# RESEARCH

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# Adverse childhood experiences and their influence on psychological well-being and emotional intelligence among university students

Seema Irshad<sup>1\*</sup> and Ayoob Lone<sup>1</sup>

# Abstract

**Background** Adverse Childhood Experience (ACEs) have been linked to several detrimental health outcomes, including poor mental health. Due to the change from high school to college life and the increasing pressures, university students are especially susceptible to the harmful effects of ACEs. Emotional intelligence (EI) has been identified as a protective factor against the negative impact of ACEs on psychological well-being (PWB).

**Objectives** This study aims to explore and examine the relationship between ACEs, PWB, and El among university students in Al-Hasa Governorate of Saudi Arabia.

**Methodology** A cross-sectional study was carried out with a convenience sample of 272 university students recruited from different academic disciplines in King Faisal University, Al-Hasa, Saudi Arabia. Participants completed a webbased survey in which they were asked to retrospectively self-report on ACEs, PWB and El. Chi-square and t-tests were performed to examine differences in demographic characteristics, and ACE scores. Linear regression model was applied to predict the PWB and El from total ACE score and *p* value was considered statistically significant at *p* < 0.05.

**Result** Only 27.5% of the study sample experienced no ACEs, and 18.01% participants experienced  $\ge 4$  ACEs. Participants aged between 18–24 years old had a significantly higher frequency of ACEs for emotional abuse (p=0.01), emotional neglect (p=0.01), and household mental illness (p=0.01) than the other age group. Results clearly revealed that participants who had never experienced any ACE's reported better PSW and high El. Correlation results indicated fair to moderately strong relationship between ACE, PSW and El. ACE was found significant predictor of autonomy ( $r^2$ =.11, b=-.75, p<0.01), environmental maturity ( $r^2$ =.15, b=-.90, p<0.01), personal growth ( $r^2$ =.10, b=-.77, p<0.01), positive relations ( $r^2$ =.07, b=-.67, p<0.01) and self-acceptance ( $r^2$ =.19, b=-1.17, p<0.01) dimensions of PWB. Appraisal of own emotions (p<0.05), regulation of others emotions (p<0.05), and utilization of emotions (p<0.01) were found significant predictors of ACE.

**Conclusion** These findings may have implications for mental health professional and university administration, as students with higher number of adverse experiences need higher level of service and support.

Keywords Adverse childhood experiences, Psychological well-being, Emotional intelligence

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## Introduction

Childhood is a time of significant cognitive, behavioral, physical, and emotional growth and is therefore seen to be a vulnerable time [1]. Children require a secure and nurturing environment free from violence for optimal development [2]. Adverse childhood experiences (ACEs) encompass different types of abuse (physical, emotional, and sexual), neglect, and household dysfunction, including substance abuse, domestic violence, and mental health issues [3, 4]. Such experiences disrupt typical developmental processes, often causing difficulties in emotional regulation, cognitive functioning, and an increased risk of psychological distress. ACE exposure can trigger the brain's stress response system, leading to prolonged toxic stress, which negatively impacts neurobiological development and long-term health outcomes [4].

Exposure to traumatic events is associated with changes in brain function. For instance, it can trigger the fightflight-freeze response, causing the release of the protective hormone corticotropin during stressful situations [5]. However, frequent activation of this response and the continuous release of corticotropin-releasing hormones may result in a prolonged state of heightened alertness, preventing the child from returning to a calm state and ultimately leading to chronic stress. The persistent elevation of the neurological state compromises executive functioning, memory, and attention deficiencies, which may subsequently hinder the completion of academic activities [6]. Following early life stress, it has been discovered that these pathophysiological changes are linked to depressive symptoms and suicidality [7]. Additionally, life transitions of emerging adulthood (aged 18-29-as among university students) may cause stress and psychological distress, which may exacerbate the already-existing childhood trauma, leading to worse self-rated health and life satisfaction, depressive symptoms, anxiety, illicit drug use, excessive alcoholism, mental illness, and risky sexual behavior [4, 8].

ACE's are recognized as potentially traumatic events that can have lasting impacts on an individual's health and overall well-being [9]. Previous research indicates that individuals with a history of ACEs are at an increased risk of developing various mental health disorders, including depression, anxiety, substance abuse, selfharm, and suicidal behavior [10-13]. ACEs contribute to chronic toxic stress, which has been associated with alterations in molecular and genetic structures during childhood, ultimately disrupting physiological processes [14, 15]. Research suggests that toxic stress is associated with dysfunction in allostatic systems, including the immune, endocrine, and nervous systems [16, 17]. Studies indicate that ACEs increase the likelihood of developing chronic illnesses [18], mental health disorders [19, 20], and even premature mortality [21-23].

There is presently a dearth of research on the relationship between ACEs and psychological well-being (PWB) among university students. However, a lot of research is conducted on the general adult population or vulnerable children [24, 25]. In recent years, there has been a growing focus on how ACEs affect university students' PWB [26]. According to research, university students are widely recognized as a vulnerable group that suffers from greater levels of psychological issues such as depression, anxiety, and post-traumatic stress disorder [27]. Other studies also reported that ACE was linked with poor academic performances and increased the risk of dropping out of university [28, 29]. Student who have experienced childhood ACEs are more likely to participate in hazardous behavior such as substance misuse and unprotected sex than their counterparts without a history of ACE [30, 31].

Throughout the past few decades, there has been a substantial advancement in the body of knowledge regarding the detrimental consequences that childhood adversity has on adult physical and mental health. For instance, the ACEs framework has offered a method for quantifying past childhood hardships and determining how they have affected one's health in later life [2]. According to studies, there is a dose-responsive relationship between ACEs and poor outcomes, meaning that the more ACEs a person experiences, the higher their risk of engaging in risky sexual behavior, substance abuse and health problems like obesity and cancer, and eventually dying young [32–34]. The connections between ACEs and psychological issues have received a lot of attention in studies on the long-term effects of ACEs. In Saudi Arabia, 87.7% of participants reported having at least one adverse childhood experience, while 49.2% reported having four or more [35, 36]. Whether ACE is a stressor or a trauma, it's essential to recognize it and find strategies to reduce its lasting impact on the person. It is crucial to stress that, even though ACEs can have detrimental effects on an adult's life, an individual's emotional intelligence may influence how well they can cope with that trauma.

Emotional intelligence (EI), or the ability to identify, regulate, and manage emotions, has been identified as one of the strongest protective variables against the negative consequences of ACEs [37]. According to the literature, those with higher EI are more likely to manage their emotional reactions to stressors, which reduces the psychological weight of ACEs. EI also promotes adaptive coping, making people less prone to depression and anxiety [38]. Findings from other studies reported the advantages of EI to life happiness, academic success, enhanced mental well-being, and an overall better quality of life [39]. Another research reported that those with high emotional intelligence were less likely to have depressive symptoms because they were better at controlling their emotions and employed problem-focused coping techniques [40]. Kong et al. (2019) mentioned that life satisfaction is one of the well-known benefits of EI. Individuals' EI may develop after a traumatic incident, enhancing their ability to manage and, as a consequence, experiencing less post-traumatic stress in the long term [41].

A growing number of studies have contributed to the knowledge of AECs in the general adult population and vulnerable children, including the prevalence and outcome. University students go through a unique transition phase marked by increased independence and academic stress, which can exacerbate pre-existing psychological vulnerability associated with ACEs [42]. According to research, university students who have experienced ACEs are more likely to develop anxiety, depression, or post-traumatic stress disorder [43]. Furthermore, ACE exposure has been connected to academic underachievement, recurrent dropping out, and involvement in risky behaviors such as drug misuse and unsafe sex [44]. However, there is still a gap in the literature regarding whether ACEs are associated with psychological well-being and emotional intelligence among university students. To fill this knowledge gap, the present study aims to investigate the prevalence of cumulative ACE exposure, PWB, and EI among a sample of Saudi university students. Specifically, it was hypothesized that an increase in the number of commutative ACE exposures would be associated with poor PWB and higher emotional intelligence among these students.

# Materials and methods

# Study design

The undergraduate and graduate students of King Faisal University participated in this web-based, cross-sectional survey between April, 2024 to August 2024. Ethical approval was granted by the Deanship of Scientific Research at King Faisal University in AlHasa, Saudi Arabia in compliance with the Helsinki Declaration on research involving human subjects. Every participant was informed about the purpose and objectives of the research, and the survey was conducted after all necessary ethical requirements were met.

### Participants

We recruited participants from all colleges of King Faisal University, including undergraduate and graduate students. A total of 324 participants were recruited to participate in the study voluntarily, and 272 students (Males = 129; Females = 143) finally completed the questionnaire with an 83.95% response rate. The other 52 students were excluded from the final analysis because of

missing or incomplete answers in the questionnaire. The poor response rate was because some students passed the semester examination. The sample size of this study was calculated by using Slovin's formula with the population size of 338 participants from the previously published study by Alhowaymel and Alenezi [45] with a confidence interval of 0.95 and margin of error of 0.05. The inclusion criteria were male and female Saudi university students aged > 18 years and who provided informal consent to participate in the study. Respondents who have one or more of the following reasons, such as < 18 years, high school students, and non-Saudi, were excluded.

# Measures

## ACE

The purpose of this survey was to assess the total number of ACE exposures that took place before the age of 18. Cumulative ACE exposure was evaluated by using the ACE-Q [46]. The ACE-Q is widely used in public health and medical research, as well as clinical setting, to help identify and address the effect of early childhood trauma on a person's health and well-being. The ACE-Q consists of 10-items covers the ten areas of ACEs): emotional, physical, and sexual abuse throughout childhood; emotional and physical neglect; substance abuse in the home; mentally ill family members; criminal family members; family violence; and parental separation or divorce. Each category receives one point ("yes"=1 or "no"=0) to calculate the ACE score. The overall ACE score, which ranges from 0 to 10, is then calculated by adding the 10 indications. As a result, ACEs can be classified as either absent (total ACE score = 0) or present (total ACE score > 1). The ACE Questionnaire has great internal consistency, with Cronbach's alpha values ranging from 0.77 to 0.88 in many studies, showing good reliability across samples. Additionally, test-retest reliability has been demonstrated, with findings that remain consistent over time [47]. This implies that the ACE Questionnaire is a valid and reliable instrument for assessing adversity throughout childhood. In the present study, the reliability coefficient (Cronbach's  $\alpha$ ) for ACE-Q was 0.81.

#### Psychological well-being questionnaire

The 18 items PWB [48] is a self-report instrument that comprises 18 items measuring six dimensions of PWB: self-acceptance, positive relationships with others, environmental mastery, personal progress, autonomy, and the meaning of life. A 7-point Likert scale was used to rate the responses, (strongly agree = 1 and extreme disagree = 7). Add up respondents' responses to each subscale question to determine each participant's subscale score. Higher score of PWB inventory indicates better PWB.

This questionnaire has good internal consistency, with Cronbach's alpha values reported to be more than 0.70 across all dimensions, suggesting significant reliability. Previous study reported that Cronbach's alphas for PWB, including environmental mastery, personal development, and autonomy, ranged from 0.86 to 0.93 [48]. However, in the present study, internal consistency reliability (Cronbach's alpha) of different subscales of PWB was 0.89 (self-acceptance), 0.91 (positive relationships with others), 0.88 (environmental mastery), 0.92 (personal progress), 0.88 (autonomy), and 0.91(the meaning of life).

#### Brief emotional intelligence scale- 10 (BEIS-10)

Emotional intelligence was measured using brief emotional intelligence scale [49], This 10 item scale modeled on the Schutte Emotional Intelligence Scale [50] and the emotional intelligence framework proposed by Salovey and Mayer (1990) [51]. The BEIS-10 consists of 10 self-administrated items measuring five components of emotional intelligence: utilization of emotions, own emotions, regulation of own emotions, others emotions, and regulations of others emotions [49]. To get an overall emotional intelligence score, each item was assessed on a Likert scale from 1 (agree) to 3 (disagree). It is important to mention that the scores of the BEIS-10 were reversed so that the higher the emotional intelligence score, the lower the level of emotional intelligence. The BEIS-10 has excellent internal consistency, with Cronbach's alpha scores ranging from 0.87 to 0.90, suggesting acceptable dependability [49].

#### Demographic information

To gather general participant information, socio-demographic characteristics such as gender, age, education level, financial situation, and marital status were incorporated.

#### Procedure

The study was carried out among Saudi Arabian college students at King Faisal University. Students from various socioeconomic backgrounds, male and female students, and students attending medical and non-medical colleges made up the target group. The widely-used Google Survey platform (Google LLC, Mountain View, California, USA) was utilized to conduct the online survey. After being properly informed the purpose of the study, every responder voluntarily consented to take part. The link to the survey was sent to students by email, QR code, and through the University messaging system. Participants received no monetary reward for this research. Participant's information through the online questionnaire was anonymous, and the answers were only utilized for statistical analysis.

#### Statistical analysis

Statistical tests were performed by SPSS software (version 27.0, SPSS, Inc., Chicago, IL, USA). Descriptive statistics were calculated using univariate analysis to determine the proportions and means of participants' demographic characteristics, types of ACEs, total number of ACEs, and ACE scores. Bivariate analyses, including t-tests for continuous variables and chi-square tests for categorical variables, were performed to examine differences in demographic characteristics, and ACE scores. Subsequently, one-way ANOVA was employed to explore the associations between the cumulative number of ACEs and various outcomes. (i.e. PWB and EI). Correlations between ACE's and different dimensions of PWB and EI were investigated by Spearman's correlation. Finally, linear regression model was applied to predict the PWB and EI from total ACE score. A value of p < 0.05 was accepted as statistically significant.

#### Results

The present study invited 324 students from different colleges of King Faisal University, Alhasa, Saudi Arabia. A total of 272 students (Males = 129; Females = 143) finally completed the questionnaire. The other 52 participants were reluctant to respond all items of the questionnaire were excluded. Table 1 shows that majority of participants (93.01%) were undergraduates and 19 (6.98%) were graduates. Regarding ACE types, a significant proportion of participants reported emotional abuse (42.64%), followed by physical abuse (31.25%), and emotional neglect (30.51%). Incarcerated household member a type of ACE (5.51%) was least reported by the study sample. As for ACE categories, majority of participants (27.57%) experienced no adverse childhood experience, and 18.01% participants experienced  $\geq 4$  adverse childhood experiences.

The frequency of all dimensions of ACEs for sociodemographic characteristics of the study participants presented in Table 2 shows that respondents aged between 18-24 years old had a significantly higher frequency of adverse childhood experiences for emotional abuse (p=0.01), emotional neglect (p=0.01), and household mental illness (p=0.01) than the other age group. No significant differences were found between adverse childhood experiences in terms of gender, educational level, marital status, and family income.

The distribution of demographic variable scores by ACE's score categories is presented in Table 3. Results indicated that participants aged between 18–24 years old had more frequency in adverse childhood experiences (p=0.04), as compared to participants aged 25–36 years old. Among 18–24 years age group, 24.47% of participants experienced no adverse childhood experience. However, nearly 16% of participants reported  $\geq$  4 times of adverse childhood experience.

**Table 1** Demographic characteristics of participants and descriptive statistics of ACEs

Gender         I29         47.42           Male         129         47.42           Female         143         52.57           Age category         18-24 years         256         94.11           25-36 years         16         5.88           Educational level         Undergraduates         253         93.01           Graduate         19         6.98           Marital status         Unmarried         184         67.64           Married         75         27.57         Divorce         13         4.78           Family income         Lower middle class         58         21.32         Middle class         114         41.91           Upper middle class         58         21.32         Middle class         12.87         ACE type           Emotional abuse         116         42.64         Physical abuse         56         20.59           Emotional neglect         83         30.51         Physical neglect         83         30.51           Physical neglect         38         13.97         Parental separation         30         11.03           Witness violent threat of mother         48         17.65         10.05           Household mental illn	Characteristics	N (272)	%
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Emotional neglect8330.51Physical neglect3813.97Parental separation3011.03Witness violent threat of mother4817.65Household substance abuse207.35Household mental illness6222.79Incarcerated household member155.51ACE score (Mean, SD)11.71±1.47407527.5716022.0625419.8533412.50≥44918.01	Sexual abuse	56	20.59
Physical neglect         38         13.97           Parental separation         30         11.03           Witness violent threat of mother         48         17.65           Household substance abuse         20         7.35           Household mental illness         62         22.79           Incarcerated household member         15         5.51           ACE Score (Mean, SD)         1.71±1.47           ACE Score Categories         20.06           2         54         19.85           3         34         12.50           ≥4         49         18.01	Emotional neglect	83	30.51
Parental separation       30       11.03         Witness violent threat of mother       48       17.65         Household substance abuse       20       7.35         Household mental illness       62       22.79         Incarcerated household member       15       5.51         ACE Score (Mean, SD) $1.71 \pm 1.47$ ACE Score Categories         0       75       27.57         1       60       22.06         2       54       19.85         3       34       12.50         ≥4       49       18.01	Physical neglect	38	13.97
Witness violent threat of mother4817.65Household substance abuse207.35Household mental illness6222.79Incarcerated household member155.51ACE Score (Mean, SD) $1.71 \pm 1.47$ ACE Score Categories7527.5707527.5716022.0625419.8533412.50 $\geq 4$ 4918.01	Parental separation	30	11.03
Household substance abuse207.35Household mental illness6222.79Incarcerated household member155.51ACE Score (Mean, SD) $1.71 \pm 1.47$ ACEACE Score Categories7527.5716022.0625419.8533412.50 $\geq 4$ 4918.01	Witness violent threat of mother	48	17.65
Household mental illness         62         22.79           Incarcerated household member         15         5.51           ACE Score (Mean, SD)         1.71±1.47           ACE Score Categories         75         27.57           1         60         22.06           2         54         19.85           3         34         12.50           ≥4         49         18.01	Household substance abuse	20	7.35
Incarcerated household member         15         5.51           ACE Score (Mean, SD)         1.71±1.47         XCE           ACE Score Categories         75         27.57           1         60         22.06           2         54         19.85           3         34         12.50           ≥4         49         18.01	Household mental illness	62	22.79
ACE Score (Mean, SD)       1.71±1.47         ACE Score Categories       75       27.57         0       75       22.06         2       54       19.85         3       34       12.50         ≥4       49       18.01	Incarcerated household member	15	5.51
ACE Score Categories           0         75         27.57           1         60         22.06           2         54         19.85           3         34         12.50           ≥4         49         18.01	ACE Score (Mean, SD)	$1.71 \pm 1.47$	
	ACE Score Categories		
	0	75	27.57
2     54     19.85       3     34     12.50       ≥4     49     18.01	1	60	22.06
3         34         12.50           ≥4         49         18.01	2	54	19.85
≥4 49 18.01	3	34	12.50
	≥4	49	18.01

Table 4 presents the mean scores and standard deviations for the psychological well-being (PWB) dimensions, alongside the corresponding F-values. Our analysis revealed significant differences in the psychological wellbeing of participants based on their exposure to ACEs. Those who had never experienced any ACEs reported significantly higher levels of autonomy, environmental mastery, personal growth, positive relations, and selfacceptance, compared to those who had experienced one or more ACEs. This suggests that a lack of ACEs is associated with greater well-being across multiple dimensions. However, an intriguing exception was observed in the purpose of life dimension, where participants with four or more ACEs reported higher scores, indicating that ACE exposure may contribute to a stronger sense of purpose for some individuals.

Results presented in Table 4 revealed significant differences in the emotional intelligence of participants based on their exposure to ACEs. The participants who had never experienced any ACEs reported significantly higher levels of emotional intelligence across all dimensions, including the appraisal of own emotions, appraisal of others' emotions, regulation of own emotions, regulation of others' emotions, and utilization of emotions, compared to those who had experienced one or more ACEs. This indicates that lower exposure to ACEs is associated with greater emotional intelligence in several key areas.

The Spearman coefficient of correlation determined the correlation between ACE's, PWB and EI. Results presented in Table 5 revealed fair to moderately strong correlation between ACE's, PWB and EI. The correlation analysis found that ACE were significantly and negatively associated with all dimensions of PWB (except purpose of life) and EI. This indicates that participants who had no ACE reported better PWB and higher EI. The results also found positive and significant correlation between all dimensions of PWB and EI.

In order to examine whether ACE predicted PWB and EI of participants, linear regression analysis was applied separately for each of the dependent measures. Result presented in Table 6. revealed ACE as significant predictor of autonomy ( $r^2 = 0.11$ , b = -0.75, t = -5.72, p < 0.01), environmental maturity ( $r^2 = 0.15$ , b = -0.90, t = -6.39, p < 0.01), personal growth ( $r^2 = 0.10$ , b = -0.77, t = -5.87, p < 0.01), positive relations ( $r^2 = 0.07$ , b = -0.67, t = -4.67, p < 0.01) and self-acceptance ( $r^2 = 0.19$ , b = -1.17, t = -8.01, p < 0.01) dimensions of PWB explaining 11%, 15%, 10%, 7%, 19% and 21% variance in the dependent measures respectively. Overall PWB was also found significantly predicted by ACE ( $r^2 = -4.15$ , b = -0.24, t = 8.60, p < 0 0.01) which explained 21% variance in the scores on overall PWB. Negative relation of ACE with the dimensions of PWB clearly indicated that with increasing adverse childhood experience, the problems PWB as reported by the participants decreased significantly.

Result of regression analysis predicting EI from scores on the measure ACE revealed ACE as significant predictor of appraisal of own emotions ( $r^2=09$ , b=-0.24, t=-5.16, p<0.01), appraisal of others emotions ( $r^2=0.03$ , b=-0.18, t=-3.10, p<0.05), regulation of own emotions ( $r^2=0.04$ , b=0.17, t=-3.11, p<0.05), regulation of others emotions ( $r^2=0.04$ , b=.-0.20, t=3.22, p<0.05),

	EA	PA	SA	EN	PN	PS	WVT	HSA	НМІ	ІНМ
Gender										
Male (n)	60	36	26	45	20	15	26	10	28	9
%	2206	13.23	9.56	16.54	7.35	5.51	9.56	3.68	10.29	3.31
Female (n)	56	49	30	38	18	15	22	10	34	6
%	20.59	18.01	11.03	13.98	6.62	5.51	8.09	3.68	12.50	2.20
Age category										
18–24 years (n)	104**	77	50	73**	36	28	43	19	54**	14
%	38.23	28.31	18.38	26.84	13.23	10.29	15.81	6.98	19.85	5.15
25–36 years (n)	12	8	6	10	2	2	5	1	8	1
%	4.41	2.94	2.20	3.68	0.73	0.73	1.84	0.37	2.94	0.37
Educational level										
Undergraduates (n)	105	77	51	75	35	28	45	18	57	14
%	38.60	28.31	18.75	27.57	9.19	10.29	16.54	6.62	20.95	5.15
Graduate (n)	11	8	5	8	3	2	3	2	5	1
%	4.04	2.94	1.84	2.94	1.10	0.73	1.10	0.73	1.84	0.37
Marital status										
Unmarried (n)	81	56	36	51	27	17	33	14	40	9
%	29.78	20.59	13.23	18.75	9.93	6.25	12.13	5.15	14.70	3.31
Married (n)	31	26	18	28	10	11	12	4	20	4
%	11.40	9.56	6.62	10.29	3.68	4.04	4.41	1.47	7.35	1.47
Divorce (n)	4	3	2	4	1	2	3	2	2	2
%	1.47	1.10	0.73	1.47	0.37	0.73	1.10	0.73	0.73	0.73
Family income										
Lower middle class(n)	29	20	14	18	11	10	10	4	18	5
%	10.66	7.35	5.15	6.62	4.04	3.68	3.68	1.47	6.62	1.84
Middle class	48	42	20	34	13	10	26	8	26	7
%	17.65	15.44	7.35	12.5	4.78	3.68	9.56	2.94	9.56	2.57
Upper middle class (n)	25	13	14	16	12	7	8	7	10	2
%	9.19	4.78	5.15	5.88	4.41	2.57	2.94	2.57	3.68	0.73
Upper class (n)	14	10	8	15	2	3	4	1	8	1
%	5.15	3.68	2.94	5.51	0.73	1.10	1.47	0.37	2.94	0.37

Table 2         Frequency of ACE type by sociodemographic characteristic	CS
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EA Emotional abuse, PA Physical abuse, SA Sexual abuse, EN Emotional neglect, PN Physical neglect, PS Parental separation, WVT Witness violent threat of mother, HAS Household substance abuse, HMI Household mental illness, IHM Incarcerated household member

**Bold:** \*\**p* < 0.01

and utilization of emotions ( $r^2$ =0.06, b=0.20, t=4.13, p<0.01), explaining 9%, 3%, 4%, 4%, and 6% variance in the dependent measures respectively. Negative relation of ACE with the dimensions of emotional intelligence clearly indicated that with increasing adverse childhood experience, the problems of EI decreased significantly.

# Discussion

The current study is the first of its kind in Saudi Arabia to be conducted among university students exploring the exposure of ACE's and its possible relationship with PWB and EI. The present study gathered evidence of an overwhelming high burden of ACE among university students, highlighting the importance of child protection in the country. Results from the present study indicated that a significant proportion of participants experienced emotional abuse followed by physical abuse and emotional neglect. These results are consistent with previous findings, especially regarding emotional abuse [52–55]. It is important to acknowledge the serious and harmful nature of emotional abuse in any context, including Saudi Arabia. Such abusive behaviors can have lasting negative effects on a person's mental and physical well-being. In many cases, emotional abuse can be just as damaging as physical abuse, as it can erode a person's self-esteem, sense of self-worth, and mental health. In the context of Saudi Arabia, it is crucial to address these issues with sensitivity and recognition of cultural norms and legal frameworks.

	ACE's Score	ACE's Score Categories							
			Low risk		High risk	P value			
	0	1	2	3	<u>≥</u> 4				
Gender						0.16			
Male (n)	27	34	27	18	23				
%	20.93	12.50	9.93	6.62	8.45				
Female (n)	48	26	27	16	26				
%	17.65	9.56	9.93	5.88	9.56				
Age category						0.04*			
18–24 years (n)	72	60	51	30	43				
%	24.47	22.06	18.75	11.03	15.80				
25–36 years (n)	3	0	3	4	6				
%	1.10	0	1.10	1.47	2.21				
Educational level						0.21			
Undergraduates (n)	70	59	50	29	45				
%	25.73	21.69	18.38	10.66	16.54				
Graduate (n)	5	1	4	5	4				
%	1.84	0.37	1.47	1.84	1.47				
Marital status						0.29			
Unmarried (n)	56	39	33	22	34				
%	20.59	14.34	12.13	8.09	12.50				
Married (n)	14	17	20	12	12				
%	5.15	6.25	7.35	4.41	4.41				
Divorce (n)	5	4	1	0	3				
%	1.84	1.47	0.37	0	1.10				
Family income						0.45			
Lower middle class (n)	10	12	15	9	12				
%	3.68	4.41	5.51	3.31	4.41				
Middle class	36	21	19	15	23				
%	13.23	7.72	6.98	5.51	8.45				
Upper middle class (n)	22	18	11	7	9				
%	8.09	6.62	4.04	2.57	3.31				
Upper class (n)	7	11	9	3	5				
%	2.57	4.04	3.31	1.10	1.84				

#### Table 3 Prevalence of ACE's according to demographic characteristics

Score 0–3 in Adverse childhood experience = Low risk, Score  $\geq$  4 in Adverse childhood experience = High risk

\*\*p<0.01

As for the cumulative number of ACE's, approximately three-fourths of the study sample experienced at least one ACE, and our results are matched with the results of the previous study conducted locally [56, 57] and internationally [58–60]. Several factors can contribute to a potentially high prevalence in any given country, including Saudi Arabia. One reason for the high prevalence of ACEs in Saudi Arabia could be societal norms and cultural practices that may inadvertently increase the risk of such experiences for children. For example, strict gender roles, family honor, and societal expectations may lead to instances of abuse or neglect within households [61]. The emphasis on family privacy and the stigma associated with discussing personal issues openly could also prevent children from seeking help or reporting abuse [62]. Additionally, awareness or acknowledgment of the impact of childhood trauma on long-term health outcomes may result in underreporting or insufficient interventions to support affected individuals. Previous studies also revealed that those with greater ACEs scores have worse psychological health, including higher stress, anxiety, and

<sup>\*</sup>p<0.05

Table 4 Means, standard deviations and analysis of variance of psychological well-being and emotional intelligence for adverse childhood experience

	ACE Score Categories										
Psychological wellbeing			High ris	High risk							
			1		2		3		≥4		
	М	SD	М	SD	М	SD	М	SD	М	SD	F Value
Autonomy	15.56	2.62	14.61	3.91	14.40	3.17	14.58	2.48	11.93	2.77	10.60**
Environmental mastery	15.76	3.03	15.33	3.12	15.20	2.82	14.20	3.18	11.73	3.15	14.99**
Personal growth	17.09	3.11	16.16	3.57	15.20	3.38	15.64	3.20	13.63	3.90	8.12**
Positive relation	14.52	3.55	13.71	3.88	13.07	3.15	11.23	2.73	12.30	3.14	6.89**
Purpose of life	12.69	3.49	12.00	3.18	11.03	2.92	12.20	3.78	13.32	2.62	3.74**
Self-acceptance	17.30	3.53	16.16	3.68	15.09	3.53	14.02	3.42	12.53	3.18	15.95**
Emotional intelligence											
Appraisal of own emotions	5.40	0.98	5.38	1.05	5.33	0.99	4.94	1.39	4.34	1.28	8.57**
Appraisal of others emotions	5.30	1.19	4.76	1.47	4.87	1.54	4.88	1.34	4.40	1.68	3.01*
Regulation of own emotions	5.14	1.07	4.78	1.36	4.81	1.30	4.73	1.42	4.34	1.49	2.79*
Regulation of others emotions	5.13	1.28	4.58	1.49	4.79	1.35	4.82	1.40	4.10	1.66	4.05**
Utilization of emotions	5.53	0.94	5.01	1.20	5.24	1.04	5.35	0.94	4.40	1.58	7.59**

\*p < 0.05

\*\**p* < 0 .01

#### Table 5 Intercorrelation between ACE's, PWB and El

	1	2	3	4	5	6	7	8	9	10	11	12
			_	-	_		_	_	_			
1. Adverse Childhood Experience	1											
Psychological wellbeing												
2. Autonomy	33**	1										
3. Environmental maturity	39**	.46**	1									
4. Personal growth	31**	.44**	.46**	1								
5. Positive relation	27**	.19**	.26**	.26**	1							
6. Purpose of life	.04	18**	12	.19**	.12	1						
7. Self-acceptance	44**	.43**	.61**	.40**	.31**	01	1					
Emotional intelligence												
8. Appraisal of own emotions	30**	.28**	.27**	.28**	.13*	19**	.27**	1				
9. Appraisal of others emotions	18**	.11	.20**	.26**	.07	.12	.08	.23**	1			
10. Regulation of own emotions	19**	.14*	.17**	.18**	.06	13*	.07	.27**	.15*	1		
11. Regulation of others emotions	19**	.17**	.10	.33**	.13*	.04	.11	.26**	.47**	.27**	1	
12. Utilization of emotions	24**	.18**	.21**	.27**	.05	.07	.14*	.22**	.36**	.38**	.32**	1

\*p<0.05

\*\*p<0.01

depression levels [63]. The development of emotional control was disrupted by early trauma, which had long-term psychological effects. Moreover, Gottfredson and Becker [64] research showed that early trauma reduces emotional intelligence, which makes it harder to control emotions [64].

The relationship between ACEs and sociodemographic variables we have found in the result that participants whose ages were between 18–24 years were significantly related to the emotional abuse, emotional neglect, and household mental illness of ACEs than the other age group. Similar findings were found in other studies [65, 66]. Many social, environmental, and family variables contribute to the higher prevalence of ACEs among the younger population. Since they are reliant on their careers and have little influence

Criterion variables	r <sup>2</sup>	F(1, 270)	ь	SE-b	t	95%Cl
PWB						
Autonomy	.11	33.08**	75	33	-5.72**	-1.00 - -0.49
Environmental maturity	.15	47.54**	90	39	-6.39**	-1.15 - -0.64
Personal growth	.10	29.10**	77	31	-5.87**	-1.05 - -0.49
Positive relation	.07	21.86**	67	27	- 4.67**	-0.95 - -0.38
Purpose of life	.01	.47	.09	.04	.69	-0.17 - 0.36
Self-acceptance	.19	64.24**	-1.17	43	-8.01**	-1.45 - -0.88
Overall PWB	.21	74.00**	-4.15	46	-8.60**	-5.12 - -3.21
EI						
Appraisal of own emotions	.09	26.61**	24	30	-5.16**	-0.33 - -0.15
Appraisal of others emotions	.03	9.09*	18	18	-3.10*	-0.30 - -0.06
Regulation of own emotions	.04	9.72*	17	19	-3.11*	-0.28 - -0.06
Regulation of others emotions	.04	10.40*	20	19	-3.22*	-0.31 - -0.07
Utilization of emotions	.06	17.32**	20	24	- 4.13**	-0.30 - -0.10

Table 6 Linear regression analysis predicting PWB and El from ACE's

\*p<0.05

\*\*p<0.01

over their surroundings, children and adolescents are particularly susceptible to suffering trauma. Family instability, poverty, substance misuse, and mental disorders are common problems that might expose people to ACEs. In addition, young people's growing brains and mental systems leave them more vulnerable to the long-term effects of these kinds of events.

Gender differences in ACE exposure warrant further consideration. There is evidence that women are more likely to report emotional and psychological abuse, although men may have been subjected to physical violence [67–70]. The expectation of Saudi society, as well as conventional gender roles, may influence ACE type and disclosure. For example, inflexible gender norms can increase the emotional restraint expectations on men, preventing them from expressing their emotions and reporting emotional abuse. Women, on the other hand, are more likely to face increased familial demands, leading to emotional withdrawal and psychological suffering. Gender disparities necessitate culturally relevant therapies that account for the unique obstacles that male and female ACE survivors face [71, 72].

Saudi Arabian culture and social life, such as family ties, parental expectations of discipline, and social stigma against mental illness, can all have an impact on ACE prevalence. Many Saudi studies have examined the effects of those components on childhood adversity [73–75]. According to research, collectivist cultures, such as Saudi Arabia, place a high value on privacy and family peace, which may hinder people from openly disclosing or getting help for childhood difficulties [73, 74]. Additional reasons contributing to underreporting in texts are being ignorant of laws about child abuse and avoiding situations out of fear of stigma [76]. Furthermore, social values of obedience and respect for authority might justify types of discipline that would otherwise be classified as emotional or physical abuse. A more detailed understanding of how these cultural influences impact ACE prevalence and reporting is required to guide the development of mental health therapies tailored to the Saudi settings. According to recent studies, community education about the impact of ACEs on long-term health and culturally appropriate prevention strategies are necessary [75, 76].

The results also showed that ACEs are significantly related to all dimensions of psychological well-being (autonomy, environmental maturity, personal growth, positive relations, purpose of life, and self-acceptance).

This result is in line with an increasing amount of research that shows the detrimental effects of traumatic childhood events on psychological health [77]. Adverse childhood experiences are significantly associated with several mental health issues, such as anxiety, depression, and mood disorders, according to several research [65]. Furthermore, other studies have shown that negative childhood experiences can still affect a person's psychological health even after considering other risk factors [66, 67]. In the pioneering study on adverse childhood experiences, Felitti et al. [46] established a robust connection between early childhood trauma and long-term mental health problems, such as anxiety, depression, and a worse quality of life [22]. This has been supported by further research, which demonstrates that people with higher ACE scores frequently have trouble controlling their emotions, which lowers their psychological wellbeing [78]. McLafferty et al. (2015) studies also show how ACEs affect self-esteem and emotional resilience, two essential elements of psychological well-being [79]. Regression analysis of the study also showed a negative relationship between ACE and the dimensions of PWB, indicating that when the severity or frequency of ACE rises, individuals reported considerably lower levels of psychological well-being. Many studies have documented the long-term effect of these ACEs on the psychological and mental functioning of individuals [47, 65]. Some studies have found that when parenting techniques are impacted by other elements like poor emotional warmth, decreased responsiveness, impaired attention, and unpredictable behavioral patterns, parental mental illness may have more negative effects on children's social and emotional development [80]. Read, et al. [81] also reported the same findings that exposure to such childhood adversity increases the risks of mental illness, additionally, other research showed that such adversity can cause epigenetic changes to gene expressions, which ultimately vulnerability to physical and psychological health problems [81]. These negative experiences also result in poor self-concept, more chances of having mental disorders, and problem in managing stress [82, 83].

ACE's and EI are closely related. The capacity to identify, comprehend, and regulate one's emotions and those of others is referred to as EI. Higher EI individuals are typically better at managing emotions and sustaining relationships, which frequently leads to better outcomes in terms of mental health. On the other hand, people with greater ACE experiences typically have lesser EI. This is explained by the disruption of emotional development caused by childhood trauma, which makes it more difficult for people to comprehend or control their emotions healthily. Studies repeatedly demonstrate that EI is more difficult for those with higher ACE scores [84]. Childhood trauma has a significant impact on social functioning, emotional awareness, and control. Ford and Gross [85] discovered that emotional processing is adversely affected by trauma, which makes it challenging for people to control their emotions and establish positive connections [85]. Likewise, Bastian et al., [86] discovered who have had ACEs frequently exhibit reduced emotional self-regulation, a crucial component of emotional intelligence [86]. It may be more difficult for these people to acquire the abilities required for emotional competence because of their impulsive and emotional reactivity issues. Furthermore, poor childhood experiences frequently disrupt established attachment patterns, which are necessary for the development of emotional intelligence and empathy in adulthood. It's more difficult to develop emotional resilience and good relationships later in life without these solid emotional foundations [87, 88].

Other research conducted by Martins, et al., [89], demonstrated a favorable correlation between higher EI and mental health, including less stress and increased life satisfaction [89]. Higher EI help people better understand and control their emotions, which mitigates the damaging psychological impacts of ACE's. However, research by Ford et al. [90] indicates that childhood trauma alters brain development, particularly in regions connected to emotional regulation, and can dramatically hinder the development of key emotional abilities [90]. Additionally, a study by Cohn et al. [91] highlights how emotional intelligence might mitigate the negative effects of ACE's on psychological health, implying that treatments aimed at enhancing EI could operate as protective factors. According to their findings, students with higher EI have more psychological resilience than those with lower EI, even in the face of strong ACEs [91].

Relevant theoretical frameworks must be incorporated to better understand the processes involved in the link between ACEs, PWB, and EI. According to attachment theory [92], adverse early experiences impact social interactions and emotional development. Individuals who have suffered ACEs develop insecure attachment patterns, further impairing their ability to manage their emotions and maintain healthy relationships in the future. This is particularly relevant to college students since unresolved attachment issues can make the transition to adulthood more stressful. According to neurodevelopmental theory, ACEs have a long-term impact on mental health and EI because they interfere with brain development. The chronic activation of stress hormones produces structural and functional changes in certain brain regions responsible for emotional regulation and executive functioning [93]. This emphasizes the importance of interventions that reverse these neurological effects, such as EI training and therapy.

ACEs, PWB, and EI are all correlated, which emphasizes how critical it is to address childhood trauma through interventions that improve EI to reduce the adverse effects of trauma on mental health. EI training should be taken into consideration by academic institutions and mental health professionals as a means of assisting those who have suffered from childhood trauma. This study also has some drawbacks, such as the use of self-reported data, which may add bias due to subjective views, and the cross-sectional design, which limits the capacity of this study to infer casual relationships. The study is conducted on the young university sample, which limits the application of the result to other populations, communities, and young people. Additionally, retrospective recollection of ACEs is at risk of memory loss, and the study didn't account for the possible confounding variables like family background and parental and family support. Due to this limitation, it is advised that future studies consider longitudinal designs, a more varied and larger sample, and a closer examination of contextual and cultural aspects.

#### Conclusion

The current study highlights the complex relationship between ACE's, PWB and EI among the college students in Kingdom of Saudi Arabia. The results of the study show that ACEs harm students' PWB, resulting in early-life adversity having long-lasting emotional and psychological consequences. EI on the other hand plays a mitigating role, with higher scores on EI associated with better PWB, even those students who reported significant ACEs. The importance of developing EI as a defense against the negative consequences of childhood trauma has been mentioned in the results of this study. A program that integrates EI training into counseling and educational environments might be more able to assist students who have experienced ACEs to feel better psychologically. The findings of the study also highlight the importance of early intervention techniques to deal with the psychological effects of early childhood trauma over the later years of life.

Despite the study's results adding to the understanding of how EI could reduce the negative effect of ACEs on PWB, more research is required to examine the relationships in different perspectives, cultures, and populations. This study has positive and fruitful results for educators, mental health professionals, and legislators to enhance students' resilience and well-being in the face of childhood adversity. Policymakers, healthcare professionals, and community leaders in Saudi Arabia need to address the root causes of ACEs through targeted interventions, public awareness campaigns, and improved access to mental health support services. By recognizing the prevalence of ACEs and implementing preventive measures, Saudi Arabia can work towards creating a safer and more supportive environment for children to thrive. Individuals, communities, and authorities in Saudi Arabia need to work together to raise awareness about the importance of addressing and preventing emotional abuse, physical abuse, and emotional neglect. This can be done through education, support services, counseling, and legal reforms to protect all individuals from such forms of harm.

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#### Authors' contributions

SI developed the study, took part in the study design, conducted the literature search, and wrote and submitted the manuscript. AL assisted with the study design, participated in data analysis, and aided in writing and editing the manuscript. All authors reviewed and approved the final version of the manuscript.

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#### Data availability

The datasets used and analyzed in the current investigation are accessible from the corresponding author upon reasonable request.

#### Declarations

#### Ethics approval and consent to participate

This research was conducted following the ethical principles established in the Declaration of Helsinki. Before data collection began, ethical approval was granted by the Institutional Review Board (IRB) at King Faisal University (KFU-REC-2023-MAY-ETHICS843), confirming that the study met the ethical standards for research involving human subjects. All participants provided informed consent prior to their involvement in the study. They received comprehensive information about the study's objectives, the voluntary nature of their participants and the confidentiality of their responses. Participants were guaranteed that their identities would remain anonymous and that they could withdraw from the study at any time without facing any negative repercussions.

#### **Consent for publication**

Not applicable.

#### **Competing interests**

The authors declare no competing interests.

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