRA MALAYSIA**

We are pleased to inform that you are randomly selected to participate in this research.
Your cooperation in completing this questionnaire is mostly appreciated.

Kindly return this questionnaire

Thank you

Questionnaire

The title of this questionnaire is the Adverse Childhood Experiences International Questionnaire. This questionnaire is designed to collect information from undergraduate medical students from Universiti Putra Malaysia about events they experienced during the first 18 years of their lives.

The ACE-IQ will ask you some questions about:

- Age
- Education
- Family background
- Experiences in your home when you were growing up
- Events in the community that you experienced when you were growing up

This questionnaire will take approximately 5 minutes to be answered. Your participation and data provided for the questionnaire will be completely confidential. It is your right to decline to answer any questions in the questionnaire that you do not wish to answer.

If you do have any questions, feel free to contact any of the research unit members as listed below.

1. Mohamad Izmul Hakem bin Baharun: 017-9787422

2. Nivasheene A/P Prem Kumar: 012-4300599

3. Iwana Izah Binti Mohd Deen: 014-5011812

English version:

Answer ALL the questions below and tick (/) in the box which best describes you.

Section A: Personal and sociodemographic factors

1. Gender:

☐ Male

☐ Female

2. Age: _____ years

3. Ethnicity:

☐ Malay

☐ Chinese

☐ Indian

☐ Others (specify):

4. Household income: RM _____/month

5. Residence area:

☐ Rural area (city, town)

☐ Urban area (village)

6. Number of siblings: _____.

Section B: Parental factors

The following questions are referring to events that occurred while you were growing up during the first 18 years of your life.

1. How old was your mother when you were born? _____.
2. What is the educational level of your mother?
 - ☐ No formal education
 - ☐ Primary school
 - ☐ Secondary school
 - ☐ College/university graduate
 - ☐ Masters/PhD
3. What is the educational level of your father?
 - ☐ No formal education
 - ☐ Primary school
 - ☐ Secondary school
 - ☐ College/university graduate
 - ☐ Masters/PhD
4. Was your mother unemployed?
 - ☐ Yes
 - ☐ No
5. Was your father unemployed?
 - ☐ Yes
 - ☐ No
6. Were your parents ever separated or divorced?
 - ☐ Yes
 - ☐ No
 - ☐ Not applicable
 - ☐ Refused

7. Did your mother, father or guardian die?

- ☐ Yes
- ☐ No
- ☐ Not sure
- ☐ Refused

8. Did a parent , guardian or other household member spank, slap, kick, punch or beat you up?

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

9. Did a parent, guardian, or other household member yell, scream or swear at you, insult or humiliate you?

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

10. Did someone touch or fondle you in a sexual way when you did not want them to?

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

11. How often did your parents/ guardians not give you enough food even when they could easily have done so?

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

12. Were your parents/guardians too drunk or intoxicated by drugs to take care of you?

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

13. Did your parents/guardians understand your problems and worries?

- ☐ Always
- ☐ Most of the time
- ☐ Sometimes
- ☐ Rarely
- ☐ Never
- ☐ Refused

14. Did you see or hear a parent or household member in your home being yelled at, screamed at, sworn at, insulted or humiliated?

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

15. Did you live with a household member who was a problem drinker or alcoholic?

- ☐ Yes
- ☐ No
- ☐ Refused

16. Did you live with a household member who misused street or prescription drugs?

- ☐ Yes
- ☐ No
- ☐ Refused

17. Does your mother ever smoke?

- ☐ Yes
- ☐ No

18. Does your father ever smoke?

- ☐ Yes
- ☐ No

19. Did you live with a household member who was ever sent to jail or prison?

- ☐ Yes
- ☐ No
- ☐ Refused

20. Did you live with a household member who was depressed, mentally ill or suicidal?

- ☐ Yes
- ☐ No
- ☐ Refused

Section C: Other factors

The following questions are referring to events that occurred while you were growing up during the first 18 years of your life.

1. How often were you bullied by your peers?

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

2. How were you bullied most often by your peers?

- ☐ I was hit, kicked, pushed, shoved around, or locked indoors.
- ☐ I was made fun of because of my race, nationality or colour.
- ☐ I was made fun of because of my religion.
- ☐ I was made fun of with sexual jokes, comments, or gestures.
- ☐ I was left out of activities on purpose or completely ignored.
- ☐ I was made fun of because of how my body or face looked.
- ☐ I was bullied in some other way
- ☐ Not applicable

3. How frequently during your schooling did a teacher insult you, threaten you or hit you?

- ☐ Never
- ☐ Rarely
- ☐ Commonly
- ☐ Very frequently

The following questions are referring to events that occurred in your NEIGHBOURHOOD OR COMMUNITY (not in your home or on TV, movies, or the radio) while you were growing up during the first 18 years of your life.

4. Did you see or hear someone being beaten up in real life?

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

5. Were you forced to go and live in another place due to any of these events? (eg. neighborhood disputes and violence, crimes, noise and nuisance, antisocial behavior, harassment)

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

6. Did you experience the deliberate destruction of your home due to any of these events? (eg. neighborhood disputes and violence, crimes, house fire, natural disasters like floods, landslide, severe haze)

- ☐ Many times
- ☐ A few times
- ☐ Once
- ☐ Never
- ☐ Refused

THE END OF QUESTIONNAIRE

Appendix E Ethical Approval of JKEUPM

Approval for JKEUPM Ethical Clearance

Ref. no: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM)

Date: 15 March 2021

Dear Prof./Dr./Mr./Ms.,

APPLICATION FOR JKEUPM ETHICAL CLEARANCE: APPROVED

With reference to the above, I am pleased to inform you that your application for ethical clearance for the research project entitled '**Prevalence of Adverse Childhood Experience and its Associated Factors among Undergraduate Medical Students, Universiti Putra Malaysia**' has been approved.

Please note that the official letter of approval will be issued as soon as possible. However, the ethical clearance is considered effective from the date of this email, and you may now proceed with your research.

Kindly remind the ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

Researchers should also complete a Study Final Report upon study completion. The form can be obtained from the Ethics Committee for Research Involving Human Subjects (JKEUPM) website (<http://www.tncpi.upm.edu.my/faildokumen>).

If you have any enquiries, please contact Ms. Nurulhasanah Ishak (03-97691605) or Ms. Nor Ellia Abd Ajis (03-97691244).

Note: Please use this reference number for any transaction:- **JKEUPM-2021-107**

Thank you.

Yours faithfully,

Prof. Dr. Zamberi Sekawi

Chair

Ethics Committee for Research Involving Human Subjects

Universiti Putra Malaysia



**JAWATANKUASA ETIKA UNIVERSITI UNTUK
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA**

FORM 3.2 STUDY FINAL REPORT

1.	JKEUPM Ref. No.	JKEUPM-2021-107
2.	Study Title	Prevalence of Adverse Childhood Experience and its Associated Factors among Undergraduate Medical Students, Universiti Putra Malaysia
3.	i. Principal investigator a. Name b. Address c. Tel.No d. Email ii. List of co-investigators	Dr. Norliza Ahmad Senior Medical Lecturer Department of Community Health, Faculty of Medicine & Health Sciences Universiti Putra Malaysia 03-9769 2582 lizaahmad@upm.edu.my 1. Dr Lim Poh Ying Senior Lecturer Department of Community Health, Faculty of Medicine & Health Sciences, Universiti Putra Malaysia 03-9769 2950 pohying_my@upm.edu.my 2. Mohamad Izmul Hakem bin Baharun Year 2 Medical Student Faculty of Medicine & Health Sciences Universiti Putra Malaysia 017-9787422 201127@student.upm.edu.my 3. Nivasheene A/P Prem Kumar Year 2 Medical Student Faculty of Medicine & Health Sciences Universiti Putra Malaysia



FORM 3.2 STUDY FINAL REPORT

		012-4300599 200972@student.upm.edu.my 4. Iwana Izah Binti Mohd Deen Year 2 Medical Student Faculty of Medicine & Health Sciences Universiti Putra Malaysia 014-5011812 204674@student.upm.edu.my
4.	Name Of Funding Agency	None
5.	Study Site	Faculty of Medicine and Health Sciences, Universiti Putra Malaysia
6.	Total number of eligible subjects in study site	445 participants
7.	Recruitment of subjects in study site	
	i. Number of participants recruited:	410 participants
	ii. Number of participants completing trial/ study:	336 participants
	iii. Proposed in original application:	410 participants
	iv. Number of withdrawals from trial to date due to:	None
	a) withdrawal of consent	
	b) no response from participants	
	c) loss to follow-up	
	d) death (not the primary outcome)	
	Total study withdrawals:	
	v. Number of treatment failures to date (Prior to reaching primary outcome) due to:	None
	a) adverse events	
	b) lack of efficacy	
	Total treatment failures:	



FORM 3.2 STUDY FINAL REPORT

8.	Duration of study	20 th December 2020 – 31 st May 2021
9.	Protocol Violation or Deviation	None
10.	Executive summary (<i>Summary of research background, objectives, methodology, findings and conclusion of the research project</i>) - maximum 500 words) *Committee may request additional information if required.	Background Adverse Childhood Experiences (ACEs) are traumatic events occurring during early life. ACEs include physical, emotional and sexual abuse, physical and emotional neglect, substance abuse, incarcerated household members, parental separation, parental mental illness, household violence, bullying, collective violence and community violence. The more a child experiences ACEs, the more likely for them to suffer later in life from suicidal behaviour, depression, chronic health illness, poor academic performance and substance abuse. In Malaysia, there was a rise in reports of all forms of abuse, with triple the number of cases between 2001 and 2010, to more than 3000 per year. Objective Our study aims to assess the prevalence of adverse childhood experiences among undergraduate medical students. Besides, this study also aims to assess the factors (sociodemographic factors, parental factors) associated with ACEs among undergraduate medical students. Methodology This study was conducted at the Faculty of Medicine and Health Sciences, University Putra Malaysia (UPM). The study design chosen was a cross-sectional study and it was carried out from 20th December 2020 until 31st May 2021. Our sampling population were year 1 to year 4 undergraduate



FORM 3.2 STUDY FINAL REPORT

	medical students from the Faculty of Medicine and Health Sciences in UPM and the total eligible participants were 445 students, however the targeted population was only 410 students. Students that were excluded from the study were those who did not have internet connection during data collection and this included a 35% non-response rate. However, we only managed to achieve 82% response rate which was 336 participants. The questionnaire used was the World Health Organization Adverse Childhood Experiences International Questionnaire (ACE-IQ) with Cronbach alpha value of 0.76 which showed good reliability. For the data analysis, the Statistical Package for Social Sciences (SPSS) version 26 was used. Chi-Square test, Fisher's Exact test and multiple logistic regression were conducted to analyse bivariate and multivariate analysis. Results Thirteen types of ACEs were assessed in the study. The prevalence of at least one ACE reported by participants was about 97% and more than half had experienced at least 4 ACEs. The third most frequently reported adverse childhood experiences were emotional neglect (94.3%) followed by community violence (56.3%) and collective violence (45.2%). Multiple logistic regression showed respondents whose fathers obtained secondary school education or less were 3 times more likely to have been abused either physically, emotionally or sexually compared to respondents whose fathers had higher education level (OR = 3.046, 95% CI: 1.014 – 9.152, P = 0.047). While respondents with mothers who smoke were nearly 17 times more likely to experience household
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