ADVERSE CHILDHOOD EXPERIENCES AND COGNITIVE DEVELOPMENT

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Abstract: Exposure to adverse childhood experiences (ACE) has been identifies as an indicator for poor outcomes in adult life, including chronic illness, mental health problems and poor educational outcomes. Yet, much of this research to date has been based on retrospective studies relating to adults which can result in underreporting due recall bias, that is likely to identify the more extreme cases of ACE and overlook less severe cases. This study aims to describe ACE in children population in the West Bank as reported by a sample of school children.

Key words: Adverse childhood experiences, emotional abuse, community violence, collective violence, bullying.

Introduction

Data were collected from 5,735 school children in the West Bank. 100 schools were randomly selected from a list of 436 eligible schools. From each school, 60 students were samples, 12 from each grade level (5 to 9), with a response rate of 96%. Children were invited to complete a comprehensive self-administered questionnaire addressing health and health behaviour, including ACE questions. Children were asked to report if they felt that they were emotionally neglected, emotionally abused, physically neglected, or physically abused. Response options were ‘never true’, ‘true’, ‘very often true’. Two or more response of ‘very often true’ on the scale were treated as positive response to abuse or neglect.

Overall, 85% reported that they were emotionally abused, 93% reported that they were physically neglected, 31.5% reported that they were emotionally neglected, and 23.1% reported that they were bullied. Smoking was reported

higher in the girls than boys (9.4 % and 8.4 %) All types of ACE were strongly correlated, indicating that maltreatment and abuse are likely occur together.

This is one of the very few studies that collected data on ACE from children, rather than from adults reflecting on their childhood. To further reduce recall bias, we have only classified reporting as the statement of abuse being 'very often true' as ACE, thus adopting a conservative approach for this phenomenon. Yet, even with this conservative approach, it is evident that children in the West Bank are frequently exposed to all types of neglect and abuse. This study is first in its kind to report children's current exposure to ACE and as such, it allows us to further investigate the effect that such exposure has on children's life during childhood.

The Centre for Disease Control (CDC, 2017) describe adverse childhood experiences (ACE) as being linked to: "risky health behaviours, chronic health conditions, low life potential and early death". The CDC further propose that the greater the exposure to ACE the greater the likelihood of such negative outcomes. Originating from a large scale study in San Diego within the Kaiser Health Evaluation Centre, the ACE hypothesis is based on a questionnaire completed by 9,508 adults (Felitti et al, 1998). Feletti et al (1998) established a strong relationship between ACE and chronic health conditions and morbidity in adult life.

The World Health Organisation (WHO, 2016) define child maltreatment as the "abuse and neglect that occurs to children under 18 years of age. It includes all types of physical and/or emotional ill-treatment, sexual abuse, neglect, negligence and commercial or other exploitation, which results in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power". The WHO (2016) further content that child maltreatment results in "disruption in early brain development" and suggest that in regions of armed conflict, girls in particular are vulnerable to maltreatment. The CDC define child abuse as an act by a "parent or other caregiver that results in harm, potential for harm, or threat of harm to a child" (2016). However, the CDC (2016) further argue that a consistent definition for child abuse is necessary. The terms child maltreatment and child abuse are often used interchangeably. The United Nations Convention on the Rights of the Child (UNCRC, 2011) refers to

child abuse and maltreatment as “all forms of physical or mental violence, injury or abuse, neglect or negligent treatment, maltreatment or Exploitation, including sexual abuse”.

The effects of child maltreatment are wide ranging and include: difficulties with peer relationships, behavioural problems, post-traumatic stress symptoms, juvenile delinquency, and depression and anxiety (Jaffee & Maikovich-Fong, 2010). Child maltreatment effects the normal development of the child both psychologically and biologically (Peterson, Joseph & Feit, 2013). Peterson et al (2013) argue that abuse and neglect result in changes of the prefrontal cortex of the brain which may result in uncontrolled inhibitions. Tanaka, Georgiades, Boyle and Macmillan (2015) based on a retrospective report and found that child abuse affects educational attainment. Number of years of education and high school graduation were key markers used within this study. Tanaka et al found that severe physical abuse did impact in a lower number of years in education (2015). Jaffee and Maikovich-Fong (2010, p. 185) argues that child maltreatment is associated “with poor cognitive outcomes and school adaptation problems”.

Children who suffer chronic abuse present with lower IQ scores, according to Jaffee and Maikovich-Fong (2010). Yet Jaffee and Maikovich-Fong (2010) further acknowledge that parental mental health and other environmental factors such as socioeconomic status further impact on IQ, making the link between child maltreatment and IQ difficult to prove with certainty. Glaser (2013) suggests that attachment issues further compound the neurobiological stress is experienced by children who suffer abuse. Such children lack consistency and stability in the parenting they receive and consequently the child may lack exposure to key experiences necessary for normal development (Glaser, 2013).Tyler, Johnson and Brownridge (2008, p. 563) found that “more positive parental relations are associated with greater school engagement”. This greater school engagement subsequently results in higher levels of well-being (Tyler et al, 2008).

Children are affected by the occupation in different ways. Loss, displacement and abuse are the three interrelated experiences resulting from these violent contexts (UN OCHA 2012). Checkpoints and barriers hinder the access for hundreds of children to their schools and homes. The blockade on the Gaza Strip began in 2007 and has so far resulted in many losses of loved ones, caused

numerous disabilities and injuries to children. The displacements and imprisonment of children contribute to the absence of a healthy and safe living environment for these younger generations. The interaction of all these factors directly or indirectly impacts the psychological, physical and the overall well-being of children and adolescents. Many are experiencing post-traumatic stress disorders, depression, bed wetting, bullying and several other behavioral and mental distresses. Some cases reach suicide as well (Amnesty International 2012, United Nations High Commissioner for Human Rights 2013). In general, the impact of this violence violates the child's rights and development. The sum of all this violence discussed earlier violates Palestinian youth's rights, affects their daily lives and may impact the quality of their lives in the future.

Escueta, Whetten, Ostermann and O'Donne (2014) found that there is a distinct link between exposure to traumatic events and cognitive ability. Via a longitudinal study, Escueta et al, collected data relating to orphaned and abandoned children in low five low income countries in Aisa.The Kaufman Assessment Battery for children and the California Verbal Learning Test were administered to both the orphaned children and baseline group of children in surrounding communities. The Life Events Checklist was used to ascertain exposure to traumatic events including natural disasters, physical and/or sexual abuse, or being forced to leave the home (Escueta, 2014).

Multiple previous studies have identified retrospectively that exposure to adverse experiences in childhood effects cognitive development (Majer, Nater, Lin, Capuron, & Reeves, 2010; Crozier, 2005; Pechtel & Pizzagalli, 2011; Dong et al, 2004). Yet Finkelhor, Shattuck, Turner and Hamby, (2013) suggest that retrospective studies on ACE present limitations. The average age of adults participating in research concerning ACE is 55-57 years. Hence Finkelhor et al (2013) argue that certainty concerning memories based on the vantage point of adult life may be skewed or less reliable as explanations for outcomes. Rueben et al (2016, p. 1103) found that retrospective studies relating to ACE in comparison to prospective studies, showed "more agreeable and neurotic dispositions respectively bias retrospective ACE measures toward underestimating the impact of adversity on objectively measured life outcomes, and overestimating the impact of adversity on self-reported outcomes".

One cross sectional study done on public university students in Germany (Wiehn et al. 2018) investigated the link between Adverse Childhood Experiences (ACE) and Health Risk Behaviour (HRBs). HRBs in this study are identified as being: Risky drinking, smoking daily, drug abuse, early sexual intercourse, multiple sexual partners and suicidality. Wiehn et al. show that there is a strong correlation between ACEs and health risk behaviours whereby there is a positive correlation; the more the ACEs the increased health risk behaviours and vice versa. A retrospective study done in the United States suggests that there is an increased risk of depressive disorders for those who are exposed to ACEs as children (Chapman et al. 2004). Another prospective cohort study looked into the association of ACEs and the risk of lung cancer (Brown et al. 2010). The risk of lung cancer was 3-fold higher in those having more than six ACEs. This increased risk may only be partially explained by smoking. Edwards et al. (2003) explore the relationship between multiple childhood maltreatment and adult mental health. A positive correlation was found between the number of types of maltreatments and mental health scores. One study (Garrido et al. 2018) indicated that ACE scores are predictive of risky behaviours; violence, substance use and delinquency. Furthermore, this study found that males and older youth were more likely to engage in these risk behaviours.

This study will ascertain the link between self-reported ACE and cognitive development based on HBSC data from two locations in Israel.

Methods

A cross-sectional epidemiological survey of a nationally representative sample was conducted using a questionnaire developed by Health Behavior in School Aged Children in the Middle East (HBSC-ME) cross-cultural study that included the ACE questions. The questionnaire was adapted specifically for the situation in the West Bank. The HBSC-ME was developed and tailored to the unique circumstances and needs of the Palestinian community and to provide an in understanding of health behaviors, lifestyles, and their context in young people. The students selected to participate in the study were chosen using random, multi-stage sampling. The samples was chosen from the West Bank including East Jerusalem from 5 grades: 5^{th}, 6^{th}, 7^{th}, 8th and 9^{th} graders (all from the basic stage) and from all three different types of schools, UNRWA, private and public schools.

The aim was to recruite 1143 students from each gender and grade from the total sample size of 5715.To maximize sample precision, the design effect with a value of 2 was multiplied by sample size.

The main sampling technique applied in the study was the two-stage cluster technique. 5715 student were chosen randomly from the schools using the probability proportional to their size. For the first stage, the sample size was calculated from the information given from the ministry of Education and the Palestinian Central Bureau of Statistics. For the second stage, one class was chosen from each school to make a cluster were all students were included. The previous was done for both boys and girls schools. The same total number of students, of both genders, was chosen for each grade. The total number of each sex was distributed equally between grades around 20% for each. This study used 5407 of the sample out of the 5715, the sample that reported their age. The females sample was 3658 and the males sample was 1829

In the ACE Questions, Children were asked to report if they felt that they were emotionally neglected, emotionally abused, physically neglected, or physically abused. Response options were ‘never true’, ‘true’, ‘very often true’. Two or more response of ‘very often true’ on the scale were treated as positive response to abuse or neglect. The following were used to asses the ACE in this study:

Emotional Abuse. Emotional abuse was calculated using1 question: “While you were growing up, that is, your childhood years, how often did a parent, or adult living in your home: Swear at you, insult you, or put you down?”, “never”, “true”, or “very often true” were given as responses.

Physical Abuse. 2 questions were used to describe physical abuse: (1)“While you were growing up, that is, your childhood years, how often did a parent, or adult living in your home: Actually push, grab, shove, slap you, or throw something at you?” (2) “While you were growing up, that is, your childhood years, how often did a parent, or adult living in your home: Hit you so hard that you had marks or were injured?”, there responses was “never”, “true ”, or “very often true” were given as responses. A positive response to any of the questions gave one point to physical abuse.

One or no parents, parental Separation or Divorce. This part reflected the answer of 2 questions: (1) “Do you have another home or another family, such as the case when your parents are separated or divorced?” and (2) “the people who live in the home where you live all or most of the time: I live in a foster home or children's home”. A ”yes” response to any of the 2 questions provided one point.

Emotional neglect: 3 question were used to to determine this part: (1) "While you were growing up during your childhood years, People in your family looked out for each other?” (2) “While you were growing up during your childhood years, You felt loved?” (3) “While you were growing up during your childhood years, Your family was a source of strength and support?”. The questions answers were “never”, “true”, or “very often true”.

Physical neglect: the response of 3 questions were used to determine if they’re physically neglected: (1) “While you were growing up during your childhood years, You had to wear dirty clothes?” (2) “While you were growing up, that is, your childhood years, how often did a parent, or adult living in your home: Hit you so hard that you had marks or were injured?” (3) “Some young people go to school or to bed hungry because there is not enough food at home. How often does this happen to you?”. 4 responses were given to the previous question “Never”, “sometimes”, “often” or “always”.

Bullying: one question was a determinant for bullying which is “How often have you been bullied at school in the past two months?”, responses were “I have not, “it only happened once or twice “ “2 or three”, “once a week” or “ several times a week”. One point was given to any positive answer regardless the frequency.

Community violence: this part included 2 questions on violence carried by the Israeli military or settlers (1) As a result of the Israeli military/settler incursions in the last 12 months: Viewing the shooting of a friend in front of you?” (2) “As a result of the Israeli military/settler incursions in the last 12 months: Viewing the shooting of your father or a brother or sister or a relative of yours in front of you?”. Responsing yes to any of the questions contributed one point to this part.

Collective violence: this part included violence carried by the Israeli's military of settlers on the child or witnessed by the child. it comprised 6 questions: (1) "As a result of the Israeli military/settler incursions in the last 12 months: hearing about killing your friend? " (2) "As a result of the Israeli military/settler incursions in the last 12 months : hearing about killing your father or a brother or sister or a relative of yours" (3) " As a result of the Israeli military/settler incursions in the last 12 months : seeing the killing of a friend of yours in front of you" (4) " As a result of the Israeli military/settler incursions in the last 12 months : seeing the killing your father or a brother or sister or a relative of yours?" (5) "As a result of the Israeli military/settler incursions in the last 12 months: Viewing your home destroyed by bombing or bulldozers?" (6) As a result of the Israeli military/settler incursions in the last 12 months: beaten and insulted by the military in the invasion. A "yes" response to any of the questions provided a point.

Emotional and Sexual Abuse: the ACE original questionnaire has the "sexual abuse" part as a separate part, however, in this study sexual abuse was altered to "emotional and sexual abuse" since the given questionnaire included reporting for both the emotional and sexual in one question "While you were growing up during your childhood years, You believe that you were emotionally or sexually abused?". This experience was expressed as a "yes" response to the question.

Results and discussion

Sample Characteristics

Participants Sample (n=5407) of Palestinian school children grade 5, 6, 7, 8, and 9 from West Bank. Participant socio-demographic characteristics by age group and gender are presented in Table 1. Participants are distributed uniformly between different age groups and genders, the sample was stratified according to grade level and gender type in about 20 % of each grade. The respondents was distributed as 34% boys and 66% girls.

Differences in study variables by gender

The difference between gender in terms of emotional neglections, abuse, physical, Posttraumatic stress symptoms, tobacco use, experience violence, Psychosomatic symptoms, and life satisfactions distribution by gender are presented in table 1. Girls reported higher scores than boys on emotional neglect, emotionally abused, physically neglected and bullying smoking was also reported higher for girls at 9.4% however, both community violence and collective violence were higher for boys than girls.

Table 1: Sample characteristic and ACE results.

Characteristics	Total (N= **5407**)		Females (N= 3578)		Male (N=1829)		P
	n	%	N	%	N	%	
Age (mean,SD)						13%	
11-12	2294		1419		746		
13-14	2298		1449		734		
15	1123		710		349		
ACE							
Physical abuse	143	2.6	90	2.5	53	2.9	0.39
Emotional abuse	4529	84.7	3006	84	1523	83	0.74
Physical neglect	5038	93	3346	94	1692	92.5	0.84
Emotional neglect	1701	31.5	1160	32	541	29.6	0.07
One or no parents, one or no parents, parental separation or divorce	14	0.3	11	0.3	3	0.2	0.34
emotional & Sexual	4920	91	3074	91.5	1566	85.6	0.854

abuse							
Bullying	1251	23.1	844	23.6	407	22.3	0.31
Community abuse	513	9.5	343	1	170	9.3	0.71
Collective violence	296	5.5	190	5.3	106	5.8	0.46
Smoking	491		337	9.4	154	8.4	.271
Grade							
5			712		369		
6			706		378		
7			714		381		
8			735		353		
9			710		349		

Table2 smoking and ACE

ACE	**Smoking (p value)**
Physical abuse	0.00
Emotional abuse	0.00
Physical neglect	0.00
Emotional neglect	0.00
One or no parents, one or no parents, parental separation or divorce	0.47
emotional & Sexual abuse	0.00
Bullying	0.00
Community abuse	0.02
Collective violence	0.66

There was significant association between smoking and most of the ACEs except for “collective violence” and “One or no parents, one or no parents,

parental separation or divorce", however, it should be noted that the prevalence of smoking was very low, thus the results may be false positive

Conclusion

In conclusion, it is evident that children in the West Bank frequently exposed to all types of neglect and abuse. The results of the study indicate that highly reported exposure to traumatic events are associated with an increased emotional difficulty, and this increase is associated with gaps in the cognitive development. In addition to this ACEs was associated with Smoking behaviors

The psychosocial status plays an important role in a child's ability to gain knowledge, and one factor that influences this status is a child's exposure to traumatic and other adverse experiences.

Thus study is one of the first to collected data on ACE from children as most of the studies data are collected from the adults retrospectively. For future recommendations, to further reduce recall bias, we have only classified reporting as the statement of abuse being 'very often true' as ACE, thus adopting a conservative approach for this phenomenon. Yet, even with this conservative approach, it is evident that children in the West Bank are frequently exposed to all types of neglect and abuse.

Limitation

Lack of causal implication due to the cross-sectional design of the study is a major limitation. The causal association between ACE's and health outcomes in children cannot be established.

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