Journal of Biostatistics and Epidemiology

J Biostat Epidemiol. 2022;8(3):314-327

Original Article

Study of Childhood Abuse and Anxiety: An Application of Logistic Regression

Sultana Mubarika Rahman Chowdhury*, Florence George, Sneh Gulati

Florida International University College of Medicine, Miami, USA.

ARTICLE INFO

Received 22.05.2022
Revised 05.06.2022
Accepted 13.06.2022
Published 15.10.2022

Key words:
Logistic Regression;
Logit model;
Survey data analysis;
Add Health;
Anxiety;
Panic Disorder

ABSTRACT

Introduction: Disorders can often lead to physical illness and suffering along with associated functional disability which hampers the overall well-being of a person. Consequently, it can lead to loss of productivity at the workplace, absenteeism, and social isolation which eventually affects the individual and the society. Researchers have found a crucial association between childhood traumatic experiences with developing anxiety or panic disorder.

Methods: The purpose of this study is to do a logistic regression on Add health survey data to examine whether a history of childhood abuse tends to lead to a diagnosis of anxiety or panic disorder in later life. Additionally, medical conditions such as ADHD, PTSD or socio-economic conditions, and addiction were also investigated for their possible contribution to developing anxiety or panic disorder.

Results: 49.4 % of respondents reported having faced either physical, emotional, or sexual abuse before the age of 18. Among the total respondents, 12.5 % reported having been diagnosed with anxiety disorder and among these individuals, 25.9 % reported having experienced physical abuse, 64.6 % faced emotional abuse, and 10.3 % said they faced sexual abuse earlier in their life. Results from logistic regression indicated gender (OR=2.069; 95% CI 1.627-2.7), race (OR=0.513; 95% CI 1.442-2.634), PTSD (OR=2.087; 95% CI 1.811-4.35), depression (OR 9.857; 95% CI 7.752-12.535) had a significant effect on developing anxiety. Additionally, an individual who experienced any kind of abuse in their childhood is 0.7 times (95% CI 0.527-0.841) more likely to develop the panic disorder later in their life.

Results from the unadjusted logistic regression model indicated that individuals who reported a history of childhood abuse have 1.799 times (95% CI 1.473-2.197) higher odds of being diagnosed with anxiety disorder. Interestingly, women have higher odds (OR= 2.039; 95% CI 1.624-2.560) of having anxiety disorder than men if they were a victim of childhood abuse. Respondents who reported to have faced at least one type of abuse have approximately 1.886 (95% CI 1.512-2.354) times' greater odds of having anxiety than those who didn't. Consecutively, experiencing the two types of abuse increased the odds to 2.502 (95% CI 1.930-3.244) finally undergoing all three types of abuse increased the odds by more than double in comparison to those who faced a single kind.

Conclusion: Childhood emotional abuse was found to be a more significant contributor to anxiety or panic disorder than other types of abuse. Any kind of childhood abuse experience seemed to have a greater effect on the female portion of the respondents in comparison to the males. Hence, to treat anxiety and panic disorders, childhood maltreatment and other mental illnesses like PTSD and depression should be considered by healthcare professionals to ensure optimal care. Furthermore, interventions targeting those issues need to be developed.

*.Corresponding Author: schow034@fiu.edu

Introduction

"What did your parents do to you when you were a child?" A phrase that should sound familiar to all of us. We have heard a similar phrase countless times in movies and sitcoms. The phrase though is not funny. Our childhood shapes our entire adult life. Had a happy childhood in a well-adjusted home and the chances are that you are well adjusted. Grew up in a home where parents were always fighting or abusing you (physically or emotionally), chances are you have self-esteem, anxiety and panic disorders. You worry whether you locked the door, whether you left the iron on or forgot to turn off the stove. You have a panic attack just when you are about to start a meeting and sometimes you are just too afraid to leave the house. There is ample evidence that anxiety disorder and panic disorder are the two most common forms of mental disorder among people of all ages worldwide[1] and society has always thought of mental health as a subject to be discussed behind closed doors. Before 1980, panic disorder was not considered a psychiatric condition. Only after the development of the Diagnostic and Statistical Manual (DSM)-III criteria was it considered a mental disorder.[2]

These disorders can often lead to physical illness and suffering along with associated functional disability which hampers the overall well-being of a person and results in significant economic burden. According to the Anxiety and Depression Association of America, around 6 million adults (which account for approximately 2.7% of the US population) are affected by panic disorders. Generalized anxiety disorder affects around 6.8 million adults accounting for 3.1% of the population. The burden of mental health disorders is not carried by the patients alone. People suffering from mental health disorders are likely to be less productive at work, be prone to substance abuse, be less successful in their relationships, in other words, these mental disorders are associated with outrageous health care cost and immense burden of disease.[3]

Numerous studies have consistently linked childhood traumatic experience to be a crucial factor in increasing the risk of anxiety and panic disorder in adults.[1,4,5] Individuals suffering from panic disorder were found to be 8.7 times more likely of having a past history childhood distress.[6] Researchers have found a crucial association between childhood traumatic experiences with developing anxiety or panic disorder later in their lives. For instance, the risk for psychiatric and substance abuse disorders as well as anxiety and panic disorder was seen to be increased in those who were subject to childhood sexual abuse.[7] In another study[8] childhood sexual abuse and childhood physical abuse were found common among individuals who also had three or more dissociative symptoms. Furthermore, stress disorders can also be the outcome of depression following a traumatic incident which results in anxiety, shock, agitation, and dissociation.[9] Epidemiological studies have been conducted on a wide range of national surveys in the search of factors that may lead to a disorder of such kinds. A positive association between psychiatric disorders and smoking has also been found in some studies.[10] Another cross-sectional study[11] concluded that anxiety disorder and disorder due to alcoholism go hand in hand, having one increases the odds of having the other substantially. Other mental disorders namely

Attention Deficit Hyperactivity Disorder (ADHD), post-traumatic stress disorder (PTSD), were also linked to anxiety or panic in various studies. According to the findings of a published review of ADHD in youth, there was a noticeable association between anxiety and social functioning in youth with ADHD.[12] This study also contributes to finding some key factors mostly sociodemographic or life experiences that may result in anxiety or panic disorder. The primary objectives are to find association between anxiety and panic disorder with history of childhood physical, mental, or sexual abuse, depression, addiction, ADHD, post-traumatic stress disorder (PTSD) using nationally representative longitudinal study known as Add Health data. In addition to finding the key factors effect of confounding variable Gender will also be explored to check whether the effects differ between Male and Female individuals.

The rest of this paper is organized as follows: Section 2 discusses the dataset and its origin along with the explanation of the variables selected for the analysis. In Section 3, descriptive statistics and outcomes from logistic regression analysis are presented and the results are discussed. Finally, section 3 presents the conclusions drawn from this work.

Data and Methodology

Data

The data used for the analysis is a nationally representative longitudinal study known as Add Health. It is a school-based longitudinal study of a nationally representative sample of adolescents in grades 7-12 in the United States in 1994-95.[13,14] The details of the methodology and data collection procedures can be found in Data have been collected from adolescents, their fellow students, school administrators, parents, siblings, friends, and romantic partners through multiple data collection components over the period of more than 20 years. The survey was conducted in four stages known as Wave I, Wave II, Wave III, Wave IV, and Wave V. A part of the complete data set was made public to facilitate independent researchers to investigate from a wide range of data relating to health and social behavior of the participants. The findings from the data set enable researchers to follow the cohort throughout the years and analyze adolescent behavior to future health outcomes. The public-use data set is available from different sources.

The Add Health study design used clustered study design and the clusters were selected with unequal probabilities. When units are sampled with unequal probability, it is necessary to give them corresponding unequal weights in the analysis.[15] Special statistical software is needed to run logistic regression analysis in such cases. To facilitate that, public-use data sets of Add Health made available have been properly weighted to account for the cluster sampling with unequal probabilities. In this analysis, the public use data set was used which was collected from The Data Sharing for Demographic Research (DSDR) project website.[16] To resolve this issue regarding clustered study design with unequal probabilities, SPSS version 25 was used which allows analyzing weighted datasets that are not independently and identically distributed. The study dataset includes a sample of 5114 observations from Wave IV which was conducted in the year 2008.

Methodology

Variables and Measurements

In this section, a brief explanation of the variables considered for the analysis and how they have been prepared is given.

Anxiety or panic disorder

Based on the self-reported positive response to the question "Has a doctor, nurse, or other health care provider ever told you that you have or had: anxiety or panic disorder?" The dependent variable was created that has been considered as the study variable in this analysis.

Predictor Measures

To create the variable for Abuse history in childhood a six-item questionnaire in the Wave 4 data set called "Mistreatment by adults" was used. The questionnaire includes questions that inquiry the respondents about facing emotional, sexual, or physical abuse in their earlier life. To measure emotional abuse the corresponding question was "Before your 18th birthday, how often did a parent or other adult caregiver say things that really hurt your feelings or made you feel like you were not wanted or loved? ". Sexual abuse was assessed by the question, "How often did a parent or other adult caregiver touch you in a sexual way, force you to touch him or her in a sexual way, or force you to have sexual relations?" Similar to measure physical abuse the question used was, "Before your 18th birthday, how often did a parent or adult caregiver hit you with a fist, kick you, or throw you down on the floor, into a wall, or downstairs?" All the above questions have the six options which were "this never happened," "1 time," "2 times," "3–5 times," "6–10 times," and "more than 10 times. These options were recoded into two options "Happened at least once", "Never happened" where the incident of happening any kind of abuse at least one time was recoded as "Happened at least once" all others were coded as "Never Happened". After that, all three variables were merged into a single variable representing the history of any kind of abuse that may have happened to the respondents as a child.

The measurement scales used to measure the level of childhood abuse were validated by the database administrators. The item measuring childhood emotional abuse was developed by the Add Health database administrators based on similar questions from the Childhood Trauma Questionnaire.

The scale used to measure childhood physical abuse was taken from the Traumatic Events Scale[17] and the scale used to measure childhood sexual abuse was adapted from the Conflict Tactics Scale.[18] These scales are used by numerous researchers for studies involving childhood abuse. Childhood abuse was linked to developing migraine in later life based on the data set of wave IV in the published literature.[19] Equivalently, the childhood abuse items from the Wave- IV dataset have been broadly used in research. For instance, based on Add Health data it has been found that childhood maltreatment has a direct and indirect effect on victimization by dating partners during adolescence and victimization by romantic and marital partners during adulthood, and whether dating victimization mediates the relationship between child

abuse and intimate partner victimization in adulthood.[20]

In order to create the variable addiction some commonly known forms of addiction were considered, such as smoking, drinking, marijuana, and some other drugs. These data were collected from a 119-item questionnaire titled Tobacco, Alcohol, and Drugs. The questions were self-administered by the respondent. The four questions that were used to create the variable addiction were, "Currently, how soon after you wake up do you have your first cigarette? ", "Did you continue to drink after you realized drinking was causing you problems with family, friends, or people at work or school?", "Did you continue to use marijuana after you realized using it was causing you problems with family, friends, or people at work or school?" Did you continue to use your favorite drug after you realized using it was causing you problems with family, friends, or people at work or school?" Addiction to smoking can be identified by the habit of smoking early in the morning. According to the Fagerstr¨om Test,[21] which evaluates nicotine dependence, if you have your first cigarette of the day within five minutes of waking up, your addiction is pretty strong. If it's within 30 minutes, it's moderate, and if it's within 60 minutes or later, it's somewhat lower.[22] The question in the Add health data set has the options "within 5 minutes", "within 6 to 30 minutes", "within 31 to 60 minutes", "after 60 minutes". To convert this into a binary response "within 5 minutes", "within 6 to 30 minutes" have been merged to be considered as the number of addicted respondents and the other options are considered the number of patients who are not severely addicted to nicotine. All other questions concerning addiction such as alcohol, marijuana, and other drugs were recorded as a binary yes/ no response. These four types of addiction were then merged into a single variable which created the variable addiction which was used for the final analysis. Among the other explanatory variables, the history of being diagnosed with conditions such as ADHD (attention deficit hyperactivity disorder), PTSD (Post-traumatic stress disorder (PTSD), Depression were considered. All these questions have binary Yes/No responses.

Age, sex, household income, and race are social and demographic characteristics that have been considered as other variables that may have a confounding effect in the model. In wave IV of the Add Health data, the age cohort was between 25-34 years. To pinpoint the effect of age on causing anxiety disorder, this cohort was divided into two age groups (less than 30 years, 30, and above). Based on annual household income, respondents were classified into three classes, Low income (less than 40,000 USD), mid-range income (between 40,000 USD and 100,000 USD), and high-income class (100,000 USD or more).

Statistical Analysis

The summarization of the data was done by utilizing mean and standard deviation for the continuous variables and proportion (%) and frequency (n) for the categorical variables. Both adjusted and unadjusted multivariable logistic regression analysis[23] was carried out the reach the goal of this research as the primary outcome variable was binary. The logistic regression model can be represented as below,

$$Logit\ P(Y\ =\ 1) = log\frac{P(Y\ =\ 1)}{1 - P(Y = 1)} = \beta_0\ +\ \beta_1 X_1\ +\ \beta_2\ X_2 + \beta_3 X_3\ +\ \ldots\ \beta_k X_k \quad (1)$$

Here, Y represents the outcome variable which is anxiety and panic disorder in this study. X1 … X^2 are the independent variables included in the model including covariates and β_1, β_2,...,β_k are the coefficients representing the effect corresponding to the individual independent variables.

Using these coefficients, the primary measure of comparison Odds Ratio was calculated. All analysis conducted was performed in SPSS – 25.

Results

The public-use dataset for Wave IV consists of 5114 respondents with a mean age of 29 years ranging between 25 to 34. About 46% (n=2354) of these are male (n=2352) and the rest are Female. Among these 5114 respondents, 12% (n=639) were diagnosed with anxiety or panic disorder. Table 1 depicts an overview of the overall characteristics of the study population.

The mean age of the respondents diagnosed with anxiety or panic disorder was 29.01 (SD = ± 0.02) which was not much different than the others who were not. The percentage of female respondents having such a disorder was seen to be higher than male respondents. However, the female to male ratio is not equal in the study population, hence further tests need to be carried out to check if there is any statistically significant difference. White / Caucasians constituted major portion of the population (71.8%) [Table 1]. Distributing the study population on the basis of their reported BMI, it can be seen that more than 50% [Table 1] of them were overweight. The income of individual respondents was categorized into three groups where about 50% (n=2430) of people belonged to the middle-class income range (40k-100k per year) and 15.2% (n=723) were in the high-income class [Table 1].

About (49.4%) of the total respondents faced either physical, emotional, or sexual abuse at least once before they turned age 18. Approximately 5% of respondents said that they experienced sexual abuse and 17 % admitted experiencing physical abuse at least once before the age of 18 whereas the emotional abuse count exceeded 45% of the total population. Among the individuals diagnosed with anxiety or panic disorder, 13.6% (n=87) also were recognized to have PTSD. Similarly, 10.5% (n=67) were reported to have ADHD by a health care professional. It is worth mentioning that more than half of the respondents who had a history of panic disorder had suffered from depression in their lifetime at least once.

Characteristic Addiction was created by merging the history of being addicted to either smoking, alcohol, marijuana, or some other drugs. Among the respondents who reported having at least one type of addiction (n=4140), only 11.4% (n=473) of them were diagnosed to have anxiety or panic disorder. Table 2 illustrates the outcome of logistic regression taking the binary variable anxiety disorder as the dependent variable against all other characteristics of the study population. The table shows the P-value of each explanatory variable along with the odds ratio of the corresponding category.

Table 1. Descriptive Statistics of the study variables.

Descriptive Statistics				
Characteristics of the study population	Total Population 5114 (100%)	Diagnosed with anxiety disorder		Chi Square (χ^2) p-value
		Yes 639 (12.5 %)	No 4474 (87.5 %)	
Age				< 0.001
Mean (SD)	29.00(0.02)	29.01	28.94	
Range	25 - 34	25-34	25-32	
Less than 30, n (%)		375 (12.5%)	2617 (87.5 %)	
More than 30, n (%)		1857 (87.6%)	264 (12.4%)	
Sex				< 0.001
Male, n (%)	2352 (46 %)	167 (26.2%)	2185 (48.8%)	
Female, n (%)	2761 (54%)	472 (73.9 %)	2289 (51.2%)	
Race				< 0.001
White, n (%)	3671 (71.8%)	538 (84.3 %)	3132 (70.1%)	
Others, n (%)	1438 (28.2 %)	138 (15.7 %)	1338 (29.9%)	
BMI				< 0.001
Underweight, n (%)	77 (1.5%)	18 (2.8%)	59 (1.3%)	
Normal, n (%)	1578 (30.9%)	221 (34.6%)	1357 (30.3%)	
Overweight, n (%)	3458 (67.6%)	400 (62.6%)	3058 (68.4%)	
Income				< 0.001
Low, n (%)	1608 (33.8%)	246 (40.9%)	1362 (32.7%)	
Medium, n (%)	2430 (51%)	294 (48.9%)	2135 (51.3%)	
High, n (%)	723 (15.2%)	61 (10.1%)	662 (15.9%)	
Physical Abuse				< 0.001
Never Happened, n (%)	4170 (82.6%)	470 (74.1%)	3700 (83.8%)	
Happened at least once, n (%)	880 (17.4%)	164 (25.9%)	716 (16.2%)	
Emotional Abuse				< 0.001
Never Happened, n (%)	2667 (53.0%)	1956 (44.5%)	2442 (55.5%)	
Happened at least once, n (%)	2366 (47.0%)	410 (64.6%)	225 (35.4%)	
Sexual Abuse				< 0.001
Never Happened, n (%)	4800 (94.9%)	569 (89.7%)	4231 (95.7%)	
Happened at least once, n (%)	257 (5.1%)	65 (10.3%)	192 (4.3%)	
PTSD				< 0.001
No, n (%)	4952 (96.9%)	552 (86.4%)	4400 (98.3%)	
Yes, n (%)	161 (3.1%)	87 (13.6%)	74 (1.7%)	
ADHD				< 0.001
No, n (%)	4838 (94.6%)	572 (89.5%)	4266 (95.4%)	
Yes, n (%)	275 (5.4%)	67 (10.5%)	208 (4.6%)	
Depression				< 0.001
No, n (%)	4286 (83.8%)	423 (9.5%)	4051 (90.5%)	
Yes, n (%)	827 (16.2%)	404 (63.2%)	423 (9.5%)	
Addiction				< 0.001
No, n (%)	957 (18.8%)	163 (25.6%)	794 (17.8%)	
Yes, n (%)	4140 (81.2%)	473 (74.4%)	3667 (82.2%)	

It is noticeable that the effect of gender was significant and female respondents were 2 times (OR=2.069; 95% CI 1.627-2.7) more likely to be diagnosed with panic disorder than Male respondents. Likewise, Race also was found to play a significant role as White or Caucasians had almost 0.51 times (OR=0.513; 95% CI 1.442-2.634) higher odds of reporting such disorder compared to individuals of other races such as African American, American Indian, or Alaska Native, Asian or Pacific Islander. Amid other socio-demographic factors, income was seen to be borderline significant with higher income having higher odds of being diagnosed with anxiety, whereas the effect of BMI was not found to be significant.

Individuals who self-reported to be identified as having PTSD or Clinical Depression also were significantly more likely to suffer from anxiety. Undergoing PTSD doubles (OR=2.087; 95% CI 1.811-4.35) the likelihood of having anxiety or panic disorder and Depression multiplies the chances by 10 times (OR 9.857; 95% CI 7.752-12.535) approximately [Table 2]. On the contrary, the effect of ADHD and addiction did not seem to have any significant relationship with the dependent variable.

The predictor Abuse, which accounts for all three types of abuse taking 'Yes' if the respondents faced at least one type of abuse before the age of 18 was found to have a significant effect on anxiety. That is, an individual who experienced any kind of abuse in their childhood is 0.7 times (95% CI 0.527-0.841) [Table 2] more likely to develop the panic disorder later in their life.

In order to investigate if any one of the abuses is more significant than the other, instead of using the merged abuse variable, we included three separate binary variables for each type of abuse, where 0 is the absence of abuse and 1 being the presence of abusive history controlling for the other variables in the model. Results from the logistic regression are given in the table below.

Results suggest emotional abuse (OR=1.496; p=0.001) and physical abuse (OR=1.33, p=0.023) have a significant effect on anxiety or panic disorder. Sexual abuse was found to be insignificant and the odds of having the condition being higher for emotional abusive history compared to other types of abuse. Moreover, the number of abuses was also found to be significant (p=0.003) when regressed on the dependent variable controlling for the other variables present in the model.

Furthermore, to inspect whether any one type of abuse has a greater effect than the other three different bivariate logistic models were utilized to get the odds ratio by regressing each type of abuse against the dependent variable accompanied by another model where the predictor indicated the number of types of abuse experienced by an individual before the age of 18. Additionally, the same models were repeated in the case of female and male respondents separately to investigate if gender creates any discrepancy with the outcome.

Results from the model which included physical abuse indicated that individuals who reported a history of childhood abuse have 1.799 times (95% CI 1.473-2.197) higher odds of being diagnosed with anxiety disorder. Interestingly, women have higher odds (2.039 95% CI 1.624-2.560) of having anxiety disorder than men if they were a victim of childhood abuse. In the same manner, the odds for the entire sample in case of emotional

Table 2. Results showing tests of model effects and corresponding odds ratio.

Characteristics of the Study population	P value	Odds Ratio	95% CI	
			Lower	Upper
Age	0.088			
Less than 30 n (%)		Reference		
More than 30 n (%)		1.224	0.97	1.544
Sex	<0.000*			
Male n (%)		Reference		
Female n (%)		2.096	1.627	2.7
Race	<0.000*			
White n (%)		Reference		
Others n (%)		0.513	0.38	0.694
BMI	0.194			
Underweight		Reference		
Normal		0.853	0.394	1.844
Overweight		0.676	0.306	1.489
Income	0.057			
Low		Reference		
Medium		0.733	0.564	0.953
High		0.745	0.481	1.156
Abuse	0.001*			
No		Reference		
Yes		0.665	0.527	0.841
PTSD	<0.000*			
No		Reference		
Yes		2.087	1.811	4.35
ADHD	0.192			
No		Reference		
Yes		1.334	0.864	2.062
Depression	<0.000*			
No		Reference		
Yes		9.857	7.752	12.535
Addiction	0.325			
No		Reference		
Yes		0.875	0.669	1.144

Dependent Variable: Ever been diagnosed with Panic or anxiety disorder (reference category = (0) No).
Model: Intercept, Age, Sex, Race, BMI, Income, Abuse, PTSD, ADHD, Depression, Addiction.
*Significant at 5% level of significance.

abuse and sexual abuse were 1.496 (95% CI 1.176-1.903), 2.359 (95% CI 1.664-3.346). In both of these cases, females have higher odds in comparison with the male respondents. For example, the odds of having anxiety or panic disorder is more than double in the case of women who faced sexual abuse compared to men in the same category.

Additionally, respondents who reported to have faced a certain type of abuse have approximately 1.886 (95% CI 1.512-2.354) times' greater odds of having anxiety than those who didn't. Consecutively, experiencing the two types of abuse increased the odds to 2.502 (95% CI 1.930-3.244) finally undergoing all three types of abuse increased the odds by

Table 3. Relationship between Abuse with Anxiety or panic disorder.

Explanatory variable	Pvalue	Odds Ratio (95% CI)
Considering Abuse types individually		
Physical Abuse (0 = reference group)		
Happened at least once	0.023	1.33 (1.041-1.699)
Emotional Abuse (0 = reference group)		
Happened at least once	0.001*	1.496 (1.176 - 1.903)
Sexual Abuse (0 = reference group)		
Happened at least once	0.189	1.334 (0.866 - 2.056)
Number of Abuse (0 = reference group)		
1 type	0.003*	1.462 (1.128 - 1.895)
2 types		1.442 (1.054 - 1.972)
3 types		2.27 (1.32 - 3.905)

Dependent Variable: Ever been diagnosed with Panic or Anxiety Disorder (reference category = (0) No).
*Significant at a 5% level of significance.

4. Relationship between Abuse with Anxiety or panic disorder.

Explanatory variable	Overall Odds Ratio (95% CI)	Males (95 % CI)	Females (95% CI)
Considering Abuse types individually			
Physical Abuse (0 = reference group)			
Happened at least once	1.799 (1.473 - 2.197)	1.449 (0.974 - 2.156)	2.039 (1624 - 2.560)
Emotional Abuse (0 = reference group)			
Happened at least once	1.496 (1.176-1.903)	1.971 (1.359 - 2.856)	2.080 (1.656 - 2.612)
Sexual Abuse (0 = reference group)			
Happened at least once	2.359 (1.664 - 3.346)	0.870 (0.317 - 2.385)	2.272 (1.611 - 3.205)
Number of Abuse (0 = reference group)			
1 type	1.886 (1.512 -2.354)	1.788 (1.155-2.770)	1.722 (1.343 - 2.209)
2 types	2.502 (1.930 - 3.244)	2.037 (1.280 - 3.240)	2.512 (1.828 - 3.415)
3 types	4.287 (2.659 - 6.912)	1.974 (0.626- 6.225)	4.432 (2.738 - 7.171)

Dependent Variable: Ever been diagnosed with Panic or Anxiety Disorder (reference category=No (0)).

more than double in comparison to those who faced a single kind.

Discussion

The primary objective of this study was to explore the association between childhood abuse and developing anxiety or panic disorder later in life. Association with anxiety or panic disorder condition and other mental conditions like PTSD, ADHD and depression was also verified. Findings from the analysis indicate an association between childhood abuse, PTSD and depression with developing anxiety and panic disorder conditions.

On the basis of the analysis childhood emotional and physical abuse are found to be two most dominant contributor to developing

anxiety condition and all types of history of abuse have a significant effect on the anxiety disorder. These findings collide with the findings by Hettema et al. which linked childhood sexual abuse with panic disorder,[7] Brown & Harris who connected childhood distress with increased risk of panic and anxiety disorder.[6] Childhood abuse in general was also stated as key factor in developing such disorder by a number a of researchers.[1,4,5,24] A 7-year longitudinal study conducted analyzed by (Silverman AReinherz HGiaconia R) discovered that 80% of the abused young adults met the criteria for developing at least one psychiatric disorder at age 21 which led to significant functional impairment between the age 15 to 21.

Gallo EMunhoz TLoret de Mola C et al. in their systematic review also investigated whether gender plays a crucial role in causing adverse effect to mental health of an individual followed by a meta-analysis.[25] They found that exposure to each kind of abuse such as sexual and physical abuse increased the odds of depression or anxiety and the associations were larger for women in comparison to men, however the difference was not significant due to insufficient evidence. Likewise, our findings also indicate that childhood maltreatment treatment whether physical, sexual, or emotional has significantly higher effect on the female proportion of the study population compared to the male proportion. Other factors such as PTSD and depression was also found to be significant in many studies done by researchers worldwide.[26-29] In general cases the type of maltreatment faced can be interconnected. A child who faces physical abuse is also likely to face emotional abuse resulting in increasing number of traumas that eventually leads to elevated risk of developing various mental illness later in life.

It should be mentioned that there are some limitations to this study done by using Add health survey data. It is a cross sectional study hence constructing direct causal relationship between abuse and anxiety is not possible. Further longitudinal analysis can be done based on these findings once data for WAVE -V is available. All possible confounders were included in the analysis however the restriction to data prevails as this is a survey. Add health data is a relatively large and the weights make is possible to be nationally representative which increases the validity of the study.

Conclusion

Based on the findings of this study, childhood emotional abuse was found to be a more significant contributor to anxiety or panic disorder than other types of abuse. Any kind of childhood abuse experience seemed to have a greater effect on the female portion of the respondents in comparison to the males. Likewise, the number of types of abuse experienced is also significant, with women having higher odds of developing the condition later in life. Additionally having mental disorders like PTSD and depression also amplifies the chance of developing anxiety or panic disorder. Even though a direct cause and effect relationship between the predictors and the response variable cannot be established from this analysis, the association present neither be disregarded. Nevertheless, a further thorough investigation could be effective in understanding the magnitude of these factors causing the discussed disorders and their remedies. Moreover, to

treat anxiety and panic disorders, childhood maltreatment and other mental illnesses like PTSD and depression should be considered by healthcare professionals to ensure optimal care. Furthermore, interventions targeting those issues need to be developed.

References

1. Kessler RC, Ruscio AM, Shear K, Wittchen HU. Epidemiology of anxiety disorders. Behavioral neurobiology of anxiety and its treatment. 2009;21–35.

2. Angst J. Panic disorder: history and epidemiology. European Psychiatry. 1998;13:51s–5s.

3. Bandelow B, Michaelis S. Epidemiology of anxiety disorders in the 21st century. Dialogues Clin Neurosci. 2015;17(3):327–35.

4. de Venter M, van den Eede F, Pattyn T, Wouters K, Veltman DJ, Penninx BWJH, et al. Impact of childhood trauma on course of panic disorder: contribution of clinical and personality characteristics. Acta Psychiatr Scand. 2017 Jun 1;135(6):554–63.

5. Hovens JGFM, Wiersma JE, Giltay EJ, van Oppen P, Spinhoven P, Penninx BWJH, et al. Childhood life events and childhood trauma in adult patients with depressive, anxiety and comorbid disorders vs. controls. Acta Psychiatr Scand. 2010;122(1):66–74.

6. Brown GW, Harris TO. Aetiology of anxiety and depressive disorders in an inner-city population. 1. Early adversity. Psychol Med. 1993;23(1):143–54.

7. Hettema JM, Prescott CA, Myers JM, Neale MC, Kendler KS. The structure of genetic and environmental risk factors for anxiety disorders in men and women. Arch Gen Psychiatry. 2005;62(2):182–9.

8. Mulder RT, Beautrais AL, Joyce PR, Fergusson DM. Relationship between dissociation, childhood sexual abuse, childhood physical abuse, and mental illness in a general population sample. American Journal of Psychiatry. 1998;155(6):806–11.

9. Brandes D, Ben-Schachar G, Gilboa A, Bonne O, Freedman S, Shalev AY. PTSD symptoms and cognitive performance in recent trauma survivors. Psychiatry Res. 2002;110(3):231–8.

10. Pohl R, Yeragani VK, Balon R, Lycaki H, McBride R. Smoking in patients with panic disorder. Psychiatry Res. 1992;43(3):253–62.

11. Kushner MG, Sher KJ, Erickson DJ. Prospective analysis of the relation between DSM-III anxiety disorders and alcohol use disorders. American Journal of Psychiatry. 1999;156(5):723–32.

12. Bishop C, Mulraney M, Rinehart N, Sciberras E. An examination of the association between anxiety and social functioning in youth with ADHD: A systematic review. Psychiatry Res. 2019;273:402–21.

13. Harris KM, Halpern CT, Whitsel E, Hussey J, Tabor J, Entzel P, et al. The national longitudinal study of adolescent to adult

health: Research design. 2009.

14. Harris KM. The add health study: Design and accomplishments. Chapel Hill: Carolina Population Center, University of North Carolina at Chapel Hill. 2013;1:1–22.

15. Lumley T. Analysis of complex survey samples. J Stat Softw. 2004;9:1–19.

16. Harris KM, Udry JR. National longitudinal study of adolescent to adult health (add health), 1994-2008 [Public Use]. Ann Arbor, MI: Carolina Population Center, University of North Carolina-Chapel Hill [distributor], Inter-university Consortium for Political and Social Research [distributor]. 2018;6–8.

17. Bernstein DP, Stein JA, Newcomb MD, Walker E, Pogge D, Ahluvalia T, et al. Development and validation of a brief screening version of the Childhood Trauma Questionnaire. Child Abuse Negl. 2003;27(2):169–90.

18. Straus MA, Hamby SL, Finkelhor D, Moore DW, Runyan D. Identification of child maltreatment with the Parent-Child Conflict Tactics Scales: Development and psychometric data for a national sample of American parents. Child Abuse Negl. 1998;22(4):249–70.

19. Tietjen GE. Childhood maltreatment and headache disorders. Curr Pain Headache Rep. 2016;20(4):1–9.

20. Cohn EG, Iratzoqui A. The most cited scholars in five international criminology journals, 2006–10. British Journal of Criminology. 2016;56(3):602–23.

21. Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom K. The Fagerström test for nicotine dependence: a revision of the Fagerstrom Tolerance Questionnaire. Br J Addict. 1991;86(9):1119–27.

22. Ratjen F, Hug C, Marigowda G, Tian S, Huang X, Stanojevic S, et al. Efficacy and safety of lumacaftor and ivacaftor in patients aged 6–11 years with cystic fibrosis homozygous for F508del-CFTR: a randomised, placebo-controlled phase 3 trial. Lancet Respir Med. 2017;5(7):557–67.

23. Agresti A. Categorical data analysis. John Wiley & Sons; 2003.

24. Juruena MF, Eror F, Cleare AJ, Young AH. The role of early life stress in HPA axis and anxiety. Anxiety Disorders. 2020;141–53.

25. Gallo EAG, Munhoz TN, Loret de Mola C, Murray J. Gender differences in the effects of childhood maltreatment on adult depression and anxiety: A systematic review and meta-analysis. Vol. 79, Child Abuse and Neglect. Elsevier Ltd; 2018. p. 107–14.

26. Infurna MR, Reichl C, Parzer P, Schimmenti A, Bifulco A, Kaess M. Associations between depression and specific childhood experiences of abuse and neglect: A meta-analysis. Vol. 190, Journal of Affective Disorders. Elsevier B.V.; 2016. p. 47–55.

27. Goodwin GM. The overlap between anxiety, depression, and obsessive-compulsive disorder. Dialogues Clin Neurosci. 2015;17(3):249–60.

28. Cha EJ, Hong S, Park DH, Ryu SH, Ha JH, Jeon HJ. A network analysis of panic symptoms in relation to depression and anxiety sensitivity in patients with panic disorder. J Affect Disord. 2022 Jul 1;308:134–40.

29. Quenneville AF, Kalogeropoulou E, Küng AL, Hasler R, Nicastro R, Prada P, et al. Childhood maltreatment, anxiety disorders and outcome in borderline personality disorder. Psychiatry Res. 2020 Feb 1;284.