

A STUDY OF HEALTH-RELATED SCREENING BEHAVIORS AMONG INDIVIDUALS
IN TEXAS WITH ADVERSE CHILDHOOD EXPERIENCES

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Dissertation Prepared for the Degree of

DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS

August 2021

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Baniya, Ganesh. *A Study of Health-Related Screening Behaviors among Individuals in Texas with Adverse Childhood Experiences*. Doctor of Philosophy (Health Services Research), August 2021, 119 pp., 11 tables, 2 figures, 2 appendices, references, 238 titles.

Data from this dissertation was obtained from the Texas Behavioral Risk Factor Surveillance System (BRFSS). The Texas BRFSS questionnaire used a cross-sectional retrospective research design while asking questions about individuals' exposure to adverse childhood experiences (ACEs) and included 11 questions. The sample included 9096 individuals over the age of 18 who had exposure to at least one ACE. An ACE score was calculated for all participants and were divided into two groups (less than 4 ACEs and more than 4 ACEs) to compare whether differences in ACE score would impact participating in routine health screening or not. Additionally, whether different kinds of ACEs would impact health screening was also examined. Logistic regression was used to assess whether different kinds of ACEs impact participation in routine health screening. This study found that individuals with a history of childhood adversities including experiencing childhood emotional abuse, living in a dysfunctional household impeded them from participating in routine health screenings. It is recommended that both primary care physicians and mental health providers to use motivational interviewing while interacting with patients with ACE histories. It is also suggested that using trauma-informed care (TIC) in primary care can help patients talk about their abuse histories and utilize healthcare without any judgment.

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ACKNOWLEDGEMENTS

This dissertation is dedicated to all individuals who had to go through the painful experience of childhood adversities.

This was a long journey and I will forever be grateful to my dissertation chair Dr. Justin Watts, who took me as his advisee. I am thankful for his time, dedication, expertise, positivity and always advocating for my success. To Dr. Liam O’Neill and Dr. Chisom Iwundu, who graciously agreed to be the committee members of my dissertation. I am thankful for your expert guidance in helping me shape my dissertation. I also wish to thank Dr. Chandra Carey, Dr. Denise Catalano, Dr. Stan Ingman and my department at UNT for their continued academic and financial support. I am glad that there are numerous other students who are continuing their doctoral journey through your support and resources. I also would like to thank Mr. Trey from ORC, who spent quite a time helping me with the analysis portion. I am thankful that UNT provides resources like the ORC, without whom most of us would not be able to navigate the statistical analysis phase.

My words of gratitude to all current and former students pursuing doctorate in my department. This dissertation is also dedicated to my parents, who knew the value of education, and have worked tirelessly to ensure that I receive the highest level of education. To my wife, Niru, for her continued support and encouragement, and my two children, Shreyash and Reyan, for their unconditional love and hugs. I wish to thank my brothers, Ramesh (Shreezana) and Dinesh, for their constant inspiration and moral support. Also, many thanks to my in-laws, to Shishir and Julisha for their kind words and encouragement. This was a long journey and my sincere gratitude and respect to all my friends, relatives and well-wishers, who have helped me reach this milestone. Lastly, I wish to pay my due respect to God almighty for protecting me throughout my academic journey in the US.

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CHAPTER 1

INTRODUCTION

Child maltreatment is defined as “ all forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment, or commercial or other exploitation of children that results in actual or potential harm to a child’s health, survival, development, or dignity in the context of a relationship of responsibility, trust, or power”(Krug et al., 2002, p.59). Although “there is no universally accepted definition of child maltreatment” (McCarthy et al., 2016, p. 218), available literature suggests four common types of maltreatment: sexual abuse, physical abuse, emotional abuse/psychological maltreatment, and neglect (M. D. De Bellis Zisk, 2014; Rokita et al., 2018). The Centers for Disease Control and Prevention (CDC) has defined adverse childhood experiences (ACE) as “potentially traumatic events that occur in childhood (0-17 years) such as experiencing violence, abuse, or neglect; witnessing violence in the home; and having a family member attempt or die by suicide” (Center of Disease Control and Prevention, 2019 p.7). This also includes environmental factors that can directly impact a child’s “sense of safety, stability, and bonding such as growing up in a household with substance misuse, mental health problems, or instability due to parental separation or incarceration of a parent, sibling or other member of the household” (p.7). Therefore, for the purpose of this dissertation, some common terms used to describe negative childhood experiences such as child abuse, neglect, child maltreatment, early neglect experience, and childhood trauma are condensed into one general definition of adverse childhood experiences (ACE). This definition by CDC provides justification for using ACE as a consolidated term rather than using different terms that essentially convey the same meaning.

The life course theory of health suggests that although health is produced throughout the lifespan, childhood is a critical period of one’s life because the interactions that occur during the

childhood can have lasting effect on future health (Forrest Riley, 2004). This concept of how diseases and risk behaviors in adult life is related to childhood exposure of emotional, physical, or sexual abuse, and household dysfunction was first explored in the landmark ACE study in joint collaboration between Kaiser Permanente's Health Appraisal Center in San Diego, California and the CDC by Felitti and colleagues in 1998, which then opened the arena for ACEs research. The original study found that exposure to ACEs increased the risk for alcohol abuse, drug abuse, depression, suicide, smoking, poor-rated self-health, physical inactivity and obesity. Additionally, they also found that early ACE increased the chances for heart disease, cancer, disease of lungs and liver, and skeletal fractures in adult life. Children who are exposed to early ACEs grow up to become adults with various risky behaviors and have increased chances for chronic diseases. As adults, they are more likely to have chronic obstructive pulmonary disease (COPD), autoimmune disorders, cancer, and shorter life expectancy (Bachmann Bachmann, 2018). Thus, the original ACE study established a new thought in public health that a person's physical, mental and social health is deeply rooted in early childhood years.

1.1 What Does ACEs Include?

There is a lack of uniform definition for negative childhood experiences and the definition varies from one field to another. For example, the American Psychological Association (APA) has defined trauma as "an emotional response to a terrible event like an accident, rape or natural disaster" (American Psychological Association, 2020). This definition is very limited in itself whereas another definition by the Substance Abuse and Mental Health Services Administration (SAMHSA) is more encompassing which defines trauma as "experiences that cause intense physical and psychological stress reactions" (SAMHSA, 2014 p. 7). It can refer to "a single event, multiple events, or a set of circumstances that is experienced by an individual as physically and

emotionally harmful or threatening and that has lasting adverse effects on the individual's physical, social, emotional, or spiritual wellbeing" (SAMHSA, 2014 p. 7). Additionally, a traumatic event can either be a single or a series of events as well as chronic conditions such as childhood abuse and domestic violence that ignites the "fight" or "flight" response, which produces fear, vulnerability and a sense of helplessness at the time of the event (SAMHSA, 2014).

SAMHSA suggests that there are three "E"s of trauma: events, experience of trauma and effect of trauma which can shape the overall magnitude of trauma. The events of the trauma include circumstances that may include the actual threat of physical or physiological harm severe, life-threatening neglect for a child that imperils healthy development. Whereas the experience of the traumatic event is how individuals feel with the event. It is the experience of the event that determines whether the event is traumatic or not. The experience of traumatic event is highly subjective and thus the same event may be traumatic to one individual whereas it may not be traumatic to another individual. Therefore, how the individual labels and gives meanings or controls the expression of emotions determines whether the individual is disrupted physically and psychologically which will help to determine whether the event is traumatic or not. Lastly, the effect of the trauma are the changes that occurs within the individual after experiencing a traumatic event. The adverse effect of trauma can occur almost immediately or can have delayed onset and the duration may be long or short depending on the event and the experience (SAMHSA, 2014)

In the field of public health, traumatic events are represented broadly by the term adverse childhood experiences (ACES) and "include being a victim of physical, sexual or emotional abuse or neglect as a child and exposure to chronic environmental stressors such as living in a household affected by domestic violence, substance misuse or mental illness" (M. A. Bellis et al., 2019 p. 168). Most researches on ACEs focus on 9 different areas that include physical, sexual and

emotional abuse; household dysfunction including domestic violence, parental separation, having a family member suffer from mental illness, problematic drug and substance use, family member either serving or served a prison time (M. A. Bellis et al., 2019; Felitti et al., 1998a; Hughes et al., 2017). These 9 categories were also used in the seminal work by Felitti and colleagues. Therefore, adverse childhood experiences (ACEs) is the collective definition that is consistently used in available literature and this will be the definition used in this dissertation as well.

1.2 ACE as A Public Health Problem

The current body of research has increasingly accepted ACE exposure as a growing public health concern. For example, in a systematic review of 221 articles involving ACE and cost for chronic diseases across Europe and North America, M. A. Bellis et al., (2019) found that US\$581 billion in Europe and \$748 billion in north America were linked to presence of two or more ACEs who suffered from anxiety, depression, cardiovascular diseases, respiratory diseases and cancer. Additionally, they suggested that even with just a 10% reduction in ACE prevalence could yield an annual savings of 3 million DALYs or \$105 billion. The CDC has stated that “At least five of the 10 leading causes of death have been associated with exposure to adverse childhood experiences, including several contributors to declines in life expectancy” (Merrick et al., 2019). Since ACE exposure is associated with higher prevalence of chronic diseases, it also increases the healthcare costs. Authors (Schickedanz et al., 2019) found that exposure to ACE increases the household financial burden and out-of-pocket costs for healthcare. Specifically, the annual cost increased by \$184 for one or two ACEs, whereas, three or more ACEs in the household increased the cost to \$311 than the household with no ACEs.

Recent research has shown that individuals with more than four types of ACEs tend to utilize healthcare more often than those without any kind of ACE. Researchers in England studied

7414 residents who were exposed to nine ACEs and household stressors and found that healthcare utilization increased with increasing ACEs. Specifically, those with more than 4 ACEs were 2.34 times more likely to frequently visit general practitioners (GP), 2.32 times more likely to use emergency department and 2.67 times more likely to stay overnight at the hospital than those without any ACEs (M. Bellis et al., 2017). Similarly, in a Canadian study researchers found that as the number of ACEs increased, so did the use of general practitioners by 12%, emergency rooms by 29% and other services by 19% (Chartier et al., 2010). While in the US, from a sample of 2038 adult patients in a medium sized behavioral health department, researchers found that individuals with more than four ACEs made more appointments but could not keep those appointments when compared to those with less than four ACEs (Koball et al., 2019). The same study also found that even after controlling for age, gender, and insurance type, individuals with higher ACE score cancelled appointments at the late stage and had more no-show during appointments than those without ACEs. Additionally, individuals with higher ACEs had more comorbidities, medications and the need for care coordinators than those with moderate or no ACEs. Therefore, individuals with high ACEs were responsible for revenue loss to the healthcare provider and were also the driving force for increased healthcare expenditure due to presence of more than two comorbidities. Therefore, presence of ACEs is a growing public health concern not only in the US but also around the world.

1.3 Prevalence of ACEs among US Children

In a 2016 National Survey of Children's Health (NSCH) using 45,287 US children, the most common ACE faced by US children was economic hardship (22.5%), and parent or guardian divorce or separation (21.9%) (Crouch et al., 2019). Similarly, using the same data, Bethell et al., found that prevalence of one or more of the nine ACEs varied from 38.1% to 55.9%. Similarly,

prevalence for two or more than two ACEs varied from 15.0% to 30.6%. Additionally, although ACE is prevalent among all income groups, about 58% of children with ACEs lived in household with incomes less than 200% of the federal poverty level. Furthermore, while ACE is also prevalent among all racial and ethnic groups, the rates are generally lower for White, Non-Hispanic and lowest for Asian children with Black children having the highest rates (17.4%) of all US children with ACEs (Bethell et al., 2017).

1.4 Cost of Child Maltreatment

Adverse childhood experiences are costly to both individuals and to the society as well. The societal cost of child abuse and maltreatment was first estimated in 1988 by Deborah Daro, reporting \$20 million annual cost of hospitalization maltreated children, cost for rehabilitation and special education to be \$7 million; and, the cost for foster care to be \$460 million. Additionally, the juvenile and court detention cost \$14.8 million, \$646 million for long-term foster care, and future lost earnings of maltreated children of between \$658 million and \$1.3 billion (Gelles Perlman, 2012). In another report published by Prevent Child Abuse America, Wang and Holton (2007) estimated the cost of child abuse and neglect to be \$103.4 billion. In another mostly cited article for costs of child maltreatment, (Fang et al., 2012) reported “\$210,012 as the lifetime costs of child maltreatment per child in 2010, which also included \$32,648 in childhood health care costs; \$10,530 in adult medical costs; \$144,360 in productivity losses; \$7,728 in child welfare costs; \$6,747 in criminal justice costs; and \$7,999 in special education costs” (p. 160). The same study authors estimated that “the lifetime cost of death from child maltreatment was \$1,272,900, including \$14,100 in medical costs and \$1,258,800 in productivity losses” (p.160). Lastly, a 2015 estimate of child maltreatment suggested that the estimated nonfatal child maltreatment per-victim lifetime cost increased to \$830,928 (2015 USD) from \$210,012 (2010 USD) and the fatal per-

victim cost increased from \$1.3 to \$16.6 million in the US. Similarly, the cost of 2015 substantiated incident cases was 428 billion whereas the cost for investigated incident cases was 2 trillion (Peterson et al., 2018). All of these statistics show that child maltreatment is very costly to the society and to the US healthcare system. As the US healthcare system already has one of the highest medical costs among the developed nations (schick et al., 2018), the need for early intervention and prevention of child maltreatment cannot be over stated.

1.5 Importance of Health Screenings

Health screenings are widely used in public health to identify individuals who may be at risk for disease/condition, so that the disease could be caught earlier before it progresses to more complicated stage. Screenings are “the systematic application of a test or enquiry to identify individuals at sufficient risk of a specific disorder to warrant further investigation or direct preventive action, amongst persons who have not sought medical attention on account of symptoms of that disorder” (Wald, 2001 p.1). Preventive health screenings or routine screenings assess the demographic and lifestyle risk factors of current health of an individual and predict the chances of getting the disease/condition in future (Dryden et al., 2012). Screenings are one of the ways to determine the risk of developing disease/condition at population level widely used in public health that can result in early diagnosis and treatment, helps to improve quality of life and even prevent premature deaths (Bell et al., 2017). Preventive health screenings are beneficial to public health as it can save up to 3.7 billion in medical costs in the US if such screenings are routinely done and increased by 90 percent (McGill, 2014). Since, health screenings are used not only to detect the presence/absence of a disease, the overall goal of screening is to improve health outcomes that are important to the patient (Bell et al., 2017).

There appears to be presence of certain socioeconomic factors that result in higher

participation in health screening behaviors. In a systematic review examining the characters of attendees of general health checkup, (Dryden et al., 2012) found that females are more likely to participate and approve of routine health checkup than males. Males are also more likely to be absent than females for routine checkups. Additionally, older adults were more likely to engage in routine checkups than younger adults. However, participation also depended on the types of screenings provided and the intended age-group for the screening test/tool. Furthermore, the same study reported that lower socio-economic status resulted in low participation. Specifically, being from low income, having low education and no employment were the biggest reasons in the SES spectrum for low attendance in health screenings. In terms of race/ethnicity, Whites are more likely to participate in health screenings than other racial/ethnic groups. Those who did not believe in the advantages of health screenings did not value their health strongly, had low-self efficacy, felt they had less control of their health and were more likely to not trust the effectiveness of screening tools. In another systematic review of reasons why patients in UK did not attend health screenings offered by the National Health Services (NHS), (Harte et al., 2018) reported lack of awareness/knowledge of the event, misunderstanding the purpose of the screening, aversion to preventive medicine, conflicting time or competing priorities and difficulties accessing GP as the reasons for not attending health screening.

Therefore, in order to achieve the full benefits of health screening, the World Health Organization (WHO) has prescribed certain guidelines to be followed while completing a screening. The guidelines for population-based screening include; 1. Screenings should happen only for diseases with severe consequences, so that early screening is beneficial. 2. The test should be reliable and should not harm the individual taking it. 3. There should be clearly established scientific benefits for early detection and that an effective treatment is available for the disease

when detected at an early stage. 4. Information provided should be neutral to the public, so that they can decide on their own to either participate or not participate in the screening test. (Institute for Quality and Efficiency in Health Care (IQWiG), 2013 p. 2).

1.6 Recommended Preventative Screenings

The importance of routine preventative health screenings is also outlined in the Healthy People 2020 stating that screenings help to prevent and diagnose diseases and illness in their earlier state which then are more treatable which can significantly reduce the risk of illness, disability, early death, and medical care costs. Additionally, many of the preventative screenings and tests are covered by Medicare, Medicaid, the Affordable Care Act and through private insurance. However, not many adults and children participate in regular health screenings (US Department of Health and Human Services, 2014). For e.g., in the US, only 25% of adults between 50 to 64 years and fewer than 40% of adults age 65 and older participate in routine colorectal cancer screening. In the US, the US Preventive Task Force (USPTF) is an independent, expert panel in primary care and preventive services that systematically reviews the effectiveness of preventive services and make recommendations on needed preventive services (U.S. Preventive Services Task Force, 2017). The USPTF grades the effectiveness and usefulness of a screening test as either A, B, C, D and I. According to the USPTF, services that are graded as A should either be offered or provided by the practice because there is high likelihood of maximum benefits. Services with grade B should also be either provided or recommended by healthcare providers because there are moderate to substantial benefit. Services with C should be provided selectively, based on individual circumstances because there is very small net benefit to the patients. Services with a grade D is discouraged as there is no evidence that it benefits the patients. Lastly, services with a grade “I” suggest that there is inconclusive evidence about the efficacy of the treatment/test. Based

on the recommendations of the USPTF, the use of preventative health behaviors in regards to cholesterol screening, blood pressure screening, and receipt of flu shot among individuals with ACEs will be the focus of this dissertation.

1.6.1 Cholesterol

Cholesterol is an important component of good health because it is needed in important bodily functions such as making hormones and in digesting body fats (Centers for Disease Control and Prevention (CDC), 2019). According to CDC, there are two types of cholesterol-low-density lipoprotein (LDL), also known as “good” cholesterol and high-density lipoprotein (HDL), also known as the “bad” cholesterol. More LDL than HDL is present in human body and high levels of LDL is not good for human body as it increases the risk for heart disease and stroke. However, presence of high amount of HDL is desirable as it lowers one’s risk for heart disease and stroke.

According to the CDC, (2020), more than 12% of US adults aged 20 and above had total cholesterol higher than 240 mg/dL, and more than 18% had high- HDL cholesterol levels less than 40 mg/dL in the year 2015-16. Additionally, about 43 million US adults are currently taking cholesterol medication. Most people are unaware that they have high cholesterol because it is asymptomatic and only a blood test can detect the cholesterol levels. Getting regular cholesterol checked is necessary because it is a risk factor for heart disease and stroke, which are one of the leading causes of death in the US. Therefore, adults aged 20 and above should have their cholesterol checked every 5 years and men between 45 to 65 and women between 55 to 65 should get it every 1 to 2 years (U.S. National Library of Medicine, 2019).

1.6.2 Hypertension

Regular screenings for high blood pressure is categorized as grade A by the USPTF (U.S. Preventive Services Task Force, 2017). According to CDC (2014), one in three American adults

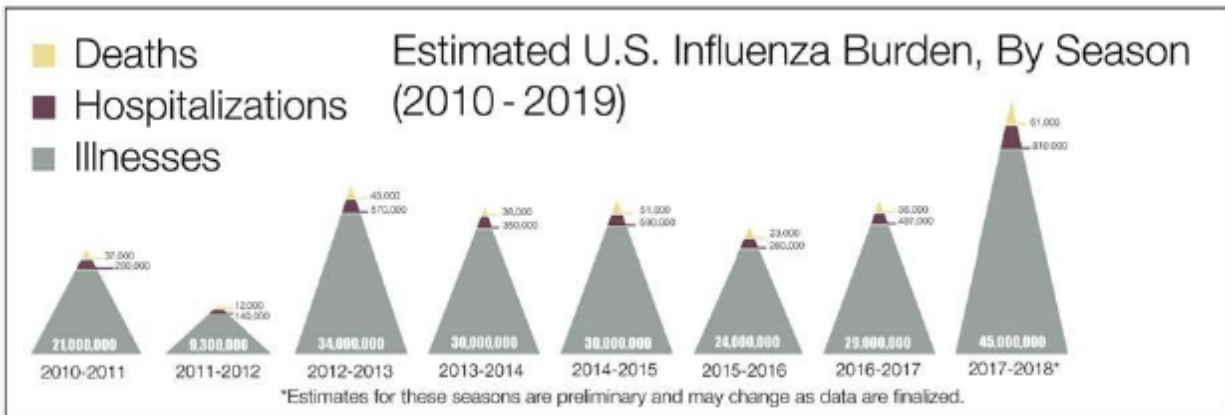
have high blood pressure, i.e., having a blood pressure at or above 130/80 mmHg according to the new guidelines from the American College of Cardiology and the American Heart Association. High blood pressure is responsible for more than 1000 deaths/day in the US and individuals with high blood pressure is 4 times more likely to die from stroke and three times more likely to die from heart disease. Additionally, high blood pressure was the common chronic condition among 69% of individuals who had heart attack for the first time, 77% among those who had a stroke and 74% among people with chronic heart failure. The annual estimated cost of high blood pressure is \$51 billion with \$47.5 billion in direct medical costs. However, only about 47% of people with hypertension have it under control. Reduction in systolic readings by just 12-13mmHg can have significant reduction in stroke, coronary heart disease and deaths due to cardiovascular disease. In a 2003–2014 study that included pooled data from a total sample of 224 920 to examine the economic burden of high blood pressure in the US, (Kirkland et al., 2018) found that about 36.9% of the US population suffered from high blood pressure resulting in an annual expenditure of \$9089 among hypertensive individuals which is about \$2000 higher than non-hypertensive individual's cost. Additionally, hypertensive individuals also had other increased costs such as a 2.5 fold inpatient costs, almost double the outpatient cost, and nearly triple the cost for prescription drugs. Their results estimated that hypertensive population costs \$131 billion more to the healthcare system when compared with non-hypertensive population. Preventing hypertension yields more benefits than the combined benefits from other preventative screenings such as mammography, colonoscopy, and Papanicolaou (Kirkland et al., 2018). Therefore, preventing high blood pressure and managing it effectively can save both lives and healthcare costs in the US.

1.6.3 Flu

Flu is a common name used for Influenza virus which affects our nose, throat, and

sometimes the lungs. Symptoms of flu include slight fever, sore throat, coughing, runny nose, pain in muscle/body, headaches, feeling tired, and children may also experience vomiting and diarrhea (Centers for Disease Control and Prevention, 2019b). Authors (Tokars et al., 2018) suggested that about 8% of the U.S. population gets sick from flu each season, with a range of between 3% and 11%, depending on the season. Although anyone can get flu, there are certain groups which are more likely to get flu than others. For example children are more likely than others to get sick from flu with an attack rate of 9.3% for children 0-17 years and 8.8% for adults 18-64 years (Tokars et al., 2018). However, individuals aged 65 and above are least likely to get sick from flu with an attack rate of 3.9%. However, other studies have shown that individuals aged 65 and older are also at higher risk of getting flu (Reed et al., 2015; Thompson et al., 2004).

Figure 1.1: Burden of Flu in the US



As like other infections, flu is costly to the US healthcare as well. A study by (Molinari et al., 2007) estimated that the annual influenza epidemic resulted in an average of 610,660 life-years lost (undiscounted), 3.1 million hospitalized days, and 31.4 million outpatient visits. Additionally, there were an annual \$10.4 billion in direct medical costs (95% confidence interval [C.I.], \$4.1, \$22.2). Similarly, \$16.3 billion (C.I., \$8.7, \$31.0) was lost on earnings and loss of life due to influenza and the total annual economic burden was estimated to \$87.1 billion (C.I., \$47.2,

\$149.5). Similarly, in another study using data from 2010-2013 flu season data, authors Reed et al., (2015) estimated that flu was responsible for 114,018–633,001 total hospitalizations, 18,476–96,667 ICU admissions, and 4,866–27,810 deaths per season. They also found that older adults aged 65+ years had higher rates of hospitalization and deaths (54–70% of hospitalizations and 73–85% of deaths) depending on the season. Figure 1.1 shows the estimated burden of flu, by season in the US.

One way to avoid getting flu infection is getting an annual flu shot either through the primary care provider or through the local health department. Additionally, it is available at pharmacy stores as well. While the flu shot might not work for every single individual, getting a flu shot every year is beneficial because even if one gets flu and is vaccinated, the symptoms will be mild and manageable (National Institute on Aging, 2017).

1.7 Self-rated Health Status

Self-rated health (SHR) is known by different other names such as self-assessed health, self-reported health or self-perceived health which “refers to a single-item health measure in which individuals rate the current status of their own health on a four- or five-point scale from excellent to poor” (Wu et al., 2013 p.320) and is widely used in surveys in western population due to its simplicity. Self-rated health status has helped in predicting mortality among individuals with chronic diseases including diabetes and cardiovascular disease as well as dialysis patients (Christian et al., 2011). One of the benefits of SHR is that it allows the individual to prioritize and evaluate their personal health. Additionally, because SHR is little abstract, it also provides opportunity for the researcher and primary care providers, a chance to examine the cognitive ability of an individual because of the cognitive processes involved in evaluating self-health (Bombak, 2013).

1.8 Rationale for the Study

Many prior studies have established the relationship between ACEs and health risk behaviors (i.e. substance use, obesity) and chronic health conditions (i.e. cancer, cardiovascular disease, chronic obstructive pulmonary disease (COPD)) later in development (Dube et al. 2009; Felitti et al., 1998). Research has consistently demonstrated that as the severity of ACEs increases, so does the risk for many significant health conditions, diseases and disability (Rose et al., 2014). Experiencing chronic stress in childhood related to ACEs has been shown to not only impact clinically significant issues at the time of abuse (i.e. higher rates of stress, increased risk for mental health conditions), however these issues often extend into adulthood. In addition to adopting health risk behaviors early in development that have been linked to chronic health conditions and disease later in life, exposure to ACEs is also linked to issues regulating the stress response (from both a psychological and physiological perspective) (American Academy of Pediatrics, 2014), which in turn further increases this risk for a compromised immune system and chronic health issues. Further, individuals exposed to ACEs early in development also demonstrate issues related to trust, attachment and decreased psychosocial functioning, and develop distrust of authority figures including healthcare professionals (Barreca, 2018). Furthermore, several routine activities in medical settings such as removing clothes, physical touch, vulnerable physical positions, lack of privacy, and invasive procedures, may trigger maladaptive stress response among individuals with ACEs histories. Coupled with these issues are other issues such as navigating the complex power dynamics between the physician-patient relationship, the gender of the healthcare provider and the ways how personal questions are asked in healthcare setting (Valeras et al., 2019), which may interfere with routine medical screenings which are essential to prevent future issues with health. The literature has established that individuals with ACEs are more likely to engage several

health-risk behaviors such smoking, drinking, substance abuse, early sexual debut, multiple sexual partners (Anda et al., 1999) and are more likely to have chronic diseases including cancer, bronchitis, heart diseases, rheumatoid arthritis, headaches, hypertension, obesity, diabetes and mental illness (Oral et al., 2016). Many of the chronic conditions could be identified early with routine health screenings which can help in early detection and management of chronic diseases. Current research on ACEs and usage of preventative health is focused mainly on cancer screenings such as colorectal and cervical cancer (Alcal'a et al., 2017) with minimal research examining ACEs and whether these adversities impact participation in routine health screenings. Therefore, this research is undertaken to fulfill that gap.

1.9 Purpose of the Study

As previously mentioned, exposure to ACEs early in development are significantly related to chronic disease and other health conditions later in life, this relationship has been very well established in the literature (Rose et al., 2014; Dube et al. 2009; Felitti et al., 1998). In addition to this, research has consistently demonstrated that as severity of ACEs increase, so does the adoption of health risk behaviors (Chapman et al., 2007). Other studies (Valeras et al., 2019) have shown that the experience of ACEs results in several factors (negative attachment, mistrust etc.) that might influence interactions with healthcare providers that may involve the utilization of health screening practices. Currently minimal research has been done to examine whether this relationship (or lack thereof) exists. Results from this study will illustrate rates of ACEs within the state of Texas, examine health screening practices among individuals with ACEs, and also determine whether differences in screening practices occur or not based on the ACE scores. Findings are intended to educate health care providers and other key personnel involved in supporting the overall health and functioning of patients. These findings are intended to emphasize

a critical risk factor for chronic health issues (ACEs), and the importance for screening clients for adversities that occurred early in development in order to increase utilization of screening practices which are likely to reduce the risk of disability and issues in functioning later in development. As such, research questions to guide this study are as follows: (a) What is the prevalence of ACEs among this sample? (b) Is there a relationship between ACEs and how individuals rate their overall health status? (c) does the type of ACEs (physical, emotional or sexual abuse, or household dysfunction) predict participating in routine health screening?, and (d) is there a difference in screening behaviors of routine health screening such as screening for cholesterol, hypertension, and receiving flu shot among those with low and high ACEs?

CHAPTER 2

LITERATURE REVIEW

According to authors Leeb et al. (2008), Child maltreatment includes “any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child” (p.11). According to the authors, acts of commission include actions that are intentional and whether or not it causes harm to the child. Some acts of maltreatment that is included in act of commission are physical abuse, sexual abuse and psychological abuse. Whereas, acts of omission include “the failure to provide for a child’s basic physical, emotional, or educational needs or to protect a child from harm or potential harm” (p.11), including inadequate supervision and exposure to violent environment as well. Authors (Forston et al., 2016) in another report by CDC, have classified child maltreatment into four common types: physical abuse, sexual abuse, emotional abuse and neglect. Physical abuse includes “the use of physical force, such as hitting, kicking, shaking, burning, or other shows of force against a child”, sexual abuse includes “inducing or coercing a child to engage in sexual acts” including “behaviors such as fondling, penetration, and exposing a child to other sexual activities”. Emotional abuse refers “to behaviors that harm a child’s self-worth or emotional well-being, such as name calling, shaming, rejection, withholding love, and threatening” and neglect is the “failure to meet a child’s basic physical and emotional needs such housing, food, clothing, education, and access to medical care” (p.8). Additionally, the terms “maltreatment” and “abuse” are often used interchangeably in the literature. However, for this dissertation, it will be referred by adverse childhood experiences (ACEs).

Children often experience multiple types of abuse and neglect over the course of development. For example, child maltreatment occurs globally affecting 1 in 5 children under 18

annually (Ferrara et al., 2015). Considerable variations occur among different nations due to differences in the legal framework and reporting system. Even among the developed nations, there is a difference in child maltreatment prevalence. For example, European countries such as the United Kingdom and Italy had 11.2% and 9.5% respectively while the US and Canada had 12.1% and 9.7% respectively (Ferrara et al., 2015). In the US, out of 580,740 cases reported in 2011, 1,740 involved fatal outcomes due to child maltreatment (Fang et al., 2012). Whereas in many of the economically developed countries such as Brazil, Russia, India, and China, prevalence data have not been standardized, making global comparison difficult (Scomparini et al., 2013). This shows that there are considerable differences in the prevalence rate of child maltreatment across the globe.

Additionally, not every child experiences the same kind of abuse and neglect. Younger children are more likely to suffer from fatal abuse and neglect, while 14- to 17-year-olds usually suffer from non-fatal abuse and neglect (Forston et al., 2016). In 2017, there were 674,000 reported victims of abuse and neglect in the US which included 74.9% neglect, 18.3% physical abuse, and 8.6% sexual abuse. Most victims either had one or a combination of two or more types of maltreatment. Additionally, most of the perpetrators were close relatives such as parents (77.6%), relatives other than parents (6.3%) multiple relations with the victim (4.2%) and “other” relationship, such as foster sibling, nonrelative, babysitter, etc. (3.8%) (U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families Children’s Bureau, 2019). Race/ethnicity and family income also play an important role in child maltreatment, as discussed below.

2.1 Child Maltreatment by Race and Ethnicity

Race as it relates to health disparities has been widely studied and plays an important role

in one's overall health (Chen et al., 2006; Egede, 2006). Thus, race is an important factor while studying disparities in child maltreatment. Additionally, attention is increasing to understand the role of culture and ethnicity in context of child maltreatment (Elliott Urquiza, 2006) due to disparities in reported rates, rates of children in the foster care system and due to the frequency and intensity of services received by children (Derezotes et al., 2005). There are racial differences in different forms of child maltreatment. For example, in a study by Hawkins et al., (2010), researchers found that the lifetime prevalence of injurious spanking is higher among African American youths than Caucasians and Hispanics. The study also found that Hispanic, African American, and Native American youths were more likely to report child physical abuse than the Caucasian youth (Hawkins et al., 2010). Studies involving child sexual abuse (CSA) in Asian countries have revealed low levels of CSA among Chinese children compared to US children (Chen, Dunne, Han, 2004). A (2003) study by Back et al., comparing Singaporean and US women found that Singaporean women were more likely to experience child physical abuse, report the injury arising from the abuse and to disclose the abuse compared to US women. Furthermore, Singaporean women who had previous exposure to CSA had higher psychological symptom levels when compared to their non-abused peers and to US women with a history of child sexual abuse (Back et al., 2003). The low prevalence of CSA in Asian and Asian-American communities can be partly explained by the cultural and societal norms of this group. The Asian community has conservative cultural norms and a strong emphasis on family reputation. They also have strong filial piety and restriction in emotional expression which can prevent Asian children from reporting CSA (Elliott Urquiza, 2006). Asian children who are raised in a strong patriarchal society are less likely to accuse their family members as abusers. Additionally, a woman losing her virginity is viewed as a disgrace (Kenny McEachern, 2000) which may prevent her from reporting the abuse.

Another ethnic group that has similar cultural values with the Asians is the Hispanic group. It is the largest and fastest growing ethnic group in the US (U.S. Census Bureau, 2011). It is thought that the cultural concept of “familismo” acts as a protective factor for child maltreatment (Coohey, 2001) because it emphasizes on strong family loyalty and contributing to the overall wellness of the family (Ayon et al., 2010). The likelihood of maltreatment increases when the males in the family employ “machismo” and demonstrate male dominance and authority (Warner et al., 2012). Available literature suggests that both familismo and machismo fosters child maltreatment in Hispanic families. For example, similar to the Asian beliefs, Hispanics are also less likely to report abuses because of the expectation of maintaining family unity (Morash et al., 2000). Sexual abuse reporting is also discouraged in this culture due to the taboo against losing virginity before marriage. Furthermore, male victims are less likely to report abuse, especially when abused by a male perpetrator, for fear of being labeled as homosexual (Kenny McEachern, 2000). Thus, above examples demonstrate that cultural and societal factors can be a major player in promoting child maltreatment.

2.2 Social Status and Child Maltreatment

Among many socially underprivileged individuals in our society, women and individuals with low socioeconomic status (SES) are more likely to be abused (Sedlak et al., 2010) and they tend to have more intense stressors throughout their life course (Lantz et al., 2005). Additionally, people from low SES tend to have more elevated emotional distress while compared to high SES individuals (McLeod Kessler, 1990). Children growing in low SES families and disadvantaged communities are susceptible to the biological embedding of the disease risk (Center on the Developing Child at Harvard University, 2010). Unhealthy living conditions such as crime, violence, boarded-up houses, abandoned lots and inadequate municipal services may contribute to

this stress (Evans, 2004). Furthermore, children from low-income families whose parents' education level is less than high school degree, unemployed and single household are at greater risk of being abused (Cancian et al., 2013; Mersky et al., 2009). These children are also deprived of higher-quality parental responsiveness and their parents are more likely to engage in conflictive and punitive parental control (Evans, 2004). In terms of gender, girls have more chances of being sexually abused than boys (Maikovich-Fong Jaffee, 2010).

While examining household income and child maltreatment, children from high-income families are less likely to be maltreated than from low-income families. For example, children in household annual income below \$15,000 were 22 times more likely to experience maltreatment and severe injuries while compared with a household income greater than \$30,000 (Cort et al., 2010). Thus, social characteristics such as gender and SES are highly related to an individual's risk to childhood maltreatment (Johnston Coyle, 1979). Individuals growing up in low SES often lack adequate and effective coping strategies and are also more likely to have lower psychological strength to cope with stressors (Pearlin et al., 2005). An absence of adequate coping skills in adolescents may lead to alcohol abuse as a coping mechanism (Rothman et al., 2008). A high number of those exposed to childhood maltreatment engage in tobacco use, illicit drug abuse, obesity, promiscuity, and pathologic gambling, the more severe the exposure, often the more often individuals engage in maladaptive coping (Anda, Croft, Giles, et al., 1999). Childhood adversities also have a cumulative biological toll on the body making the individual susceptible to a host of cardiovascular diseases, immune dysfunction, cancer, COPD, autoimmune diseases, poor dental health, depression (Shonkoff et al., 2012), smoking, suicidal behavior, anxiety disorders, eating disorders, and higher risk of sexually transmitted infections (STIs) (Norman et al., 2012). These examples suggest that adverse childhood experiences are highly related to negative health

outcomes in adult health as well.

2.3 Theories For Occurrence Of ACEs

Parents' behaviors have an important role in the health of their children and especially, the health of a mother affects her child's health as well (Case Paxson, 2002). Therefore, "developmental and biological disruptions during the prenatal period and earliest years of life may result in weakened physiological responses, vulnerabilities to later impairments in health and alerted brain architecture" (Center on the Developing Child at Harvard University, 2010, p. 2). These disruptions can result in permanent impairment of both physical and mental health in later life as well. In order to understand how disease and disabilities in later life are linked to these negative experiences in early childhood, it is important to understand our body's biological response to stress. The word "stress" has been oversimplified and is used ambiguously often to explain either events (stressor) or how an individual reacts to different life challenges (McEwen, 2002; McEwen & Wingfield, 2003). In this paper, stress is defined as "any events or stressors that are threatening to an individual and that evoke behavioral and physiological responses" (McEwen Wingfield, 2003, p.4).

2.4 Biological Theories Related to Stress

When an individual is presented with an external stimulus that threatens his/her safety, the body releases adrenalin and adrenocortical hormones through "fight or flight" response that helps the individual to survive (McEwen Seeman, 1999). A physiological stress response is necessary because they help in our survival by "mobilizing stored energy, increasing cardiac output, and suppressing nonessential digestive, immune, and re- productive functions" (Luecken Lemery, 2004, p. 172). Our body reacts to a stimulus by activating the hypothalamic-pituitary-adrenocortical (HPA) axis and the sympathetic adrenomedullary(SAM) system that increases

various stress hormones such as corticotropin- releasing-hormone (CRH), cortisol, norepinephrine, and adrenaline (Shonkoff et al., 2012). When stress management system is triggered, stress hormone is secreted which increases the heart rate, blood pressure, blood sugar, inflammatory proteins and it also redirects the blood flow to the brain resulting in increased vigilance and fear (McEwen, 2000). While a normal, healthy and temporary activation of the stress response system is essential for our survival, continuous exposure to these stress hormones can be both harmful and toxic (McEwen, 2005; McEwen Seeman, 1999). If the body is exposed to chronic stress, the otherwise “protective” effect can be detrimental because the stress response is non-specific and continuous exposure leads to neuron atrophy and impaired memory in the brain (McEwen, 2005). In case of the immune system, while acute stress improves immune functioning by moving immune cells where needed to protect against a pathogen, chronic stress suppresses the body’s immune function (Dhabhar McEwen, 1999).

In case of children, three distinct types of stress: positive, tolerable and toxic responses have been identified by the National Scientific Council on the Developing Child (2005). These responses are classified based on their potential to cause physiologic disruption based on exposure and intensity of stress. A positive stress response is brief and mild to moderate in magnitude. In presence of a caring and responsible adult, it provides a protective effect and also facilitates the stress response system to return to a normal level. In case of tolerable stress, although the magnitude of stress is increased, there is less likelihood that it produces a long-lasting negative physiologic harm when supportive adults assist in coping and provide continued protection. Whereas in a toxic stress response, there is an absence of adult protection and the body is subjected to strong, frequent and prolonged stress leading to permanent physiological damages to the child (Shonkoff et al., 2012).

In addition to short-term and observable physiological changes in children, toxic stress can cause permanent changes in brain structure and functions because of the plastic nature of fetal, infant, and early childhood brains (McEwen, 2005; McEwen Seeman, 1999). For example, prolonged exposure to stress can trigger chronically activated physiological stress response and also increases fear and anxiety. It also impacts memory and mood-related functions making it difficult for affected kids to excel at linguistic, cognitive and social- emotional skills (National Scientific Council on the Developing Child, 2005).

2.5 Physiological Theories Related to Stress

While biological theories related to stress focus on the body's responses to stress by hormones, physiological theories explain the cumulative effect of the interaction between chronic stress and hormones. One such theory that can explain this relationship is the allostatic load theory. Allostasis is the "process of achieving stability through change" (McEwen Wingfield, 2003, p. 3) which is different from the homeostasis process that stabilizes physiological systems such as pH, body temperature and glucose levels. In a homeostatic environment, the internal environment of the organism is maintained steady whereas allostatic environment requires continuous evaluation of physiological needs and adaptations to these needs (Karlman et al., 2002). Allostatic load occurs when the normal allostatic processes fail to occur because they either wear out, fail to disengage or shut off, thereby disabling the physiological systems to constantly adapt to changing environment (Seeman et al., 2004) due to frequent and chronic exposures to stress. This chronic stress disrupts several physiological systems including the HPA, sympathetic nervous system and the immune system (Logan Barksdale, 2008).

McEwen (2002) suggested four response patterns in allostatic load due to environmental challenges. In the first pattern, there are continued environmental assaults resulting in allostasis

over time. In the second pattern, the organism is not able to acclimatize with the stressful stimuli. In the third pattern, the organism remains at hyperactivity state without sufficient recovery whereas, in the fourth pattern, the adaptation mechanism is inadequate that leads to activation of a compensatory mechanism. These four different types of mechanisms may occur in unison or may occur alone, which ultimately results in chronic illness (McEwen, 2002). For example repeated elevated blood pressure can increase the chances of atherosclerotic plaques and thus greater risk of cardiovascular disease (Luecken Lemery, 2004; McEwen, 2002). Increased allostatic load due to repeated experiences of racism, discrimination, and disparity in access to health services is thought to be one of the reasons for poor health outcomes in ethnic minority groups as well (Carlson Chamberlain, 2005). Physiological dysfunctions due to chronic stress are also associated with numerous poor health outcomes such as cardiovascular disease, viral hepatitis, liver cancer, asthma, chronic obstructive pulmonary disease, autoimmune disease, poor dental health, and depression (Shonkoff et al., 2012).

2.6 Social Theories Related to Stress

Since it is inherently difficult to pinpoint why adults engage in child maltreatment, another avenue that can possibly explain the continued occurrence of child maltreatment is to examine the social and cultural context. Some form of violence occurs daily in our lives and is even acceptable. For example, many people believe that children need to be disciplined and that parents should be willing to hit their children when they misbehave (Miller-Perrin Perrin, 2012). Spanking is a common method to discipline children around the world and in the US (Gershoff, 2013; Regalado et al., 2004). A study conducted by Regalado et al., (2004) found that two-thirds (65%) of young children aged 19-35 months were spanked by their parents. In another study by Bender et al.,

(2007), 85 percent of teenagers reported being slapped by their mothers at some point. These statistics show that some forms of violence are culturally accepted.

As human beings are social and our culture and socialization influence our way of living, reasons for child maltreatment can also be looked through the social learning theory (SLT). SLT suggests that “new patterns of behavior can be acquired through direct experience or by observing the behavior of other” (Bandura, 1971, p. 3) and has been referred to as modeling. While learning, people not only perform actions. They also observe the consequences of their action. In case of child maltreatment, a child’s exposure to or witnessing violence (example, being hit/spanked for yelling) and the reinforcement of violence through the desired results (i.e., the child stops yelling) teaches the child that violence works and is an acceptable social behavior. Thus, violence is reinforced as a way of fulfilling their demand. When children are continuously exposed to violence and other abuses, they are also deprived of developing a meaningful and nurturing relationship with the adults. They learn that violence is perhaps an acceptable way, or even the only way to resolve family issues and express emotions (Miller-Perrin Perrin, 2012). In addition to this, in many households with higher rates of abuse and neglect, caregivers often fail to model effective strategies to cope with stress, further potentiating the stress response and increasing the risk that children engage in maladaptive coping (i.e. substance use).

Another social theory that explains the occurrence and continuity of child maltreatment is social bonding theory. This theory posits that human beings are “inherently motivated to commit deviant acts” (Miller-Perrin Perrin, 2012, p. 42). Whereas most theories have tried to explain the reasons for the occurrence of child maltreatment, social bonding theory questions given the cultural and social factors where family violence is encouraged, why don’t adults abuse children? (Miller-Perrin Perrin, 2012). There are four constructs of this theory; attachment to significant

others, commitment to traditional types of action, involvement in traditional activities, and beliefs in the moral values of society (Ozbay Oz- can, 2006). Out of these four constructs, commitment, attachment, and belief are important aspects while explaining child maltreatment. Commitment is the cost of investing in actions. Parents who have a lot to lose at stake are less likely to abuse their children. Attachment is the bond between significant people. People with significant attachment do not want to disappoint people who are important to them. Thus, those with less significant attachment are prone to commit deviant acts. Finally, belief is the degree where one feels whether it is wrong to break formal and informal laws. If a person believes that rules against child maltreatment do not matter to them, they are more likely to abuse children. Thus, the social bonding theory shows that social isolation is correlated with child maltreatment. Coohy, (2000) found that abusive parents had fewer contacts with their peers and with their immediate family members and other relatives than non-abusive parents. Specifically, abusive fathers spent only five hours a day watching children compared to nine hours a day among non-abusive fathers.

2.7 Child Maltreatment and Disease in Adulthood

Numerous studies have linked ACE with negative health outcomes in adulthood. Seminal works for ACE and poor adult health were first conducted by Vincent Felitti and Robert Anda in 1997 (Felitti et al., 1998) in the CDC-Kaiser Permanente Adverse Childhood Experiences (ACE) Study. The original study, along with other studies conducted thereafter, have found that at the individual level, exposure to childhood adversities increases the risk factor for cancer, cardiovascular disease, chronic obstructive pulmonary disease, depression, anger, fear, anxiety, and maladaptive coping behaviors such as using alcohol (Anda et al., 2006; Hughes et al., 2017; Shonkoff et al., 2012). At the societal level, in FY 2015, the economic impact of child maltreatment accounted for \$428 billion in the US (Peterson et al., 2018). Additionally, individuals with

significant childhood adversities are less likely to have insurance but have higher usage of general practitioners and emergency department (Alcal'a et al., 2017). Individuals with high ACEs tend to make appointments than the ones without ACEs but were more likely not to keep or miss their appointment (Koball et al., 2019). All of these examples show that adversities during childhood will have a negative impact on the health of an individual. This section will provide a review of the available diseases/disabilities and other negative health outcomes associated with ACE. It will also highlights the need of importance of early detection of signs and symbols of maltreatment among both children and adults by clinicians, primary care doctors, social workers, mandatory reporters, teachers, and policymakers and calls for effective intervention to minimize the negative consequences of ACE.

A plethora of studies have found that many of the diseases and poor health in adulthood can be traced to negative childhood experiences such physical, sexual, and emotional abuse (Dube et al., 2010; Halonen et al., 2015; Norman et al., 2012). Furthermore, family dysfunction and socioeconomic status of the family also plays an important role in the occurrence of maltreatment (Lawson et al., 2017; Lefebvre et al., 2017). About 50% of adults in the US experience some kind of ACE during their childhood (Schu'ssler-Fiorenza Rose et al., 2014). The original ACE study also found that individuals with multiple adversities also tended to have multiple health risks (Felitti et al., 1998). For example, individuals with four or more adversities had "4 to 12 fold increased risk for alcoholism, drug abuse, depression, and suicide attempt; a 2 -to 4-fold increase in smoking, poor self-rated health, ≥ 50 sexual partners, and sexually transmitted disease; and a 1.4- to 1.6-fold increase in physical inactivity and severe obesity" (p. 774). They also found a graded relationship between ACE and heart disease, cancer, lung disease, skeletal fractures, and liver disease (Felitti et al., 1998). Another study conducted by Chartier, Walker, Naimark (2010)

also found that additional ACE posed additional health problems. There is 1.22 increased risk for multiple health problems due to each additional ACE. Specifically, chances of multiple health problems increased by 22% with one adverse experience, 48% with two adversities and by 172% with five or six reported ACE (Chartier et al., 2010). Some of the notable disease conditions that can be linked with childhood adversities are discussed in the following section.

2.7.1 Cardiovascular Disease

Relationship between heart disease and ACEs demonstrates that heart health is linked to ACEs. Dong et al., (2004) found that any ACE exposure except parental discord increased the risk for ischemic heart disease (IHD). Persons with more than 7 ACEs had 3 fold increased for IHD than persons with no ACE and every additional ACE increased IHD by 20%. In another study by (Fuller-Thomson et al., 2012) found that males who survived childhood sexual abuse (CSA) were three times more likely of having myocardial infarction when compared with those without CSA histories even after controlling for “age, race, adult SES, health behaviors, social support, mental health, diabetes, and health care use” (p. 659). However, CSA histories had no significant relationship with heart attack among women. This finding contradicted with the findings from Goodwin Stein (2004) because Fuller-Thomson et al., (2012) defined CSA only based on penetrative sex whereas Goodwin and Stein included both rape and sexual molestation. Lastly, Rich- Edwards et al., (2012) found that childhood physical abuse and heart disease were strongly associated. Women who reported being physically abused had 46% and women reporting CSA had a 56% increased risk for heart disease. They also found that CSA and physical abuse occurred concurrently (Rich-Edwards et al., 2012).

2.7.2 Chronic Obstructive Pulmonary Disease (COPD) and Lungs Disease

Anda and colleagues (2008) studied ACE score and COPD and found as ACE scores

increased, the risk for COPD also increased. The risk for COPD was doubled with an ACE score greater than 5 when compared to people with a score of 0. Ford and colleagues (2011) also found that each of the 8 areas of ACE scores were significantly associated with smoking. They also found individuals with an ACE score ≥ 5 was more likely to be currently smoking than those with a score of 0. Anda and colleagues (1999) thought that adolescents and adults used early initiation of smoking behavior as a coping mechanism to deal with addictive effects of nicotine. Additionally, children with no ACE initiated smoking at 20.9 years whereas those with all 8 ACEs initiated smoking at 17.3 years. Adolescents who smoke earlier than the legal age are at increased risk of being fined or criminally charged. Furthermore, they are also more likely to suffer from smoking-related diseases due to prolonged smoking (Anda, Croft, Felitti, et al., 1999). In another recent study between ACE and lung cancer, individuals with score ≥ 6 were three times more likely to have lung cancer when compared with a score of 0. People with a score ≥ 6 had higher hospitalization rates and lived 13 years shorter due to lung cancer than those without ACEs (Brown et al., 2010).

2.7.3 Autoimmune Diseases

Autoimmune diseases (AD) are a group of 70 to 80 different inflammatory disorders which affects about 3-8% of people in the US. An overwhelming majority (80%) of AD occurs among women because of the differences in immune response between male and female (Dube et al., 2009). For example, women produce antibody higher than men when responding to infection, immunization, or trauma whereas men have inflammation more severe than women (Fairweather et al., 2008). A study by Danese colleagues (2007) found that childhood maltreatment elevated the C-reactive protein levels (CRP) (an inflammation biomarker that has a role in AD) even after 20 years which suggests that childhood maltreatment can increase inflammation rate. By using data

from the original ACE study, Dube and colleagues (2009) studied the role of childhood maltreatment and the risk for 21 ADs. They found that as ACE score increased, then chances for hospitalization also increased. For example, between individuals with ACEs and no ACEs, there was a 70% increased chance of hospitalization for Th 1, 80% increased chance for Th 2, and a 100% increased risk for rheumatic disease among individuals with $ACE \geq 2$. Furthermore, chances of first hospitalization for any kind of AD was higher among adults endorsing 2 or ≥ 3 ACEs versus adults with no ACEs. Additionally, hospitalization rates for AD increased as the years of the individual increased (8.8 for 19-44 years; 26.0 for 45-64 years, and 56.8 for ≥ 65 years). Among different types of ADs, when compared with persons with no ACEs, individuals reporting ≥ 2 ACEs had 70% increased the chance for Th1, 80% increased chance for Th2 and two-times the risk for rheumatic diseases as well. These results show that being exposed to childhood maltreatment is detrimental for one's immune health as well.

2.7.4 Diabetes

Studies involving ACE and diabetes are fairly new and concrete causality has not been established yet. However, in a 20-year longitudinal study by Campbell and colleagues (2019) found that there is a strong association between 'diabetes and ACE' and mortality but there is a huge difference when "diabetes only" and "ACE only" are studied separately. They found that adults with both diabetes and ACEs have a 2.3 times higher mortality rate than adults who do not have any diabetes and ACE. Existing literature needs to examine the co-occurring impact of both diabetes and ACEs. However, (Deschenes et al., 2018) found that ACEs were related to diabetes with every additional score of ACE increasing the risk of diabetes by 11%. The results might be conflicting because literature lacks information on "whether the co-occurrence of ACEs with a chronic disease, such as diabetes, explains the increased risk for mortality, or if the co-occurrence

of ACEs and chronic disease amplifies the risk of early mortality” (Campbell et al., 2019 p. 20).

2.8 ACEs and Maladaptive Coping in Adulthood

The impact of ACEs are not limited to the early childhood phase, they extend to adult life as well. As each individual internalizes traumatic events differently, they also use their own unique ways to cope with the events. The following section discusses some of the common maladaptive coping techniques used by individuals with history of ACEs.

2.8.1 Problematic Alcohol Use

ACEs have been associated with maladaptive behavioral choices in the adulthood. For example, authors (Dube et al., 2002) found that having one parent with alcohol use disorder increased the risk of alcohol-related problems like engaging in heavy drinking, having alcohol-related problems, alcohol use disorder, and marrying a partner who also uses alcohol in adulthood. Adults with a minimum of four ACEs were two times more likely to engage in heavy drinking and three times more likely to have alcohol problems than those with no ACEs. Additionally, individuals whose parents had alcohol use disorder and those who had 4 or more ACE score were at the highest risk for heavy drinking (24.2%) and self-reported alcohol problems (30.7%). Lastly, having any ACE also increased chances of using alcohol during adolescent age rather than after reaching adulthood and ACEs also increased chances of using alcohol during middle adolescence (15-17 years) by 20% to 70% (Dube et al., 2002).

2.8.2 Smoking

Studies examining relationship between ACEs and smoking found a bidirectional relationship where an increased ACEs showed increased tendency for smoking behavior. For example researchers (Ford et al., 2011) found that individuals with more than 5 ACEs were twice

as likely to be a current smoker and were also less likely to try quitting than individuals without ACEs. In another study in California, Hispanic adults with a gradual increase of ACE score from 0 to 8 was associated with smoking (22%), binge drinking (24%), marijuana use (31%) and with hard drug use (12%) (Allem et al., 2015); which suggests that smoking can be used as a gateway substance for other dangerous substance abuse habits. Strine and colleagues (2012) have found smoking being used as a coping mechanism because it has the “ability to modify mood, manage dysphoria, regulate negative affect, control situational anxiety, and improve concentration” (p.1).

2.8.3 Risky Sexual Behaviors and STIs

Adverse childhood experiences including abuses, poverty, low SES, low educational level and dysfunctional family can increase the risk for risky sexual behaviors. Women are disproportionately affected by engaging in higher risk for sexual behaviors than men because women are biologically more susceptible to sexually transmitted infections (STIs). They are also more likely to be left undetected due to being more prone to asymptomatic infections (Hillis et al., 2000). Hahm, Lee, Ozonoff, Wert (2010) found that an increase with ACE score also resulted in an increase in risky sexual behavior. For example, women who were not maltreated had the lowest proportion of risky sexual behavior such as low rate of STD diagnosis (9%), having sex for money (1.3%); having multiple sex partners (22.9%) versus 14, 1.9, and 30% respectively among those exposed to at least one type of maltreatment. Women whose ACE was ≥ 3 reported higher sexual outcomes such as having sex for money 9.6% to having multiple sex partners (38.2%). Additionally, not having adverse experiences acts as a protective factor for early initiation of sex. For example, only 6% to 8% of women who were not maltreated had sex before the age of 15 whereas about 12% to 17% women had sex if they had experienced at least one ACEs in childhood (Hillis et al., 2000). In another study of 241 Black women accessing public STD clinic, being

coerced, age of man ≥ 3 years also increased the chances of being sexually abused and early initiation of sex (Tsuyuki et al., 2019). Furthermore, each additional ACE score increased the risk of early sexual initiation as well.

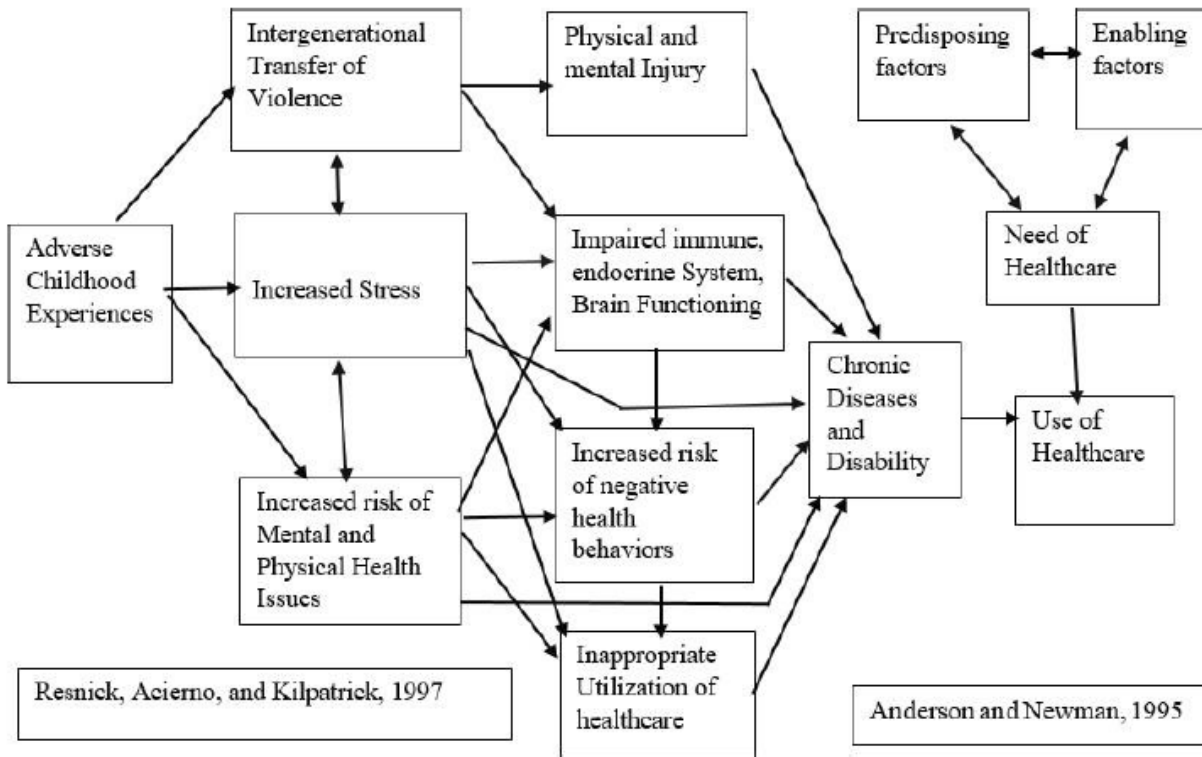
2.9 ACEs and Healthcare Utilization

The conceptual model for ACEs and healthcare utilization is derived from two models based on previous literature (see Figure 2.1). The model proposed by (Resnick et al., 1997) has been adapted to include ACEs. The model suggests that experiencing ACEs during childhood is responsible for an increased risk of injuries, violence and mental and physical health issues. The model explains the impact of ACEs which increases an individual's likelihood of using healthcare in the following sequence.

1. ACEs increases the risk for transferring violence to the next generation, it increases the stress in an individual experiencing it, which then increases the risk for a number of physical and mental health issues.
2. ACEs impact the endocrine, immune system and brain functioning which then increases an individual's chances of contracting diseases.
3. The cumulative stress from ACEs and weakened immune system of the body increases the chances of using negative coping behaviors and unhealthy behaviors such as smoking, alcoholism, substance misuse, poor diet, multiple sexual partners, being physically inactive which then are responsible for a number of chronic diseases and disability in future.
4. Because individuals with ACEs suffer from weakened immune system and are at risk for a number of risky healthy behaviors, they are more likely to engage in improper utilization of healthcare.

Although the original model by Resnick and colleagues focused on assault, this model can be utilized to explain how experience of traumatic events leads to increased health problems in general. For example, trauma survivors may experience elevated stress when going through certain gynecological procedures, dental procedures and while using anesthesia (Schnurr Green, 2004), which can lead female trauma survivors to not seek preventative care.

Figure 2.1: ACEs and Healthcare Utilization Model



Survivors of childhood sexual abuse (CSA) may not engage in preventative health due to fear as well. In a review suggesting best practices for dental treatment for CSA survivors, authors Dougall Fiske, (2009) reported that victims of CSA have difficulty tolerating dental treatment and thus tend to either cancel or avoid dental treatments completely because dental treatment and the office setting acted as a “trigger” for past events from dental procedures involving body positioning, being touched, feeling sense of loss of control, fear of judgement and criticism, being sensitive for smell and having to insert dental instruments in their mouth. Avoiding regular dental care may lead to further dental issues such as cavities, gingivitis, periodontitis, bad breath and pain in the mouth (U.S. National Library of Medicine, 2021). Additionally, trauma survivors may not use preventative health services due to psychological reasons as well. For example, Ford et al., (2005) reported that patients with mental health diseases such as anxiety and depression were more likely to reschedule, miss or cancel their primary care appointments and individuals with alcohol use

disorders also tend to have low utilization of primary healthcare. Their research shows that individuals with traumatic experience demonstrate issues related to trust, attachment and decreased psychosocial functioning which may interfere with routine medical screenings, which further reduces the likelihood or prevent future issues with health. Current research on ACEs and usage of preventative health has found two themes-either an over utilization of health services such as higher usage of general practitioners and higher repetition prescription medication (Hardcastle et al., 2020) or underutilization of preventative health services due to fear of experiencing painful past experience (Dougall Fiske, 2009; Schnurr Green, 2004).

The second model proposed by (Andersen, 1995) suggests that utilization of health-care is a result of an interaction between the predisposing factors, enabling factors and personal need. The predisposing factors include socio-cultural factors that are present before the individual utilizes healthcare. It has three constructs that include specific factors that either helps or hinders use of healthcare such as social structure which includes education, occupation, ethnicity, social networks, social interactions, and culture. Under the health belief constructs, factors such as attitudes, values, and knowledge of health system are included and age and gender are included in the demographic predisposing factors. The second construct of the Anderson model is the enabling factors which are conditions that favors the use of healthcare. There are two levels of enabling factors-personal/family and community enabling actors. Factors such as having access to a source of healthcare, stable income, health insurance, access to transportation and stable social relationships are included at the personal and family level, whereas at the community level, factors such as availability of healthcare professional and the facility itself, and wait time at the facility are included. It should be noted that in order to utilize healthcare, both personal and community level enabling factors should be present. Lastly, the most important construct of the Anderson

model is the need factor which largely dictates whether one would use healthcare or not. Needs include factors such as perceived self-rated health status, chronic conditions, and restricted activity due to disease or disability (Jang et al., 2010). In regards to needs, a perceived needs such as an individual's belief about their own health status and experience of pain and discomfort persuades an individual to utilize healthcare whereas an evaluated needs such as professional opinions of the healthcare provider regarding the health/disease status persuades individual to utilize health care. Anderson model of healthcare utilization is appropriate because previous research as established that individuals with ACEs are more likely to have low education, low income, reduced social interaction, their enabling factors are not as strong and are in greater need of healthcare than those with low or no ACEs.

CHAPTER 3

METHODOLOGY

This section discusses the research methodology utilized for this investigation, including the research design, participants, inclusion/exclusion criteria, instruments and variables, problem statement, research questions, dependent variable, independent/control variables, procedures for controlling independent variables, preliminary analysis, statistical analysis, and sampling sample size calculation.

3.1 Research Design

Data for this dissertation was received by the courtesy of Texas Department of State Health Services through the Behavioral Risk Factor Surveillance System (BRFSS) survey. The BRFSS is an annual, state-based, random-digit-dial telephone survey that collects data from non-institutionalized U.S. adults regarding health conditions and risk factors. The BRFSS questionnaire includes a set of core questions asked to all participants in all states in the US and states add their own set of optional questions. Texas included ACE questionnaire on its BRFSS in 2015 and the response rate was 34.4% (CDC, 2019). Procedures for this study were approved by the primary investigators' institutional review board (IRB).

3.2 Participants

Individuals who were 18 years or older at the time of the survey were eligible for 2015 BRFSS survey. Individuals should be non-institutionalized to be eligible for participation. Participation in the survey is completely voluntary in nature.

Individuals who are above 65 years were excluded because previous research has shown that they tend to utilize healthcare more often than the younger population which increases the chances that they have either begun to or are already utilizing more preventative health services.

For example, Vegda et al., (2009) found that as the age increases, so does the general healthcare utilization. Their study found that healthcare utilization was the highest among 80+ age group which utilized more family physician visits (average of 4.4 visits per person per year), emergency room visits (average of 0.22 ER visits per year per patient), diagnostic days (average of 5.1 test days per person per year), health conditions (average of 7.7 per patient), and medications average of 8.2 medications per person). In the US, an individual at 65 years automatically qualifies for Medicare and it includes “Welcome to Medicare” program which provides beneficiaries with an updated physical examination, screenings and vaccinations within the first 12 months of their enrollment that allows providers to learn about the patient’s medical history. Additionally, all the screenings and preventative health services utilized in this dissertation (cholesterol screening, blood pressure screening, and receiving flu shot) are also included in the Medicare plan (Sloan et al., 2012), which justifies excluding individuals above 65 years from the study. Lastly, preliminary analysis of the data revealed that over 87% of research participants over the age of 65 had received routine health screening in the last year and therefore they were excluded from the study sample, resulting in an overall ($N = 9096$).

3.3 Instruments and Variables

3.3.1 Adverse Childhood Experiences (ACEs)

The Texas BRFSS questionnaire used a cross-sectional retrospective research design while asking questions about individuals’ exposure to ACEs and included 11 questions. Categories of childhood abuse in TX BRFSS included physical abuse (1 question), childhood emotional abuse (1 question), and sexual abuse (3 questions). There were four types of household dysfunction in the survey: exposure to substance abuse (2 questions), household mental illness (1 question), and parental discord (3 questions). The ACE questionnaire has been used extensively in literature and

is a valid and reliable survey with already established psychometric properties. For example, authors Ford et al., (2014) found that when all 11 ACE items had an acceptable degree of internal consistency when taken together as a group which suggested that the total ACE score, obtained after summing up individual ACE scores represent an overall or global ACE score. Authors (Murphy et al., 2014) found a high internal consistency (Cronbach's = .88) among the ACEs questions. Questions from the BRFSS questions related to ACEs are included at the appendix.

3.3.2 Calculating ACE Score

In most studies involving ACEs, ACE score is generated which provides information about exposure to ACEs (Brown et al., 2009). The ACEs score were calculated using a method outlined by Ford et al., (2011). Using their method, the ACE score is defined as a simple summation of exposure to each ACE category occurred during the first 18 years of life of the respondent. Exposure to any ACE category were counted as one point on the score. In another study measuring the psychometric properties of ACE score, authors Ford et al., (2014) found that when all 11 ACE items had an acceptable degree of internal consistency when taken together as a group which suggested that the total ACE score, obtained after summing up individual ACE scores represent an overall or global ACE score. The total ACE score for each participants was calculated by recoding the following questions using the same scoring technique developed by Ford et al., (2011).

- Participants who answered “yes” to questions 1, 2 3, and 4 were assigned as 1, and those who answered “no” or “don’t know/not sure” were assigned as 0.
- Participants who answered “yes” to question 5 were assigned as 1 and those who answered “no”, “parents not married” or “don’t know/not sure” were assigned as 0.
- Participants who answered “once” or “more than once” to question 6, 7, 9, 10 and 11 were assigned 1 and those who answered “never” or “don’t know/not sure” were assigned 0.

- Participants who answered, “more than once” to question 8 were assigned 1 and those who answered “never”, “once” or “don’t know/not sure” were assigned 0.

Some of the ACE questions measured same constructs and therefore they were recoded into a single construct. Questions 2 and 3 were recoded as substance abuse in the household construct and questions 9, 10 and 11 were recoded as sexual abuse construct. The total ACE score was calculated by summing the 0/1 values for question 1, 4, 5,6,7,8 and substance abuse in the household and sexual abuse construct. This practice is consistent among ACE research and was also the method used in original research. After calculating the total ACE score, it was divided into two groups-less than 4 ACEs and greater than 4 aces as the original study found that individuals with more than 4 score have higher chances of negative health outcomes (Felitti et al., 1998). The dichotomous ACEs score were used to measure if differences existed between these two groups on their screening behavior for cholesterol, high blood pressure and receiving flu shot.

3.4 Problem Statement

Research on ACEs and their impact on health has clearly established a link between ACEs and risk for long-term negative health behaviors including depression, suicide, substance misuse, early sexual debut, multiple sexual partners, heart disease, cancer, obesity, tobacco use, alcohol abuse, diabetes, lung disease, improper utilization of healthcare (Alcal’a et al., 2016; Anda et al., 1999; Cheong et al., 2017; Murphy et al., 2014; Oral et al., 2016). The literature has established a clear between ACEs and an increased risk for several chronic diseases including obesity, high blood pressure, and high cholesterol levels (Danese et al., 2009).The costs associated with ACEs have a significant financial burden to the US health-care system. For example, the state of California spent \$10.5 billion dollars in healthcare spending due to ACEs which included \$4.4 billion for ACEs-related cardiovascular diseases, (\$2.8 billion for depression, \$1.9 billion for COPD, \$708 million for arthritis, \$401 million for asthma, \$169 million for alcohol abuse

treatment, \$40 million for obesity treatment and \$2 million for smoking treatment (Miller et al., 2020). Screenings for chronic diseases have a number of benefits including early detection of the disease which can lower the impact of the disease including disability and early death and also reduce the medical costs associated with the disease (Chien et al., 2020). As previous research has shown that individuals with ACEs are more likely to engage in risky health behaviors that accelerate the chances of suffering from chronic diseases, the importance of routine health screening is more pronounced in this population. With this information, the following research questions are examined;

1. What is the prevalence of ACEs among this sample?
2. Is there a relationship between ACEs and individual's ratings of overall health status among individuals with low (four or less ACEs) and high (four or more ACEs)?
3. Does type of ACEs (physical, emotional or sexual abuse, or household dysfunction) predict participating in routine health screening?
4. Is there a difference in screening behaviors among individuals with low (four or less ACEs) and high (four or more ACEs) as it relates to routine health screenings (i.e. cholesterol, hypertension, and flu)?

3.5 Dependent Variable: Routine Health Screening

Involvement in routine health care screening was measured by asking participants to indicate (yes or no) whether they “Had a routine check-up in the past year”, responses were coded as 0 = no, 1 = yes for analysis.

3.5.1 Self-rated Health

Participants were asked to self-rate their general health on a 5 point Likert scale (1 = Excellent; 5 = poor). Authors Hays, Spritzer, Thompson, Cella, (2015) have found that collapsing the five-level response to just dichotomous response of “excellent to fair” category is useful for population-level monitoring. Additionally, as the dichotomous variable measures the general

health perceptions, it also “reflects what is important to the patient in evaluating their health” (p. 1516). Previous research has consistently shown (Bombak, 2013; Lorem et al., 2020; Wu et al., 2013) that the dichotomous measure of self-rated health is significantly related to healthcare utilization and mortality rates. Therefore, in line with previous research self-rated health was recoded to dichotomous variable with general health “fair or poor” (yes =1, No = 0) in the analysis. This self-rated health status was used to measure if difference existed between those with less than 4 ACEs and those more than 4 ACEs.

3.5.2 Screening for Specific Health Conditions

Screening-related health behaviors were measured for cholesterol, blood pressure, diabetes, and flu. For cholesterol, screening behavior was measured by the question “Have you had cholesterol checked within last 5 years” with options “yes” and “no”. Similarly, for hypertension screening, it was measured by “Has the doctor diagnosed you with high blood pressure” with “yes” or “no” options. Lastly, for the flu it was measured by the question “During the past 12 months, have you had either a flu shot or a flu vaccine that was sprayed in your nose”? , with option “yes” or “no”. All of these screening behaviors will be the independent variables.

3.6 Independent Variables

Variables that were included as independent variables were 8 types of ACEs (Yes/No), employment and insurance.

3.6.1 Employment

Employment plays an important role in the overall wellbeing and financial situation of an individual. In general, the relationship between employment and overall health is bidirectional where employment improves the health status of an individual because it provides additional

benefits such as insurance, employee assistance program and sick leave. Furthermore, healthy individuals are more likely to work because being healthy increases their chances of being hired or keeping a job (Ross Mirowsky, 1995). It also provides monetary benefits which an individual can use for a variety of needs including improving their health.

In addition to financial wellbeing, being employed also has psychological benefits such as self-worth, self-efficacy, having a sense of purpose and identity in life which are an important component of one's mental health (Goodman, 2015). Previous studies on the role of employment and mental well-being have found that people experience a significant deterioration of their mental health while being unemployed and a significant improvement in their mental health when an unemployed individual finds a new job (McKee-Ryan et al., 2005). Furthermore, employment status also dictates the use of preventative health and primary care services. For e.g., in a South Korean study with 16,964 samples, authors Kim, Song, Oh, Park, (2018) found that between the non-standard workers (part-time, temporary, and daily workers), the self-employed (those who had their own business), and unpaid family workers used less preventive health care compared to the standard workers (those who had full-time jobs and permanent contracts). In particular, the self-employed were less likely to use services such as routine medical check-up, cancer screenings and flu shot than the standard workers. However, the unpaid family workers showed mixed results with low rates of flu vaccine and participating in regular health screening, and comparable participation in the cancer screening with that of standard workers. In another study examining the utilization of healthcare during the 2008 economic recession in the US, authors Hamad et al., (2016) found that employees working in a high-layoff plants had decreased use of outpatient care (-4 visits per month per 10,000) which suggested that they bypassed preventative care while increasing the use of emergency care visits (0.4 visits per month per 10,000). In another study

examining the health impacts of economic recession of 2007-2009, authors Modrek Cullen, (2013) found an increased incidence of diabetes and hypertension and an increased use of mental health services. Therefore, employment status was used as independent variable.

3.6.2 Insurance

In the US, most Americans get their insurance through their place of employment which is different than most European countries where universal healthcare is provided by the government. Additionally, since most health insurance is offered to full-time employees, Americans are more likely to get a job that provide such benefits (Feng Zhao, 2018). Insurance benefits plays a huge role in whether one wants to work full-time/part-time, to get a certain kind of job, try to remain employed in a job that has good insurance, it affects retirement decisions and is an important incentive to attract and retain talents in the workforce (Buchmueller Monheit, 2009).

Additionally, whether or not having insurance can dictate when and how healthcare would be utilized. For e.g., individuals with health insurance are more likely to see their primary care provider regularly and are more likely to get routine screenings for blood pressure, cholesterol, and hypertension, thereby increasing the usage of preventative care (Goodman, 2015). Research has shown that people without insurance cannot access healthcare than those with insurance and thus have worse health outcomes. They also forgo necessary medical care and are less likely to receive preventive care and services for major health conditions and chronic diseases than ones with insurance (Tolbert et al., 2016). Utilizing healthcare more when one has insurance has also been demonstrated by the Oregon Medicaid study which showed that once people received “free” healthcare there was an increase in overall healthcare utilization (including both primary and preventive care as well as hospitalizations), lower out-of-pocket medical costs, medical debt and

reported having better physical and mental health than those without the Medicaid (Finkelstein et al., 2012). Therefore, health insurance was used as an independent variable.

3.7 Control Variables

3.7.1 Age and Healthcare Utilization

Among several factors affecting utilization of healthcare, age is an important factor and the age of the individual influences the utilization of healthcare. For e.g., a 2015 report by the Institute of Medicine (IOM) found that young adults (individuals between 18-25 years) have worse health outcome than adolescents and adults (Institute of Medicine and National Research Council of the National, 2014). The report found that young adults had the highest risk for unhealthy behaviors such as high tobacco use, poor nutrition, and have higher rates of deaths from motor vehicles, homicides, mental health problems, sexually transmitted infections (STIs), and substance abuse than adolescents and adults. Additionally, young adults have the lowest rates of coverage from health insurance than any other age group, despite a number of serious health issues (Lau et al., 2014) and therefore they tend to underutilize the healthcare system and have higher rates of emergency room visit rates, low preventative care visits and high rates of delayed and forgone care (Park et al., 2011) compared to individuals who are immediately younger and older than them. Young adults with low SES and those in ethnic and minority group are more vulnerable to have adverse health conditions and they often lack safety net programs than those with higher SES. Therefore, there is a greater need to include both medical and behavioral healthcare preventive care, and evidenced-based interventions while transitioning from pediatric health services to adult health services (Institute of Medicine and National Research Council of the National, 2014).

In another study examining healthcare utilization among elderly adults in the US, the elderly individuals tend to underutilize recommended preventative health services than any other

group even though use of these services are more likely to detect diseases earlier and improve their quality of life (Nicholas Hall, 2011). In another study, Vegda et al., (2009) investigated the utilization of healthcare, medication use among older adults in primary care settings and found that patients aged 80 and over had a significantly higher number of primary care visits, emergency room visits, more usage of diagnostic tests and a higher number of medications. All of these studies point that age is one of the important predictors of preventative health services and therefore it is included as a control variable.

3.7.2 Gender

In the same study by Vegda et al (2009) researchers also found gender differences in healthcare utilization as participants who were female had more primary care visits than males, while and males had more specialty visits, ER visits, and surgical admissions. As the authors found that females had more primary care visits but males had more specialty visits, their findings support the general trend that men delay preventative health services and thus require further visits to a specialist. In a report examining gender differences in healthcare usage by the Kaiser Family Foundation (KFF), authors Salganicoff et al., (2014) found that only about 68% of men compared to 81% of women men had a specific clinician for their routine care. However, women who were young, of Hispanic race, had low income and were uninsured were less likely to have a usual source of care. Similarly, the same report found that men are less likely than women to have seen their provider in the last two years and also men are less likely than females to get recommended screening services. For e.g., only about 68% of men compared to 82% of women reported having received recommended screening services such as blood pressure and cholesterol in the last two years. Lastly, out of 2907 women in the survey, only about 57% knew that the ACA covered for preventative screening services such as mammogram. These type of gender difference in

knowledge and utilization of preventative health services are important in public health because increased knowledge about services usually increases utilization as well. Therefore, gender is included as one of the control variables in this study.

3.7.3 Race/Ethnicity and Healthcare Utilization

Previous research has consistently shown that race/ethnicity of an individual impacts the utilization of healthcare. For e.g., in a study examining gender and racial disparities in utilization of health care, authors Dunlop et al., (2002) reported that African American men had less physician visits, minority men and non-Hispanic women utilized fewer outpatient surgery, and Hispanic women were less likely to use nursing homes for rehabilitation even after controlling for their needs and predisposing factors. Experience of perceived and occurrence of racial discrimination is associated with a number of negative and risky health outcomes such as low birth weight infant, having high blood pressure, smoking, depression and using alcohol (Lee et al., 2009). Racial discrimination also leads to underutilization of healthcare such as lower use of cancer screening and pharmacy services (Alcal'a Cook, 2018a). Additionally, patients who experience racial/ethnic discrimination at healthcare settings have higher chances of delaying filling their prescription, delaying necessary tests and tend to dis-trust the healthcare system thereby discouraging future usage of healthcare (Van Houtven et al., 2005). Similarly, Egede (2006) found that racial and ethnic minority individuals tend to receive lower quality of care than non-minorities and that individuals from minority group have greater morbidity and mortality from chronic diseases than non-minorities. Thus racial discrimination has many implications in healthcare utilization including minimal use of healthcare services and less participation in cancer screening, pharmacy services, and even utilization of mental health services (Alcal'a Cook, 2018b).

Among the existent racial and ethnic groups, authors (Boulware et al., 2003) found that

non-Hispanic blacks trusted their physicians less than non-Hispanic whites. Non-Hispanic blacks were also more concerned about privacy and believed that they had greater possibility of being the subject of experimental procedures than non-Hispanic Whites. In another study examining previous discrimination experiences and the ease of giving their race/ethnicity information, authors (Kandula et al., 2009) found that Hispanic and Asians participants felt more discomfort while giving their race/ethnicity information to healthcare providers than White and Black participants, while Hispanic and multiracial participants felt worried that their race/ethnicity information could potentially be used to discriminate. In another study examining the role of race/ethnicity in use of preventative services among cancer survivors having Medicare, authors Cheng, Lee, Salloum (2016) found a significant racial differences in preventative services use among minorities and Whites cancer survivors. In terms of specific services utilized, the authors found that African Americans were less likely to get pneumonia shot and Hispanics were less likely to receive both the pneumonia and flu shot compared to non-Hispanic White survivors even after adjustment for enabling factors for use of preventative services. All of the above researches have consistently demonstrated that race and ethnicity plays an important role in health care utilization, especially as it relates to screening and prevention services which are an essential aspect of maintaining health.

3.7.4 Marital Status

Being married seems to work as a buffer against many negative health outcomes. For e.g., in a study examining differences in healthcare utilization between married vs. non-married individuals after a complex surgery, researchers found shorter length of stay (5.0 days vs 6.0 days, $p < 0.001$), higher rates of home discharge (87.8% vs 76.0%, $p < 0.001$), and lower rates of unplanned readmission (17.3% vs 19.7%) among married individuals even after adjusting for

several covariates (Bucher et al., 2019). Robards, Evandrou, Falkingham, and Vlachantoni (2012) examined the role of marital status on health, and found that unmarried individuals generally reported having poor overall health and had higher mortality risk than their married counterparts. Additionally, in another study examining the relationship between marital status and the use of outpatient, inpatient and skilled nursing home facilities among Medicare beneficiaries, researchers found lower odds of self-reported inpatient and SNF use among married respondents than non-married beneficiaries. Their findings led to conclude that marriage has influences health status through the support and protection that it offers and therefore, marriage can also lead to an efficient use of healthcare (Pandey et al., 2019).

In another study examining marital status and health behaviors among 7,513 Korean adults, Kim, Lee, Park, (2018) found that “both men and women living without their spouses had higher risks for poor health behaviors and illness including smoking, binge drinking, inadequate sleep duration, hypertriglyceridemia and depressive mood compared to those living with their spouses” (p.e102). Lastly, in another study examining marital status and participation in colorectal cancer screening in the UK among 4,130 participants aged 55-64, researchers found that married or cohabitating couples had more positive intentions and higher screening participation rates for cancer screening than non-married participants after controlling for age and educational level. Additionally, screening intentions were higher among women when their partners were also invited (co-invitation) after adjusting for the marriage effect (Van Jaarsveld et al., 2006). All of these findings and research point that marital status influences health behaviors and risk factors and therefore have an influence in health care utilization. Hence it was used as a covariate and was controlled.

3.8 Procedure for Controlling Independent/Control Variables

In this study, a total of ten independent variables (8 ACEs questions, employment and insurance) were used. Additionally seven variable (age, gender, race/ethnicity, marital status, education, income and whether having a personal doctor or not) were used as control variables. The control variables were collectively called as social determinants of health (SODH) variables from hereon. In a logistic regression model, the presence of a large number of explanatory variables can weaken the true relationship between variables, which then results having large standard errors with wide and imprecise confidence intervals, or, conversely, identify spurious associations (Ranganathan et al., 2017). Therefore, in order to truly capture the role of SODH on DV (having a routine checkup in the last year), propensity scores were generated.

Propensity Score (PS) was first proposed by Rosenbaum and Rubin in 1983 to reduce bias arising from confounding variables in observational studies (Mason et al., 2019). The propensity scores are the set of conditional probabilities for each individual participant of either receiving the treatment or intervention based on their given characteristics such as “gender, race, or neighborhood poverty level” (Schroeder et al., 2016 p. 466). The value of PS ranges from 0 to 1. It is calculated by only using the covariates under study by using logistic regression where the outcome is “the log odds of a binary variable (receiving the treatment or being in the control group). The predictors are the k potential confounders of treatment effect” (p.467). In this study, seven covariates (which were collectively referred as SODH) were used to calculate the propensity score on the outcome, i.e., if they received routine health screening in the past year or not. Propensity scores have successfully been used in public health discipline including cross-sectional studies (Mason et al., 2019) and therefore would serve a good method to control for the collective

effect of covariates by creating a single score for each participants from a set of related covariates (Garrido et al., 2014).

3.9 Preliminary Analysis

3.9.1 Missing Data Analysis

Missing data is a common issue in most researches which can lead to biased estimates and results. Available literature (Pampaka et al., 2016) suggests that there are three common types of missing data (a) missing completely at random (MCAR), (b) missing at random (MAR) and (c) missing not at random (MNAR). Data are classified as MCAR when there is equal probability of all cases being missing i.e., the missingness is independent of the observed and missing responses. Data are considered MAR when the probability of missing data on a particular variable Y may depend on other observed variables (but not on Y itself). Lastly, data is considered MNAR when the missing observations are dependent upon unobserved values and the missingness cannot be ignored completely.

To determine the pattern of missing data in this study, the little MCAR's test was utilized. The null hypothesis for Little's MCAR test is that data are missing completely at random (MCAR) (Cheema, 2014). Little's MCAR test demonstrated that missing values were Missing at Random [MAR] ($\chi^2 = 426$ (df = 1, $p > .05$)). Since the observed p-value (0.514) is greater than the critical value of 0.05, we accept the null hypothesis and conclude that data is missing randomly. Listwise deletion method was not used to exclude cases with missing values because about 3000 cases would have been deleted using such strategy which would produce biased estimate. Then missing data were imputed using multiple imputation (MI) method which is an acceptable strategy when the data are MAR (Enders, 2010). Multiple imputation works by creating a number of data sets (usually between 5 and 10) by imputing the values for the missing data and the final estimate is

pooled from all the imputed dataset (Karahalios et al., 2012). In this study, SPSS produced five iterations and the dataset generated from the fifth iteration was used for analysis purpose.

3.9.2 Sample Size Calculation

Effect size is “the magnitude of the difference between groups” and absolute effect size “is the difference between the average, or mean outcomes in two different intervention groups” (Sullivan Feinn, 2013 p. 279). Absolute effect size gives us intrinsic meaning such as numerical value of the variables. In our study, the mean no of ACEs is an intrinsic value.

Cohen effect size as small when ($d=0.2$), medium when ($d=0.5$), and large when ($d=0.8$) (Sullivan Feinn, 2013). Using G-power software to calculate required sample size by using following parameters (Test family=z-tests, statistical test= Logistic regression, binomial, effect size $d=.50$, medium, $\alpha = 0.05$, $\beta = .80$, the sample size required for the study was 259. After excluding individuals above 65 years, the sample size ($N=9096$) was more than sufficient to detect a meaningful effect.

3.10 Statistical Analysis

In order to answer research question 1, the prevalence of ACEs among this sample, descriptive analysis for all types of abuses, demographic characters, gender, race/ethnicity, educational level, and income was carried out.

To answer research question 2 and 4, Pearson chi-squared test of independence was used because the test help to determine whether two categorical variables are associated with each other or not (Franke et al., 2012). The assumptions of 2 test include that variables should be nominal, independence of observations/variables, there should be more than 5 frequencies in the expected contingency table (Schober Vetter, 2019).

To answer the third research question, binary logistic regression was used to examine the relationship between the independent variable [(propensity score derived from SES, and ACEs and dependent variable (whether they received routine health screenings or not in the last year). A binary logistic regression test is appropriate when there is dichotomous or binary dependent variable and continuous independent variable (Ganggayah et al., 2019). Additionally, logistic regression can also handle both continuous variables and also more than two variables at the same time (Sperandei, 2014). The assumptions of a binary logistic regression are that it should include a binary dependent variable, there should be independence of observed values, there should be no multicollinearity and there should be an adequate power to detect significant effect (Stoltzfus, 2011). The details of these assumptions and how they were satisfied are discussed in the subsequent results chapter. Multicollinearity was checked by using correlation between the DV and all IVs and also by checking the Variance Inflation Factor (VIF). Variables in the logistic regression model were entered using hierarchical method to see whether the addition of new variables would improve the model sufficiently or not and this method is considered better than other addition methods such as the traditional method (adding all variables at once), stepwise, and backward selection/forward selection (Stoltzfus, 2011).

CHAPTER 4

RESULTS

The following chapter details statistical analysis of the sample and the results of completed data set ($N = 9096$). Descriptive, chi-square and regression analysis were conducted to address primary research questions. The assumptions for chi-square test and binary logistic regression were assessed prior to conducting analysis and are also outlined in this chapter.

4.1 Statistical Assumptions for Chi-Square Test

Prior to conducting statistical analyses, statistical assumptions for chi-square analysis and binary logistic regression were examined. Three assumptions exist for chi-square test: (a) The variables should be nominal, (b) independence of observations, and (c) the presence of ≥ 5 expected frequency in more than 75%–80% of the cells in the contingency table (Schober Vetter, 2019). The assumptions for binary logistic regression include: (a) a binary dependent variable, (b) independence of observed values (observations should not come from repeated measurements or matched data), (c) absence of multicollinearity, and (d) adequate power to detect significant effect (Stoltzfus, 2011). All of the assumptions for chi-square test were met before conducting the final analysis.

4.2 Logistic Regression Assumptions Goodness of Fit Diagnostics

- *Assumption of binary dependent variable:* The basic assumption of binary logistic regression is the presence of dependent variable to be binary in nature. In this study the dependent variable (whether participants received routine health screening in last year was coded dichotomously (Yes/No), while all predictor variables are also coded as dichotomous. Therefore this assumption is satisfied.

- *Assumption of independence of observed values:* Each observation should be independent from each other, meaning observations should not come from repeated measures or paired data. In this study, each observation represents a single participant, and does not represent data from a repeated measurement design, therefore this assumption was satisfied.

- *Assumption of linearity:* The linear relationship between independent and dependent variables was checked by examining scatter plots between the independent and dependent variables. Normality was assessed by examining box plots and histograms of each variable to ensure normal distribution of the independent and dependent variables (Appendix A). Also, a Normal Q-Q plot was examined and suggested no significant deviations from normality (Appendix B).

- *Assumption of the absence of multicollinearity:* This assumption was checked using correlation analysis between the dependent and independent variables. Results showed the absence of multicollinearity because the variables entered in the regression did not demonstrate strong correlation (.80 or above). Additionally, the Tolerance values were greater than .20 and Variance Inflation Factor (VIF) values were less than 10 which confirmed absence of multicollinearity (Kim, 2019; O’Brien, 2007) as shown in (Table 4.1).

Table 4.1: Diagnostic table for multicollinearity

	Unstd Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Err	Beta			Tolerance	VIF
(Constant)	.212	.021		9.940	.000		
Has health insurance	.295	.013	.258	23.393	.000	.802	1.247
Employed	-.056	.010	-.057	-5.371	.000	.882	1.134
Age	.005	.000	.143	13.380	.000	.855	1.169
Gender Binary	.073	.010	.076	7.399	.000	.923	1.083
Race Binary	-.049	.011	-.051	-4.659	.000	.802	1.247

	Unstd Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Err	Beta			Tolerance	VIF
Marriage	.001	.010	.001	.120	.904	.860	1.163
Education Binary	-.004	.011	-.004	-.347	.728	.777	1.286
Income Binary	.038	.012	.040	3.231	.001	.643	1.556
Mentally ill household member	-.016	.015	-.012	-1.088	.277	.772	1.295
Household Substance Abuse	.004	.013	.003	.279	.780	.720	1.389
Incarcerated household member	.056	.020	.029	2.738	.006	.851	1.175
Parental separation	-.012	.011	-.011	-1.046	.296	.854	1.170
Household domestic violence	-.003	.015	-.002	-.204	.838	.726	1.377
Physical abuse	.004	.015	.003	.268	.788	.657	1.523
Emotional abuse	-.043	.013	-.039	-3.188	.001	.649	1.541
Sexual abuse	-.011	.016	-.008	-.713	.476	.822	1.216

Dependent Variable: Had a routine checkup in the past year

4.3 Primary Statistical Analyses

4.3.1 Research Question 1

What is the prevalence of ACEs among this sample?

To answer research question about the prevalence of different types of ACEs, a descriptive analysis was conducted among the sample. Out of the 9096 participants, 3796 participants did not report any kind of ACEs, indicating that 41.7% of the study participants had no ACEs while the remaining 5300 experienced at least one ACEs. Table 4.2 illustrates the prevalence of different ACEs from the sample.

Table 4.2: Participants' (N = 9096) reported prevalence of ACEs

Types of ACEs	Yes	No
Mentally ill household member	15.3%	84.7%
Household substance abuse	25.1%	74.9%
Incarcerated household member	6.7%	93.3%

Types of ACEs	Yes	No
Parental separation or divorce	27.8%	72.2%
Household domestic violence	15.9%	84.1%
Physical abuse	17.2%	82.8%
Emotional abuse	25.3%	74.7%
Sexual abuse	12.6%	87.4%

When prevalence of ACEs was examined based on ACE scores, it shows that individuals who had an ACE score of more than 4 had a substantial difference in the household living conditions and they experienced physical, emotional and sexual abuse in higher proportion than those who had a score of less than 4. Table 4.3 shows different types of ACEs based on ACE scores.

Table 4.3: Participants' (N = 9096) reported prevalence of different types of ACEs

Type of ACEs	Less than 4		More than 4	
	Yes	No	Yes	No
Mentally ill household member	10.1%	89.9%	70.3%	29.7%
Household substance abuse	18.8%	81.2%	91.0%	9%
Incarcerated household member	3.7%	96.3%	38.1%	61.9%
Parental separation or divorce	23.2%	76.8%	76.2%	23.8%
Household domestic violence	10.4%	89.6%	74.4%	25.6%
Physical abuse	11.1%	88.9%	82.1%	17.9%
Emotional abuse	18.9%	81.1%	92.9%	7.1%
Sexual abuse	8.0%	92.0%	60.3%	39.7%

Lastly, Table 4.4 provides additional descriptive statistics. From the table it shows a marginal difference in having health insurance where a slightly higher percentage of individuals with less than 4 ACEs had insurance than those with 4 or more ACEs. Additionally, more females than males had a prevalence of more than 4 ACEs. Additionally, more individuals with less than 4 ACEs were employed than individuals with more than 4 ACEs. In terms of education, more individuals with more than 4 ACEs had high school/some college than individuals with less than

4 ACEs. However, in terms of college degree, a significantly higher number of individuals with less than 4 ACEs were college graduate than those with more than 4 ACEs. Lastly, in terms of income, a significantly higher number of individuals with less than 4 ACEs had an annual household income greater than fifty thousand than those with more than 4 ACEs. Table 4.4 provides the details of the descriptive statistics.

Table 4.4: Participants' (N = 9096) reported descriptive statistics (%)

		Less than 4 ACEs	More than 4 ACEs
Has health insurance	Yes	78.0	77.4
	No	22.0	22.6
Gender	Male	43.2	33.6
	Female	56.8	66.4
Race/ethnicity	White	25.0	64.3
	Black	8.2	7.9
	Hispanic	34.0	24.6
	Other	4.4	2.3
Married	Yes	57.0	44.4
	No	43.0	55.6
Employment	Yes	63.5	55.9
	No	36.5	44.1
Education	Less than high school	15.0	15.0
	High school/some college	48.1	59.7
	College Graduate	36.9	25.2
Income	Less than fifty thousand	53.0	64.1
	More than fifty thousand	47.0	35.9
Age-group	18-29 Years	15.6	20.4
	30-44 Years	28.6	31.9
	45-64 Years	55.8	47.7

4.3.2 Research Question 2

Is there a relationship between ACEs and individual's ratings of overall health status among individuals with low (four or less ACEs) and high (four or more ACEs)?

A chi-square test of independence was used to assess whether an association exists between

the ACE score and self-rated health status. The dichotomized ACE score variable (ACE score of less than 4 and more than 4) and self-rated health status [Recoded as general health fair to poor (Yes/no)] was used to answer this question. All assumptions of the chi-square test were satisfied.

Results from the chi-square test of independence between ACEs categories and the self-rated health status showed that the relation between these variables was significant, $X^2(1, N = 9096) = 113.602, p < 0.05$. Individuals with less than 4 ACEs are more likely to rate their health more positively. Table 4.5 shows the results of the chi-square test of independence.

Table 4.5: Results of Chi-square between ACEs and self-rated health

			General Health Fair to Poor		Total
			No	Yes	
ACE_two categories	Less than 4 ACEs	Count	6762	1545	8307
		Expected Count	6647.6	1659.4	8307.0
	More than 4 ACEs	Count	517	272	789
		Expected Count	631.4	157.6	789.0
Total		Count	7279	1817	9096
		Expected Count	7279.0	1817.0	9096.0

4.3.3 Research Question 3

Does type of ACEs (physical, emotional or sexual abuse, or household dysfunction) predict participating in routine health screening?

In order to answer research question three, a binary logistic regression was conducted using routine health screening as the dependent variable while the propensity score variable obtained from social determinants of health (gender, race/ethnicity, marriage, education, income, age, whether they have someone as their health care provider collectively referred to as social determinants of health from hereon), 8 types of ACEs, health insurance and employment as independent variables. Results from the omnibus tests of model coefficients showed that the model including predictor variables is a significant improvement from the one that does not include any

predictor variables where ($X^2=1688.46$, $df =11$, $p=0.00$). Similarly, from the Model Summary table, the Nagelkerke R-square value shows that the model was able to explain about 23.4% variance in the outcome. Table 4.6 shows the model summary including the Nagelkerke R Square value.

Table 4.6: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	9997.451 ^a	.169	.234

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Similarly, from Table 4.7, the model shows that it accurately classifies about 73.6% of cases, which demonstrates that our model has a significant improvement over the null model which predicted only about 65.8% of the outcome accurately.

Table 4.7: Classification Table

Observed		Predicted		Percentage Correct
		Had a routine checkup in the past year No	Yes	
Had a routine checkup in the past year	No	1529	1582	49.1
	Yes	815	5170	86.4
Overall Percentage				73.6

a. The cut value is .500

Results demonstrated that the variables that predicted whether participants would receive routine health screening or not were SODH, living in a household with mentally ill person, household with incarcerated household, experience of emotional abuse, employment and health insurance. Table 4.8 shows the results from binary logistic regression analysis.

Table 4.8: Results of binary logistic regression

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
SODH	3.878	.131	880.875	1	.000	48.304	37.392	62.401
Mentally ill household member	-.194	.075	6.614	1	.010	.824	.711	.955
Household Substance Abuse	-.004	.066	.003	1	.954	.996	.875	1.135
Incarcerated household member	.316	.106	8.905	1	.003	1.372	1.115	1.688
Parental separation/divorce	-.044	.058	.584	1	.445	.957	.854	1.072
Household domestic violence	-.013	.077	.030	1	.863	.987	.848	1.148
Physical abuse	.067	.079	.725	1	.395	1.070	.916	1.249
Emotional abuse	-.223	.069	10.541	1	.001	.800	.699	.915
Sexual abuse	-.015	.080	.035	1	.851	.985	.843	1.152
Employed	-.283	.052	29.629	1	.000	.753	.680	.834
Has health insurance	.806	.060	178.772	1	.000	2.239	1.989	2.519
Constant	-2.183	.093	550.272	1	.000	.113		

a. Variable(s) entered on step 1: Predicted probability, Did you live with anyone who was depressed, mentally ill, or suicidal?, HouseholdSubstanceAbuse, Did you live with anyone who served time or was sentenced to serve time in a prison, jail, or other correctional facility?, Were your parents separated or divorced?, How often did your parents or adults in your home ever slap, hit, kick, punch, or beat each other up?, Before age 18, how often did a parent or adult in your home ever hit, beat, kick, or physically hurt you in any way?, How often did a parent or adult in your home ever swear at you, insult you, or put you down?, Sexual abuse, Employed, Has health insurance coverage - ages 18-64.

4.3.4 Research Question 4

Is there a difference in screening behaviors among individuals with low (four or less ACEs) and high (four or more ACEs) as it relates to routine health screenings (i.e. cholesterol, hypertension, and flu)?

In order to answer this research question, a series of chi-square test of independence was conducted. Examining relationship between ACEs and cholesterol showed a significant relation where, $X^2(1, N = 9096) = 4.931, p = .026$. Individuals with less than 4 ACEs are more likely to have their cholesterol checked in the last year. Table 4.9 shows the results of chi-square.

Table 4.9: Results of Chi-square between ACEs and cholesterol checkup

			Cholesterol Checked Within Last 5 Years		Total
			No	Yes	
ACE_two categories	Less than 4 ACEs	Count	1950	6357	8307
		Expected Count	1975.4	6331.6	8307.0
		% within	23.5%	76.5%	100.0%
	More than 4 ACEs	Count	213	576	789
		Expected Count	187.6	601.4	789.0
		% within	27.0%	73.0%	100.0%
Total	Count	2163	6933	9096	
	Expected Count	2163.0	6933.0	9096.0	
	% within	23.8%	76.2%	100.0%	

Examining relationship between ACEs and doctor diagnosed high BP showed a significant relation where, $X^2(1, N = 9096) = 5.082, p = .024$. Individuals with less than 4 ACEs are less likely to have doctor diagnosed high blood pressure than individuals with more than 4 ACEs. Table 4.10 shows the results of chi-square.

A chi-square test of independence was performed to examine the relation between ACEs categories and receiving flu-vaccine. The relation between these variables was not significant, $X^2(1, N = 9096) = .068, p = .794$. Having less or more ACEs does not impact whether

someone would receive flu shot or not. Table 4.11 shows the results of chi-square.

Table 4.10: Results of Chi-square between ACEs and BP checkup

			Doctor diagnosed High Blood Pressure		Total
			No	Yes	
ACE_two categories	Less than 4 ACEs	Count	5847	2460	8307
		Expected Count	5819.3	2487.7	8307.0
		% within	70.4%	29.6%	100.0%
	More than 4 ACEs	Count	525	264	789
		Expected Count	552.7	236.3	789.0
		% within	66.5%	33.5%	100.0%
Total	Count	6372	2724	9096	
	Expected Count	6372.0	2724.0	9096.0	
	% within	70.1%	29.9%	100.0%	

Table 4.11: Results of Chi-square between ACEs and receipt of flu-shot

			Flu Shot In the Past Year - Age 18-64		Total
			No	Yes	
ACE_two categories	Less than 4 ACEs	Count	4877	3430	8307
		Expected Count	4880.5	3426.5	8307.0
		% within	58.7%	41.3%	100.0%
	More than 4 ACEs	Count	467	322	789
		Expected Count	463.5	325.5	789.0
		% within	59.2%	40.8%	100.0%
Total	Count	5344	3752	9096	
	Expected Count	5344.0	3752.0	9096.0	
	% within	58.8%	41.2%	100.0%	

CHAPTER 5

DISCUSSION

According to National Alliance on Mental Illness (NAMI), roughly about 21% (51.5 million people) of the US adults had some kind of mental illness in the year 2019 and about 16.5% of US youths between the ages of 6-17 experienced some kind of mental health disorder in the year 2016 (National Alliance on Mental Illness, 2021). Our finding suggested that there were 15.3% of the sample (1394 individuals) were living in a household where someone was either depressed, had a mental illness or had suicidal thought. Although our prevalence of 15.3% is not quite near the 21%, it does demonstrates that many individuals are living in household with mental illnesses. Additionally, in a report written for Mental Health America, the state of Texas ranked 27th among all US states when examining prevalence of mental illness and access to care. South Dakota ranked 16th which had the closest average score among all states (Reinert et al., 2021). Findings from this report suggests that Texas still needs to increase access to mental health services to its residents.

Results from this study showed that about 15.3% of the sample lived in a household with mental illness. Available research shows that living in household with a presence of mental illness is detrimental to both parents and children. Researchers (Stallard et al., 2004) examined the effects of parental mental illness on children from 24 adults with mental illness and their 26 children. Parents felt that their children had been affected by the presence of parental mental illness and that children were quite concerned about the possibility of their parents getting sick. Parents also felt that their mental illness disrupted daily care and routine of their children citing examples such emergency hospital admission preventing parents not being able to receive their child upon their return from school, missing parent-teacher meetings due to panic attacks and parents not being

able to play and spend time with their child due to feeling depressed. In regards to children, many parents felt that their child did not understand the illness their parents were going through and that children were not communicated about the illness (es) of their parents. The study also found that more than half of both parents and children felt it would be beneficial for both parents and children to be open about the illness their parents were going through.

Additional research on the effects of parental mental illness also shows that there is an increased risk of genetic transfer, chances of complications during childbirth, exposure to disease itself, and increased risks for socio-economic disadvantages and marital conflict (Manning & Gregoire, 2009). In terms of genetic predisposition, studies have shown that there is a 13% chance of having schizophrenia among children if one parent has it and the risk is increased to about 45% if both parents have the disease. Similarly, children whose parents have bipolar disorder have 7.8% chances of bipolar and 11.4% chances of having depression, whereas children whose parents had unipolar depression have about 9.1% increased risk for unipolar depression but no risk for bipolar disorder (Scourfield & McGuffin, 1999). Furthermore, mental illnesses of parents also affects cognitive, emotional, social, behavioral development and difficulties forming attachments and meaningful relationships during adulthood where there is an increased risk of developing psychiatric disorder in childhood, adolescence, and in later adult life among children whose parents suffered from mental illness (Manning & Gregoire, 2009). In order to reduce the negative effects of parental mental illness on children, prevention should be the key where early identification of women during antenatal period would help to reduce or stop the genetic transfer. Similarly, intervention to reduce occurrence of mental illness should not only focus on treatment of parental mental illness but other socio-economic factors as well that affect the overall wellbeing of the parents and their children.

Another significant finding of this study was that about 25% of the sample (2280 individuals) were living in a household with substance abuse issue which included alcoholism, use of illicit street drug and abuse of prescription drug. According to a report published by the SAMHSA based on a combined data from 2009 to 2014 National Surveys of Drug Use and Health (NSDUH), about 8.7 million (12.3 percent) of children below the age of 17 or younger lived in households where at least one parent had an SUD (Lipari & Van Horn, 2013). Similar to the effects of parental mental illness, living in a household with parental Substance Use Disorder (SUD) also has numerous negative effects on children. For e.g., households with SUDs are at an increased risk for child maltreatment and are more likely to be involved with child welfare compared to households without parental SUDs. Furthermore, children in household with parental SUDs are also more likely of becoming the substance users themselves. Children with parental SUD are also more likely to be from a lower socioeconomic status and are likely to have difficulties doing well in school and social contexts and are more likely to be resource-deprived than household without parental SUDs (Lipari & Van Horn, 2013). Recent research in Germany examining the effects of household mental illness or parental SUD has shown that there is an increased risk of 5 to 5.6 times the occurrence of child maltreatment itself in a household with mental illness and an increased risk of 4.9 to 6.9 times of child maltreatment in a household with SUD (Clemens et al., 2020). The same study also found that there is an increased risk of negative health outcomes such as obesity, low life satisfaction, and also occurrence of other social determinants of health at lower level for income, education, being unemployed and chances of living without a partner in a household with the occurrence of mental illness of SUD. All of these studies suggest that living in a household that does not provide care, warmth and optimum living conditions, is detrimental to a growing child. Therefore, similar to parental mental illness, interventions targeting parental SUDs should

not only focus on parents but also on children as well because parental SUD necessitates a whole family in a path of recovery and each household member may their individual need.

Another finding of significance in this study was the prevalence of parental separation or divorce in the sample. Among our sample, 27.8% (2526 participants) had their parents either separated or divorced. This rate is significantly higher than the average State rate of 8.4% and the average national rate of 7.7% (US Census Bureau, 2020). Living in a household where parents are either separated or divorced is not healthy as well. Research (D'Onofrio & Emery, 2019) shows that children of separated/divorced parents have problems of adjustments, do not perform well in academics, are more likely to engage in disruptive conduct and have depressed mood. Additionally, children from divorced/separated family have a 1.5 to 2 times increased risk of engaging in risky sexual behavior, living in poverty and having their own family instable. Other researches (Nusinovici et al., 2018) have also found multiple negative effects of parental separation/divorce such as children feeling guilt and responsible for parental separation, increased stress and limited resource available for children, which in turn affects a "child's motivation, engagement, and learning-related behavior in the classroom" (p.1). Additionally, research has also shown that one of the greatest barrier for upward mobility is growing up in a single parent household (Chetty et al., 2014). Other negative impacts of parental separation/divorce on children include children losing time with their parent, children losing economic security, loss of emotional security, decreased social interactions and delayed psychological maturation, chance of losing faith/religious activities, chances of decreased cognitive and academic stimulation, increased emotional distress and increased chances of being physically unhealthy (Anderson, 2014). In order to minimize the harmful effects of parental separation/divorce on children, physicians should also be educated on the negative impacts of parental separation/divorce because they may see the

warning signs, can help children cope with stresses of familial changes. Pediatricians can look for warning signs among their patient such as children with serious and long term illness such as cancer, autism have a higher risk of divorce, whose negative impacts are often manifested as behavioral problem in the child (Cohen et al., 2016). Additionally, when pediatricians are called to testify in court, it may be in their best interest to consult with a child-abuse pediatric experts, before providing their expert testimony. Pediatricians can also help reduce the negative impact of parental separation/divorce on child by always advocating for the child, inquiring about changes in family structure in their routine visits, and referring the family and the child to appropriate resources when necessary. Lastly, interventions such as helping develop positive parenting skills, efforts to resolve family conflicts through family or marriage counseling can help reduce the occurrence of separation of family.

Descriptive analysis on the type of prevalence of different types of abuse showed a higher prevalence, about 25.3 % (2302 individuals) of emotional abuse. This is a significant occurrence in the sample because emotional abuse has received lesser attention than physical and sexual abuse because it does not show visible signs such as injury and there are significant regional and cultural differences in defining emotional abuse. For example, certain activities of emotional abuse such as swearing, yelling, constantly criticising the child may be easily noticed while activities like undue pressure, unreasonable expectations and burden, and unfair treatment of children may not always be visible (Kumari, 2020). As with other types of abuse or child maltreatment, experiencing emotional abuse poses risk for numerous negative health behaviors. For e.g. researchers (Shin et al., 2015) found that emotional abuse is related to binge drinking, alcohol-related problems and alcohol use disorder (AUD). The landmark ACE study also found emotional abuse to be associated with early initiation of drinking alcohol (≤ 14 years), even after controlling for demographic

characters including education (Dube et al., 2002). Additional meta-analysis by (Norman et al., 2012) examining the health effects of emotional abuse have found strong evidence for occurrence of depression, anxiety disorder, suicide attempts, drug use and involvement in risky sexual behavior which suggest that experiencing emotional abuse produces negative health outcome. In order to reduce the occurrence of emotional abuse and to minimize the negative effects of emotional abuse, counselors, social workers, physicians and psychiatrists who come in contact with this vulnerable population should look for non-visible signs of emotional abuse. These professionals should also work with each other and with law makers to recognize the occurrence of emotional abuse even in absence of visible signs and that certain segment of the population such as people from certain culture where emotional abuse/neglect of girls are more common than boys, are not neglected and are provided with education and interventions (Kumari, 2020).

Results between self-rated health status and ACEs, showed that individuals with lower ACE score rated their health more positively than those with a higher ACE score. Specifically, only 18.6% of the sample with ACE score ≥ 4 reported having their health status fair to poor vs. 34.5% of the sample with an ACE score ≤ 4 reporting fair to poor health status. This finding is consistent with current research on ACE and self-rated health. For e.g., in a study examining self-rated physical health status and ACEs among college students, researchers (Krinner et al., 2020) found that students who had an ACE score between 5 to 7 had reported an (OR =3.46, 95% CI 1.28-9.34) of reporting poor self-rated physical health status compared to the reference group of no ACEs. Similarly, another study found that ACEs were associated with negative self-rated physical and mental health among American Indians with diabetes. The same study also found that even among individuals with a higher ACE score but had higher level of support system reported better self-reported physical health (Brockie et al., 2018). The implications of this findings

suggests that programs that enhance social support and cultural connectedness would help to bring positive changes in the overall health status and should be encouraged at the policy level.

Results from the logistic regression from this study suggested that among different types of ACEs, living in a household with mental illness, living in a household where a member was either incarcerated or had spent time in a correctional facility, experiencing emotional abuse, employment and insurance status are associated with whether someone would participate in routine health screening or not in the last year.

In regards to adults who lived with an incarcerated household member in their childhood, current research has shown that these individuals had an increased risk of 1.18 times for poor Health Related Quality of Life (HRQOL) than those who did not have that experience. Strong association with the physical health component of HRQOL was found among Blacks whereas, the relationship was strongest with the mental health component of HRQOL among Whites. Additionally, children whose parents have been incarcerated for non-violent offences have shown increased aggression, depression and anxiety as well (Gjelsvik et al., 2014). Furthermore, living in a household or having a family member incarcerated removes the financial and social support available to the youth/child, and disrupts the attachment process of the youth, it negates the belief that the world around him/her is safe and predictable which are needed for healthy emotional development (Nichols & Loper, 2012). Other negative impacts of parental incarceration include not knowing the reason for parental absence due to incarceration, less or restricted contact, lesser supervision and frequent changes in home and school location.

Additional research (Murray & Farrington, 2008) also shows that parental incarceration results in a number of adverse outcome among children such as “antisocial behavior, offending, mental health problems, drug abuse, school failure, and unemployment” (p. 135). Higher

incarceration rates is harmful to a community as well because it causes loss of working adults, increases exposure to infectious diseases, and depletes resources from public health, social supports and the penal system as well (Gifford, 2019). To minimize the effects of parental incarceration, interventions such as adoption of family-friendly prison, providing financial support, evidence-based parenting programs, and handing sentences that do not stigmatize the offender and their families should be implemented. Programs like Mentoring Children of Prisoners program have been implemented to assist children whose parents are incarcerated. However, available research shows that children are affected not only by their parents' incarceration but incarceration of other close family members as well (Nichols & Loper, 2012). Other alternative approaches to incarceration such as community justice programs, drug courts, and mental health courts could also be used effectively to handle non-violent offenses (Gjelsvik et al., 2014).

Logistic regression analysis showed that insurance is significantly associated with having a routine health screening among the study participants. This finding is consistent with previous research. For e.g., research (Alcalá et al., 2017) found that experiencing any type of ACEs reduced the likelihood of having a health insurance, thereby limiting an individual's chances and access to a healthcare provider. Other research have shown that having higher ACEs increases the chances of utilizing healthcare frequently (Chartier et al., 2010), and therefore an increased chances for higher out-of-pocket costs as well (Schickedanz et al., 2019). In fact, Schickedanz et al., 2019, quantified the costs associated with higher ACEs among a sample of 4,784 households where they found that among households with one to two ACEs, the out-of-pocket was \$184 higher, for households with three or more ACES, the out-of-pocket cost was \$311 higher than the average annual cost of \$1,042 among households with no ACEs. The same research also found higher cost for inpatient (\$119), ambulatory care (\$251) and prescription costs (\$116) higher among single

individuals reporting three or more ACEs than those without none ACEs. The research also showed that females had increased out-of-pocket costs than males and that having three or more ACEs in the household doubled the chances of having medical debt in the household (Schickedanz et al., 2019).

Results from the logistic regression analysis also showed that employment is significantly associated with getting a routine health screening. Cross-tab analysis between employment and ACE score showed that about 10.3% of the sample with 4 or more ACEs were unemployed. Being employed continuously and having an employment that have better health benefits are important, especially in the US because for most nonelderly individuals workplace provides health benefits (O'Brien, 2003). However, because individuals with high ACEs tend to have low educational level (Houtepen et al., 2020), they might not have to work in places where it does not provide health benefits or even if it does, they might be underinsured. Other research (Metzler et al., 2017) have also shown that individuals with three ACEs had 1.53 times not likely to graduate high school and 2.4 times more likely to be unemployed than those with no ACEs. This trend increased among those with four or more ACEs where they were at 2.34 times increased risk for not graduating from high school, 2.3 times being unemployed and 1.6 times living under poverty. Another research (Yong Liu et al., 2013) showed that only about 5.8% with no ACEs were unemployed out of 17,469 respondents. However, 13.2% of the respondents with more than 4 ACEs reported being unemployed. Emerging research have also shown that experiencing ACEs during childhood can have detrimental effects on workplace as well. For e.g., in a study examining experiencing ACEs during childhood and participating in bullying at workplace, researchers (Kizuki et al., 2020) found that workers who had high ACEs were 3.15 times more likely to engage in bullying coworkers in workplace than those with lowest ACE scores even after adjusting for sex, age and childhood

socioeconomic status. This is an important implication because not only are the individuals with a history of ACEs are engaging in disruptive workplace behavior, they are victimizing other individuals, thereby supporting the notion of intergenerational transfer of ACEs (Félice et al., 2018). In another study examining relationship between ACEs and Disability Pension (DP) in Sweden, research (Björkenstam et al., 2017) showed that exposure to ACEs increased the odds of receiving DP. Among gender, females with more than 4 ACEs were four times more likely and males with more than 4 ACEs were 7 times more likely to have received DP. All of these research demonstrate that having experienced ACEs poses to be a barrier to seeking and keeping employment which helps to provide a stable environment and necessary resource to seek healthcare.

Another important significant variable associated with receipt of routine health screening is the SODH variable which included gender, race, marriage, education and income. The World Health Organization (WHO) has included factors such as income, social support, early childhood development, education, employment, housing and gender as SODH. Research in the public health domain has already established a clear link between various SODH and health outcome where minimal availability and limited access to health services will result in negative health outcome (Andermann, 2016; Shi et al., 2009). One of the greatest challenges in public health is making sure that healthcare is accessible to every individuals. In a study examining the relationship between ACEs and access to healthcare, researchers (Miller-Cribbs et al., 2016) found that as the number of ACEs increases, so does the challenge while accessing healthcare.

Additionally, individuals with higher ACE scores are more likely to have medical debt, be uninsured, have gaps in coverage and have limited health literacy. A compounding effect of not having higher level of education, good job, and transportation is limited access to utilizing

healthcare. As it is common among individuals with higher ACEs to be at a disadvantage due to limited opportunities, available research has shown that negative impacts of unfavorable socioeconomic status can be minimized by making sure that individuals with ACEs have adequate access to healthcare (Font & Maguire-Jack, 2016). Their research has shown that about 15-20% of the health risks caused due to ACEs were due to socioeconomic conditions. Specifically, the risks posed by living in a household with domestic violence, parental separation/divorce and in a household with incarcerated family member, could be fully due to socioeconomic conditions. Additionally, there is a bidirectional relationship between socioeconomic status and poor health status, where poor health status results in lower SES due to limitation in workforce participation from chronic health conditions which then results in job loss. Conversely, having lower SES also leads to poor health status when households do not have adequate health resources and demonstrate suboptimal health behaviors such as not participating in routine preventive health care, avoiding regular doctor visits, or consumption of unhealthy diets (Leonard & Pruitt, 2017).

A number of interventions could be used to mitigate the effects of socioeconomic status and ACEs. For e.g., programs such as early learning opportunities and kindergarten readiness may be beneficial during childhood, whereas, preventing school dropout, job training and preparing for the workforce so that individuals can improve their chances of getting employed can be helpful during adolescent and early adulthood period (Font & Maguire-Jack, 2016). A notable example of businesses that are trying to reduce the costs of ACEs include Boeing and JP Morgan, who are hiring individuals with criminal background in their workforce, which not only helps financially, but also helps to reduce criminal recidivism (Thompson & Kaufman, 2019).

5.1 Implications for Primary Care Physicians

Findings from this study can provide insight into why some of the individuals with a history

of ACEs do not engage in routine health screenings. One of the predictors of whether someone would receive health screening or not was the experience of emotional abuse. Because emotional abuse is one of the most understudied form of abuse (Nelms, 2001) because the etiology is unknown, health care providers, especially primary care physicians should look for signs of emotional abuse in their patients. As previous research (Berghoff et al., 2017) has shown that individuals with history of maltreatment use experiential avoidance (EA) to suppress their emotions, which leads to emotional dysregulation which then leads to poor physical health in the future. Additionally, previous research (Koball et al., 2019) has also shown that individuals with more than 4 ACEs also tend to schedule more medical appointments but did not keep their appointments than individuals with less than 4 ACEs. Individuals with high ACEs tended to cancel their appointments at the very late stage than those without any ACEs, which resulted in loss of revenue for the providers. Some of the factors that contributes to missed/cancelled appointments include misconception of the disease or the test itself among the patient, long waiting period for the actual appointment, insurance status, lack of transportation and language barriers (Samuels et al., 2015). As it is clearly established that individuals with high ACEs tend to have issues with insurance coverage, and are have low socioeconomic status, which might include lack of transportation, they are more likely to cancel their appointments. Previous research (Moore et al., 2001) has shown that missed or cancelled appointments at primary care centers amounted to over 31.1% which resulted in loss of revenue between 3% to 14%. Missing or cancelling medical appointments are not only economically costly to healthcare providers, they are costly to the individual patients as well because they are depriving themselves from the needed care.

In this study sample, only about 22.6% of the sample with more than 4 ACEs had some type of health insurance, and about 31.7% of the sample with more than 4 ACEs has someone as

their personal doctor and about 44.1% of the sample with more than 4 ACEs were unemployed. These results clearly show that individuals with more than 4 ACEs are highly disadvantaged and resource deprived while accessing healthcare than those with less than 4 ACEs. Because these individuals with more than 4 ACEs are highly likely to be resource-deprived, they are also the ones who are more likely to not show-up at their appointments. Therefore, interventions to reduce cancellation of their medical appointments should be implemented by healthcare providers. Some of the recommendations suggested in the literature include scheduling appointments having shorter duration between the scheduled day and the actual day (usually less than 14 days), using reminders such as text message, phone reminders and emails, using predictive modeling based on patient behavior and overbook other patients if necessary, holding patient accountable for their appointments by imposing a fee for no-show and even discharge patients from their care/custody in cases on continued missed/cancelled appointments, and providing detailed information about the medical procedure the patient is going to receive so that the fear and anxiety may be lessened (Marbough et al., 2020).

Since many individuals with higher ACEs have improper utilization of healthcare, techniques to motivate individuals to take care of their health and ensuring they feel comfortable during doctor visits are necessary. One technique that health care providers can use is called Motivational Interviewing (MI). Motivational interviewing is a client-centered conversation technique where clients are empowered and encouraged to change their negative health behaviors. The key constructs of MI include 1) using open-ended questions rather than direct instructions to patients, 2) affirmation, 3) reflection, 4) summarizing, and 5) providing client-centered information and advice (Miller & Rollnick, 2013). Because physicians are not directly instructing clients what to do, but instead are helping patients explore the barriers to behavior change; MI helps patients

take charge of their health. Previous research has shown that MI, to be more effective than other methods of patient engagement and behavior change and can be taught to various medical professionals including new medical students and residents as well as primary care physicians (Hershberger et al., 2021).

Another way healthcare providers can utilize to ensure that individuals with ACEs feel comfortable when utilizing their services is the application of trauma-informed care (TIC) approach. A TIC program “realizes the widespread impact of trauma and understands potential paths for recovery; recognizes the signs and symptoms of trauma in clients, families, staff, and others involved with the system; and responds by fully integrating knowledge about trauma into policies, procedures, and practices, and seeks to actively resist re-traumatization” (Substance Abuse and Mental Health Services Administration, 2014 p. 9). Because “primary care has the power to prevent, identify and address trauma-related problems” (Earls, 2018 p. 110), training physicians and healthcare providers to practice trauma-informed care because it becomes easier for patients to open up about their childhood adversities when physicians do not ask confrontational direct question such as “what’s wrong with you” but instead ask non-judgmental questions such as “what has happened to you”. Additionally, integrating mental health services with primary care and vice-versa can be very effective as we already know that individuals with ACEs tend to have need for both mental health and physical health services. Implementing TIC requires that both staff and the leaders of the healthcare organizations are equally involved which involves “communication with families in respectful and supportive ways, education of staff, creation and support of a healthy office environment, and implementation using a quality improvement approach” (Earls, 2018 p. 111).

5.2 Limitations of the Study

There are several limitations of this study. The first limitation is that the ACE questions do not include other adversities that might affect an individual. For e.g., it does not include homelessness, parental death, eviction from home, racial discrimination, community violence, and poverty which are also important determinants of health. Second limitation is due to recall bias and social desirability, there might be underreporting of actual prevalence of ACEs. Additionally, the three E's of trauma suggests that each individual processes adversities differently due to three constructs known as a) the event, b) the experience of the trauma itself and, c) the effects of the trauma itself (SAMHSA, 2014), it is difficult to determine the actual prevalence and how each individual is impacted by the type of adversities examined. Third, the ACE score does not explore the severity, duration, chronicity, sex differences and timing of the adversities (Anda et al., 2020). As stated earlier, because each individual processes the adversities differently, it is difficult to calculate the interaction between the severity, duration, and timing of the adversities. Fourth, the data was from the state of Texas and the results might not be generalizable to other states. Fifth, propensity score method was used to control the presence of large number of independent variables. Future research should explore novel ways to control for independent variables. Despite the limitations, findings from this study suggested that living in a household with mental illness, living in a household with incarcerated member, being emotionally abused, being employed and having health insurance are significant predictors of receipt/utilizing routine health screenings. These findings can be helpful to a multiple audiences including primary care physicians, mental healthcare providers, and policy makers who can understand the connection between cumulative exposure to childhood adversities and reluctance to seek healthcare. Additionally, policymakers can formulate policies to increase employment and insurance access to individuals from lower

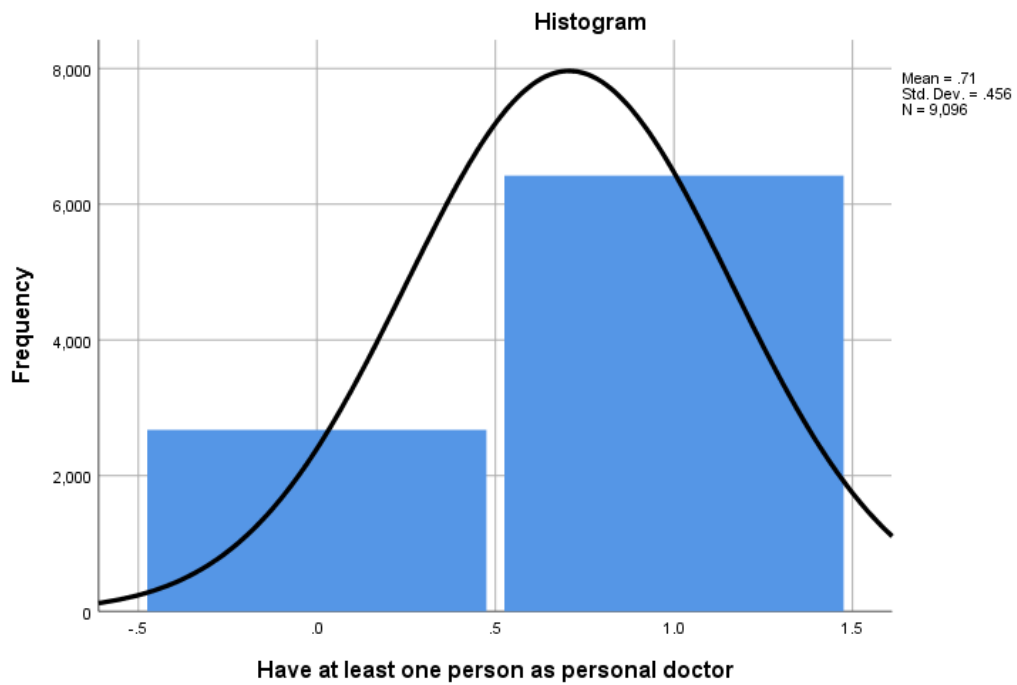
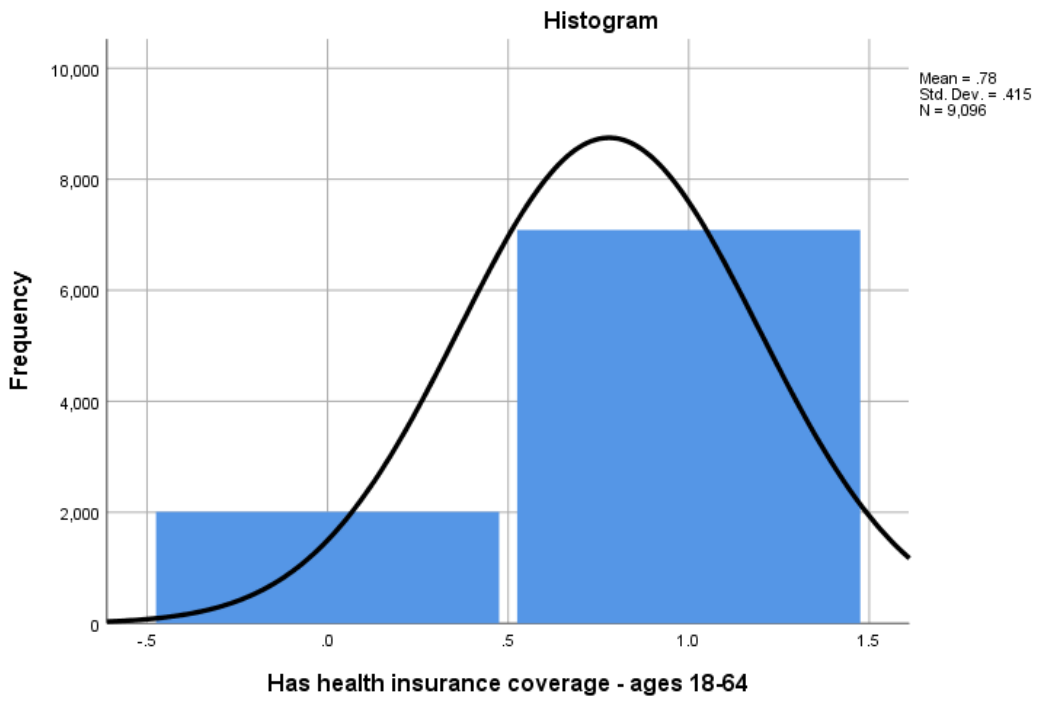
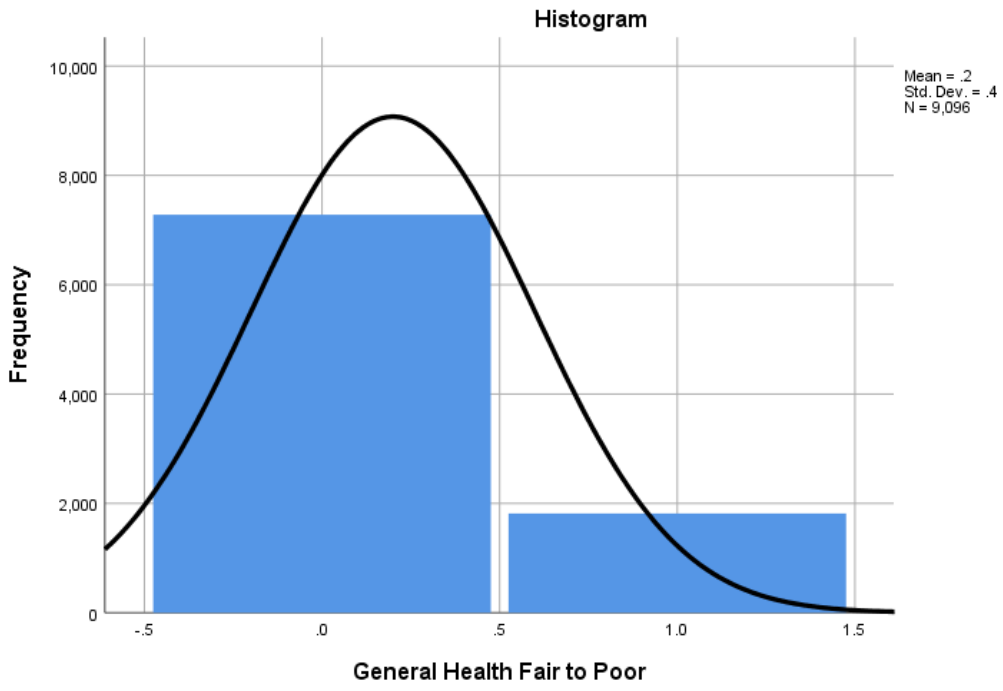
socioeconomic status, which then helps these individuals to use and access healthcare without having to worry about the costs.

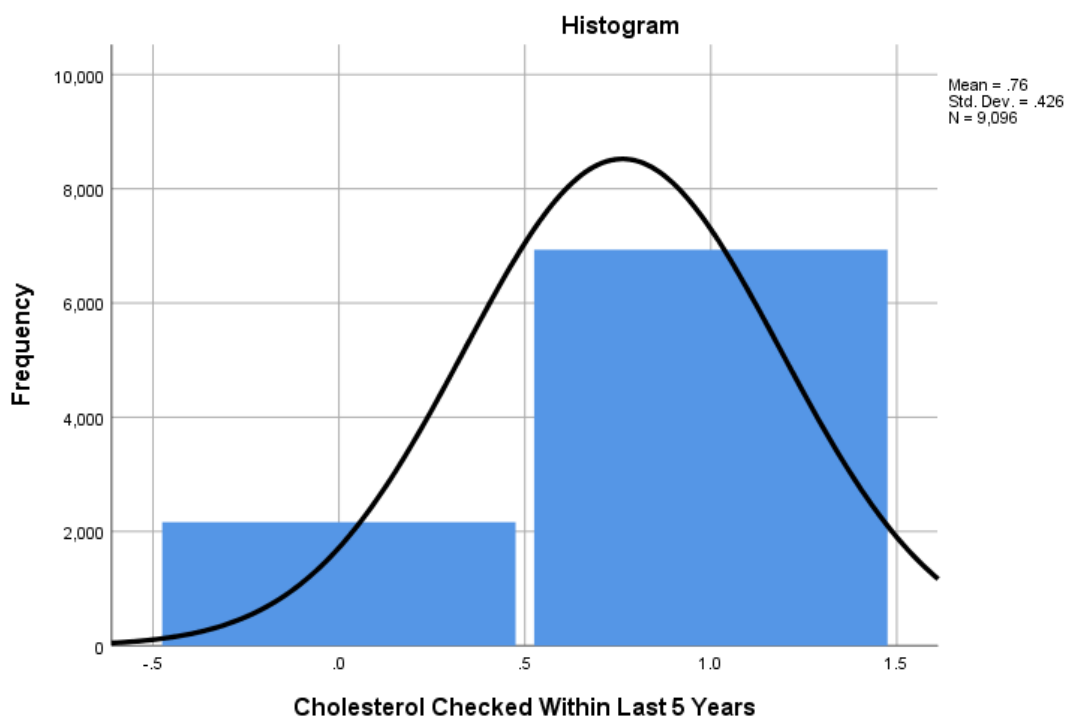
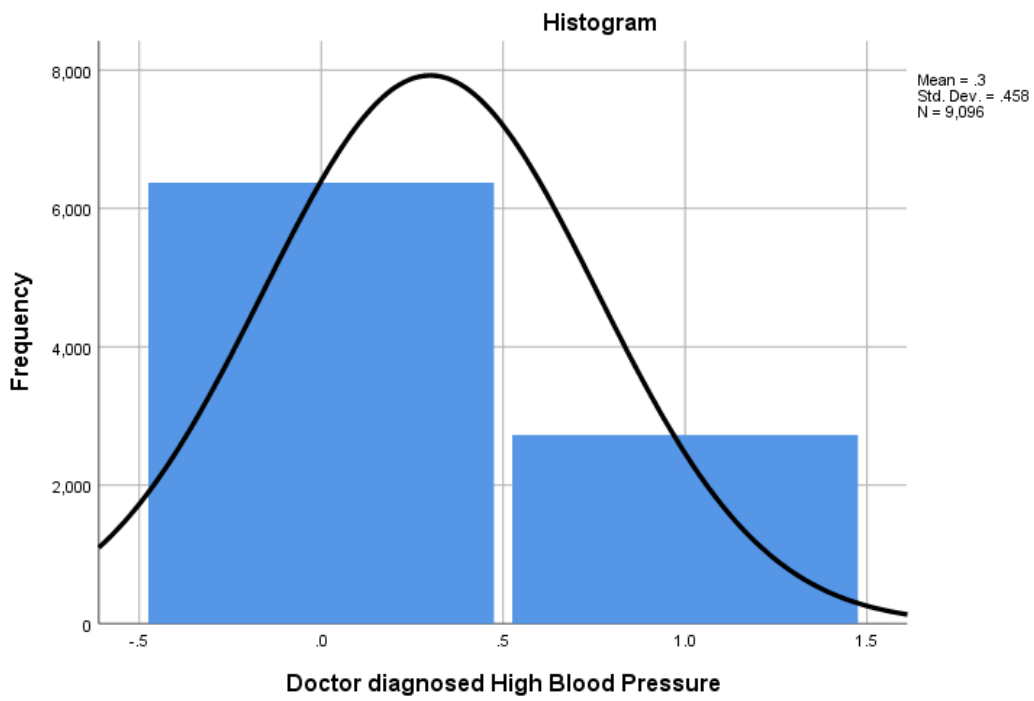
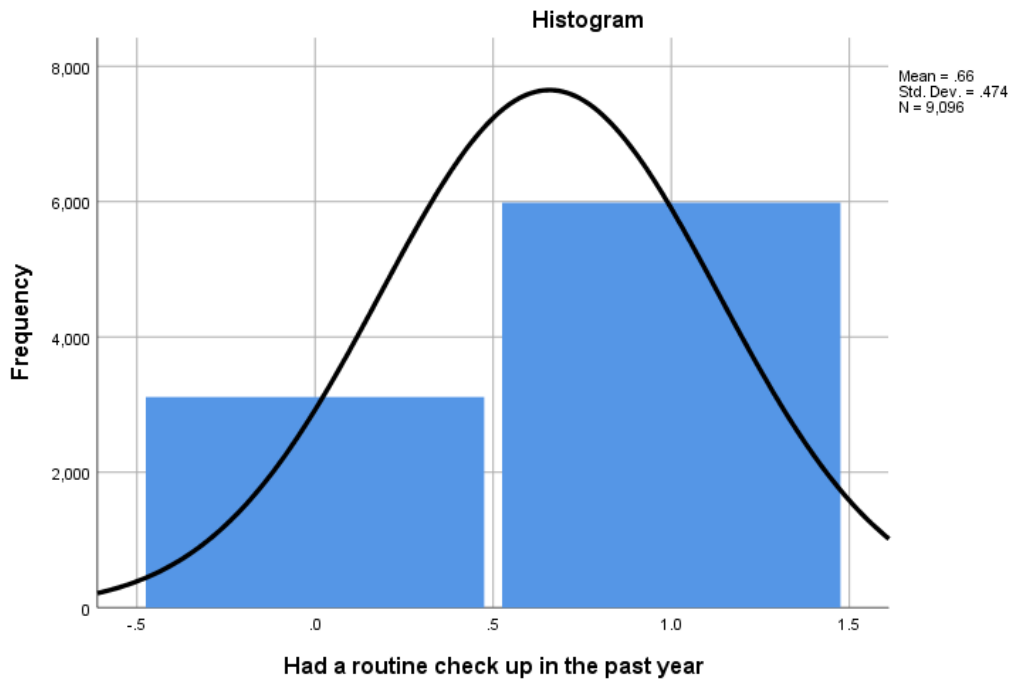
5.2 Conclusion

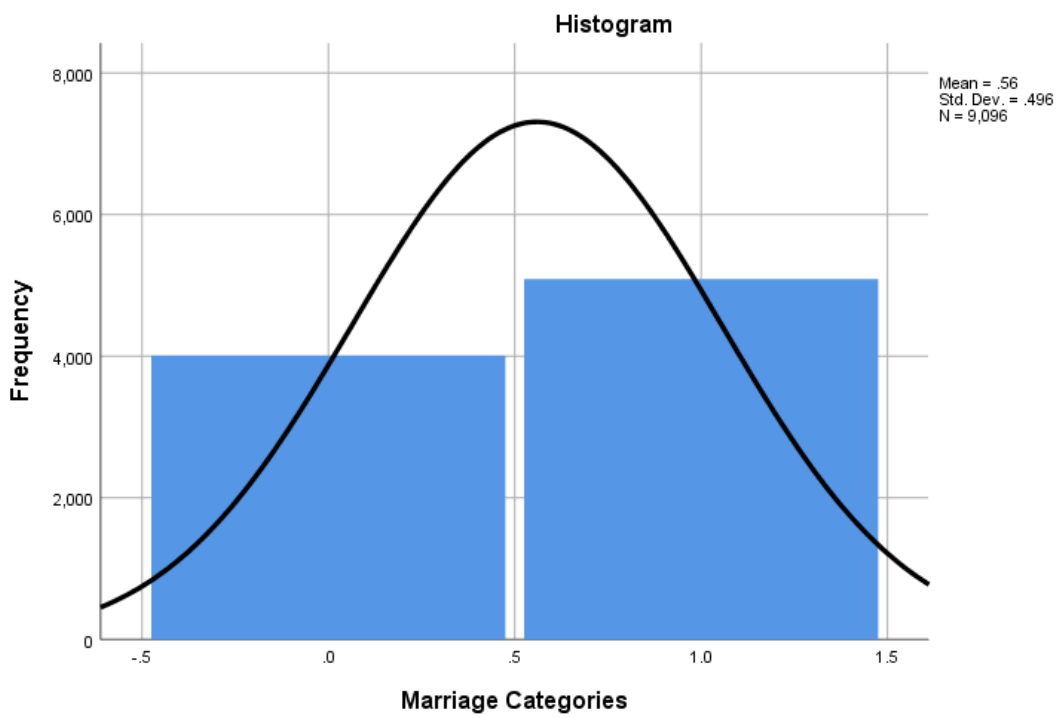
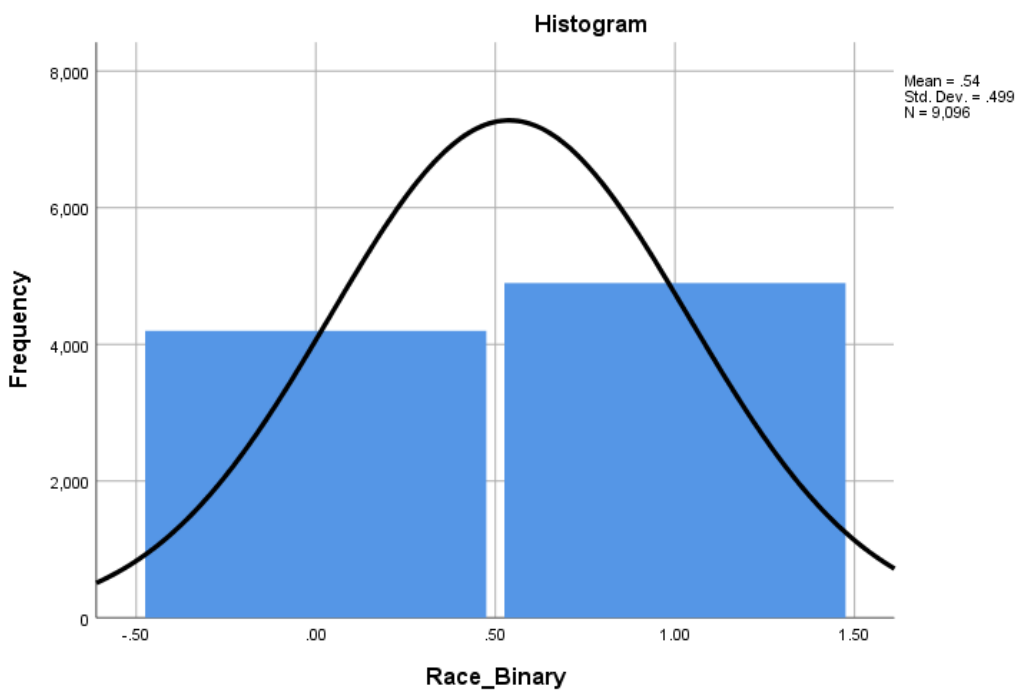
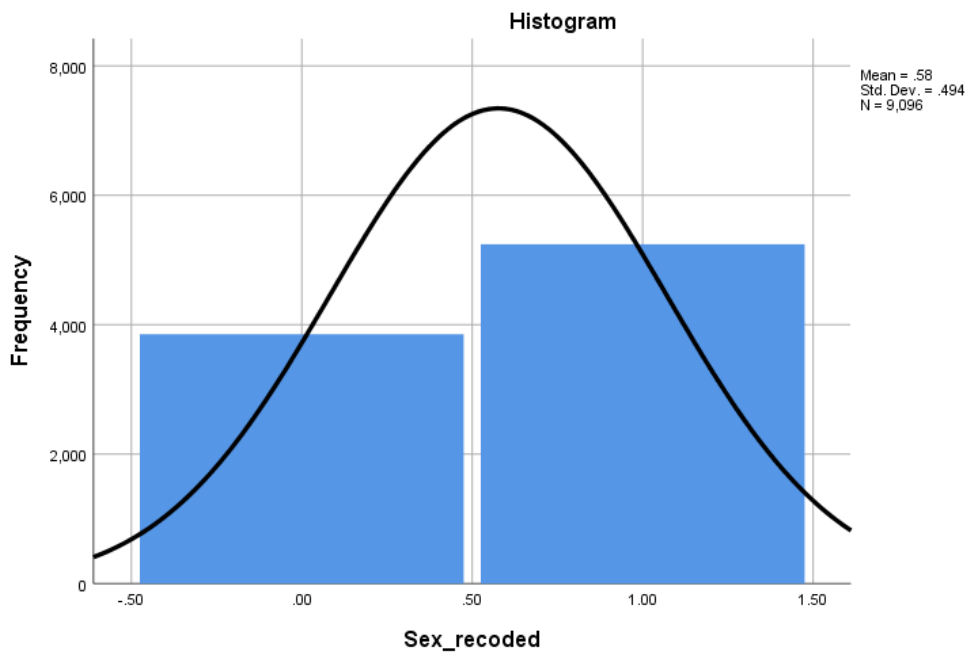
The purpose of this study was to examine how individuals with ACEs would rate their overall health status, does different types of ACEs predict participation in routine health screening and whether there was a difference in screening behavior between individuals with low and high ACE scores. Statistical analyses showed that individuals with high ACEs rated their health more negatively than individuals with low ACE scores. Additionally other independent variables such as SODH, living in household with mental illness, household with incarcerated family member, being emotionally abused, health insurance and employment were a significant predictors of receiving routine health screenings. Experience of emotional abuse as one of the significant predictors of routine screening behavior is significant as previous research suggested it as one of the most understudied forms of abuse. It is essential that health care providers (both mental and physical health) look for signs and symptoms of emotional abuse and make the client feel comfortable to talk about their past abuse history(ies). Healthcare providers can implement a number of methods such as integrating mental and physical health in a single medical home, implement trauma-informed care (TIC) and use motivational interviewing techniques while investigating patients with abuse histories. Lastly, policy makers should include policies where employment opportunities, provision for health insurance and an overall improvement in socioeconomic status of individuals who at risk of having ACEs should be implemented.

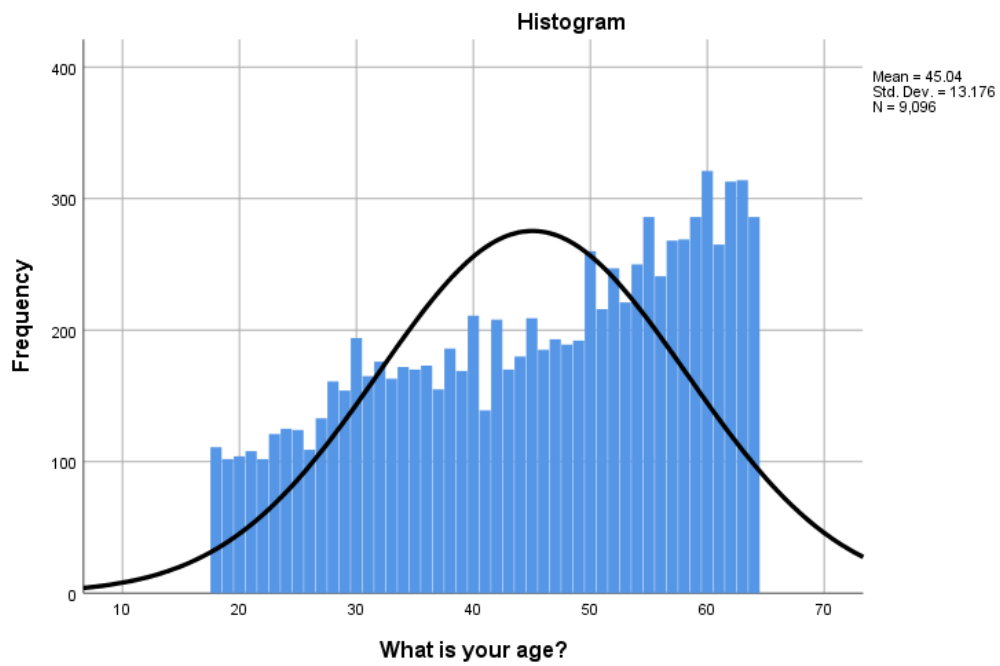
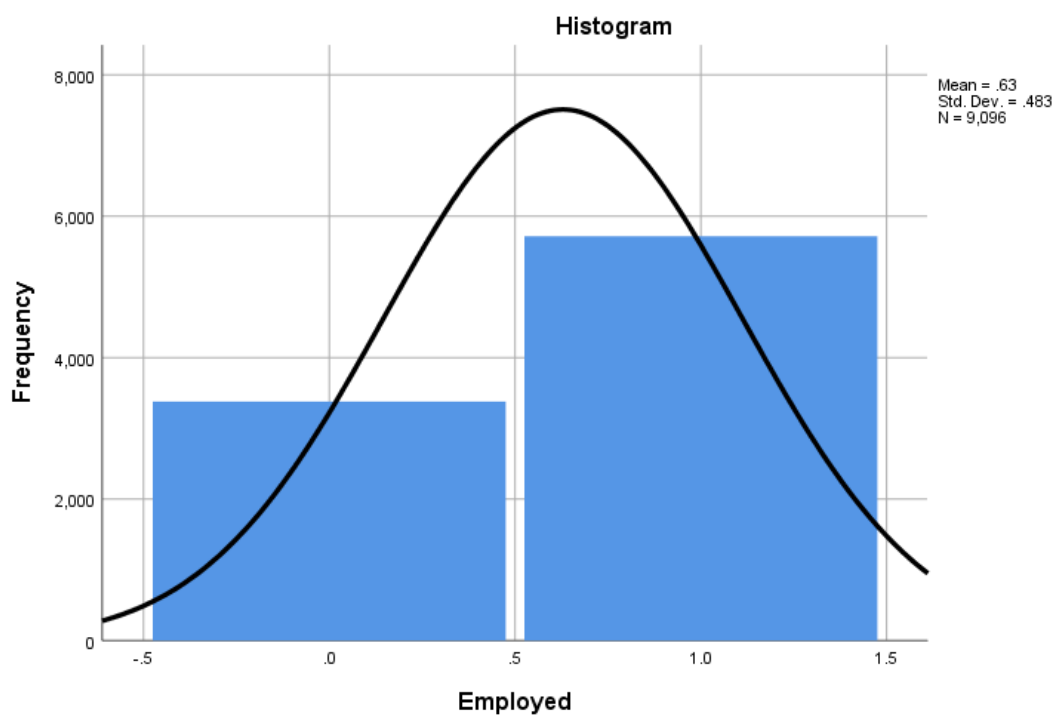
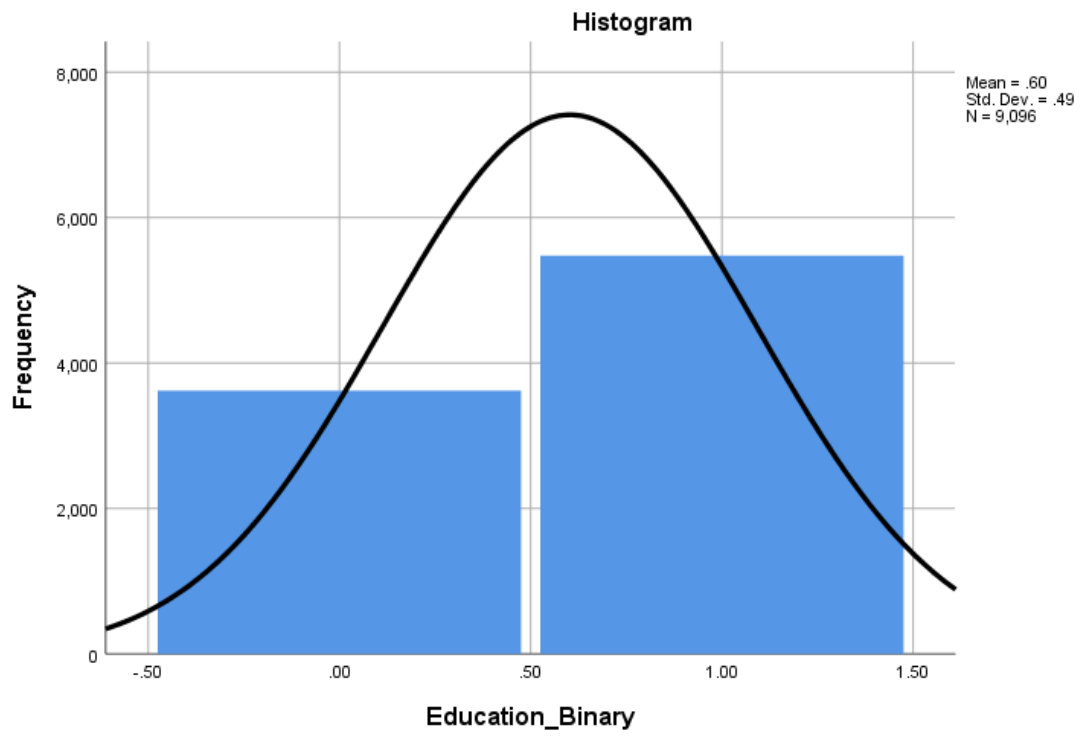
APPENDIX A

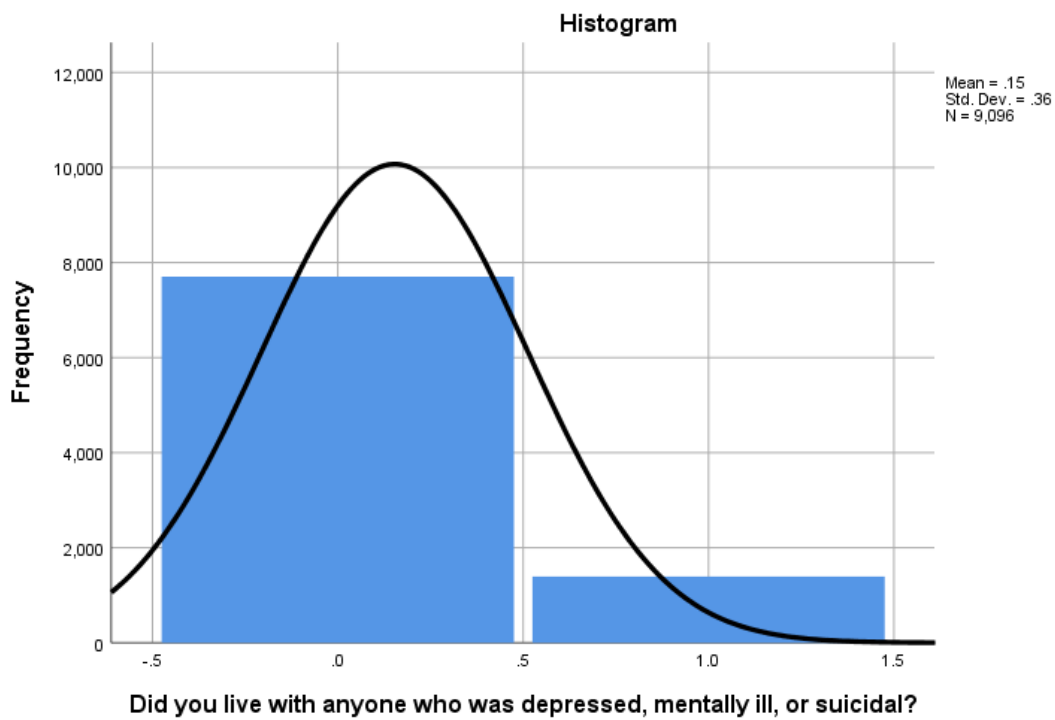
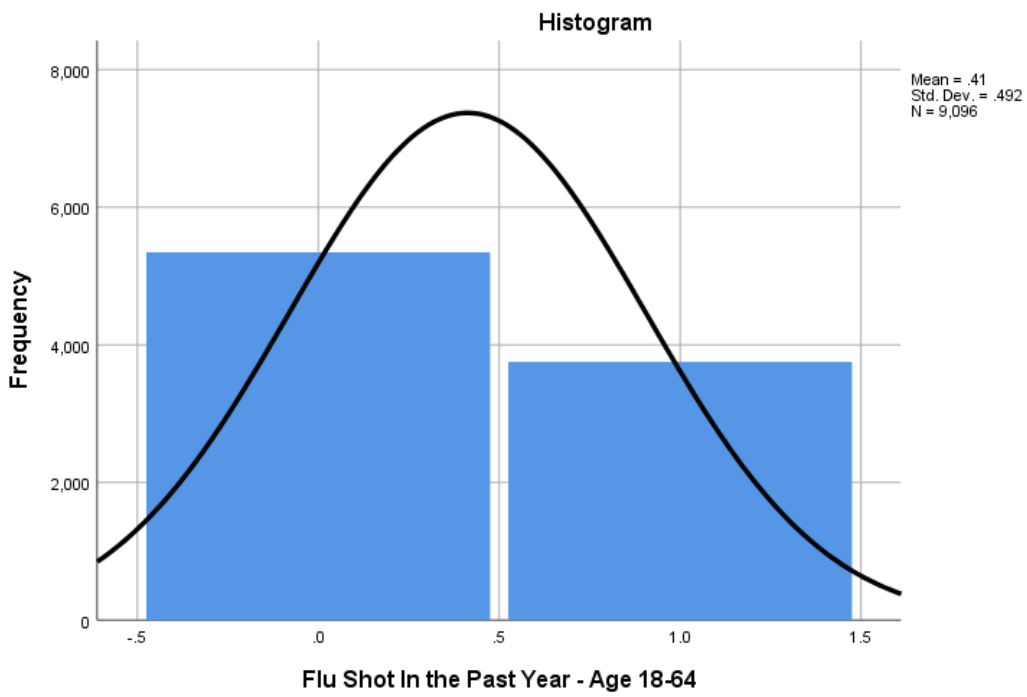
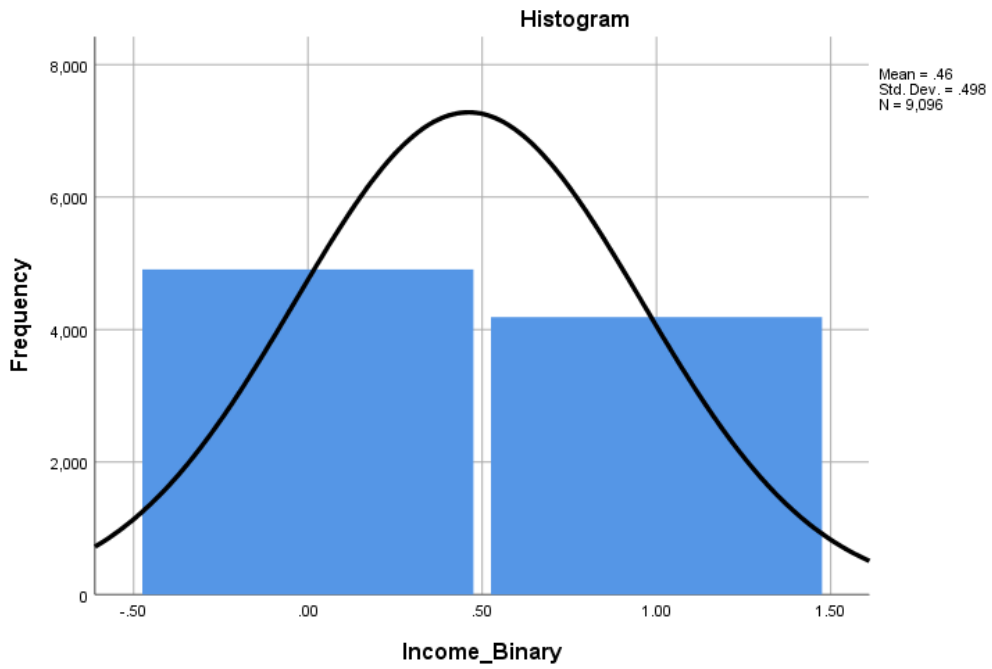
HISTOGRAM AND NORMALITY PLOT OF VARIABLES

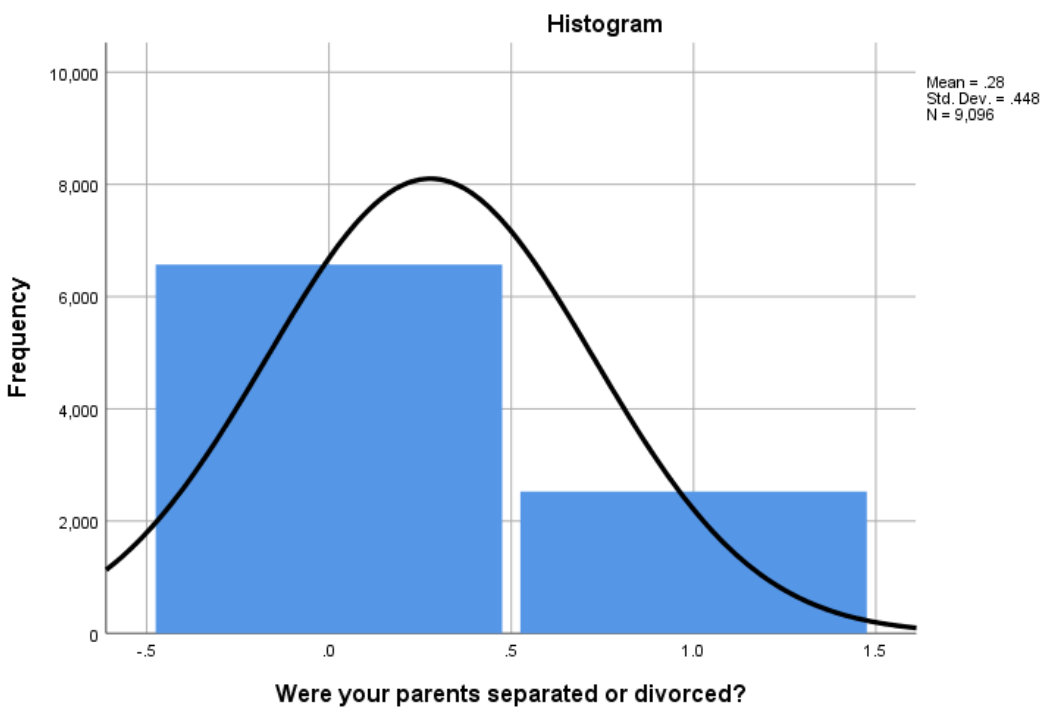
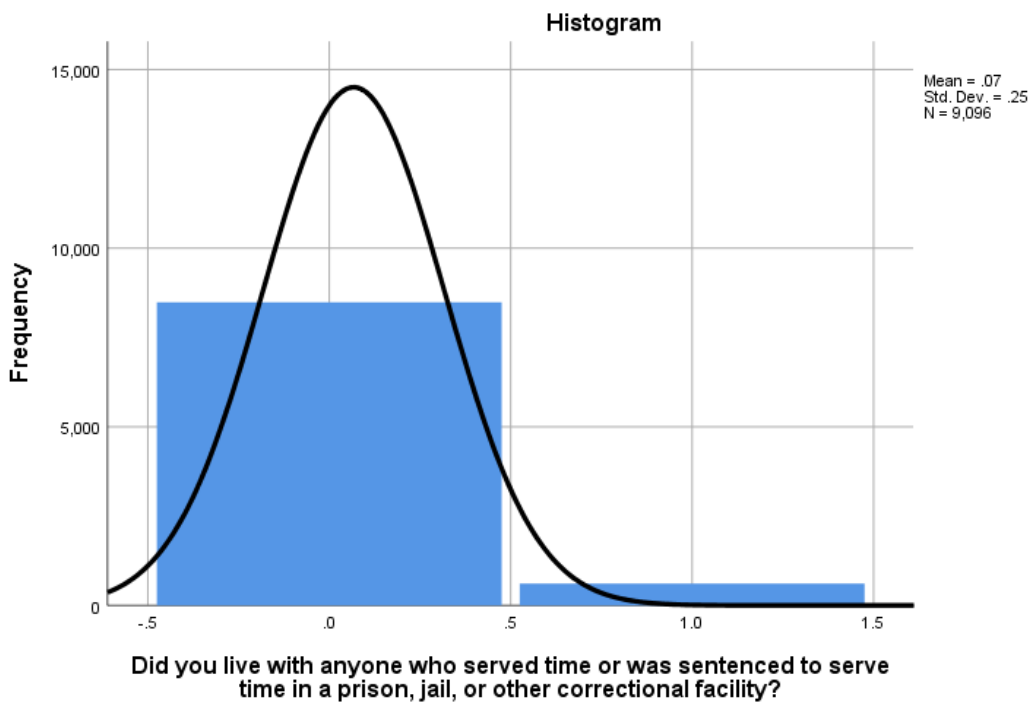
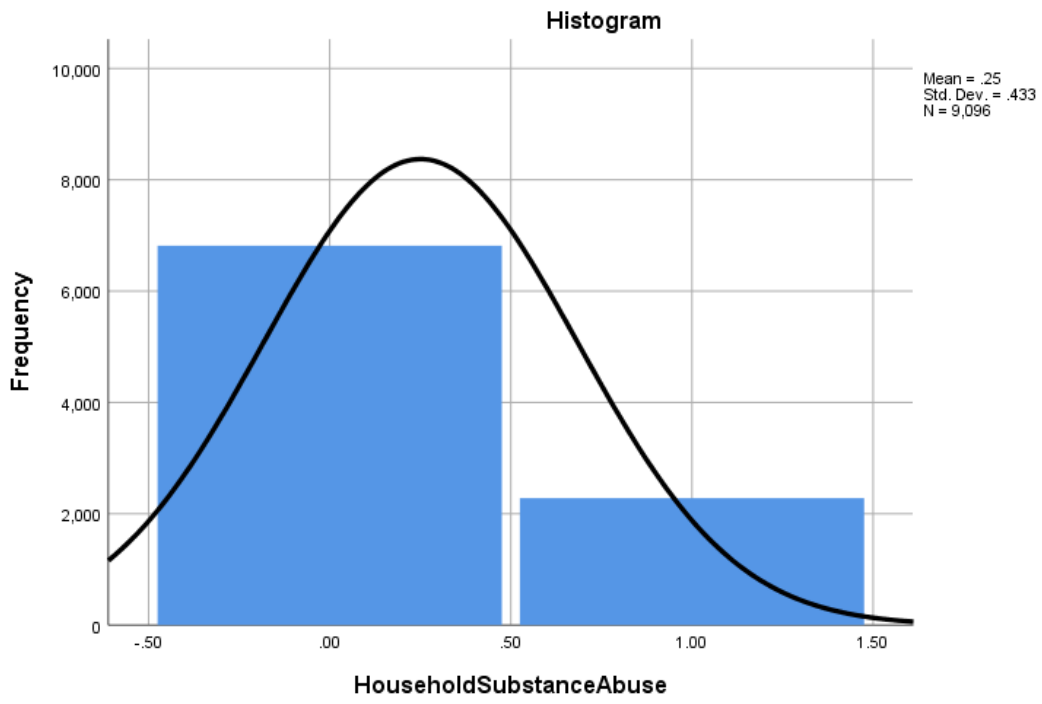


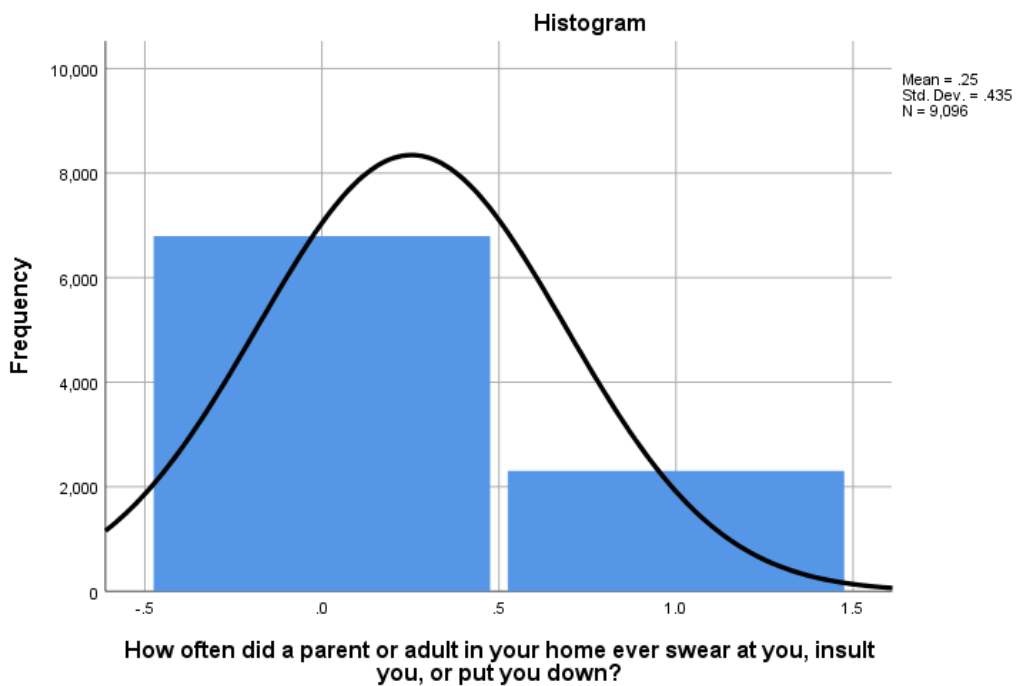
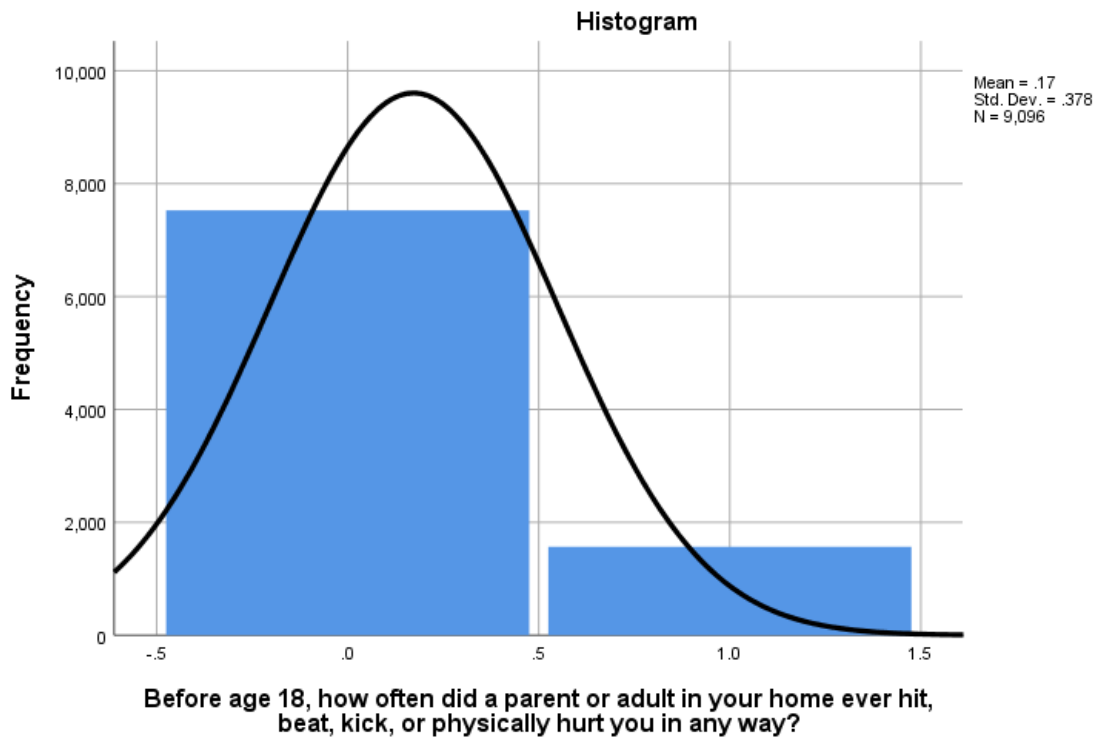
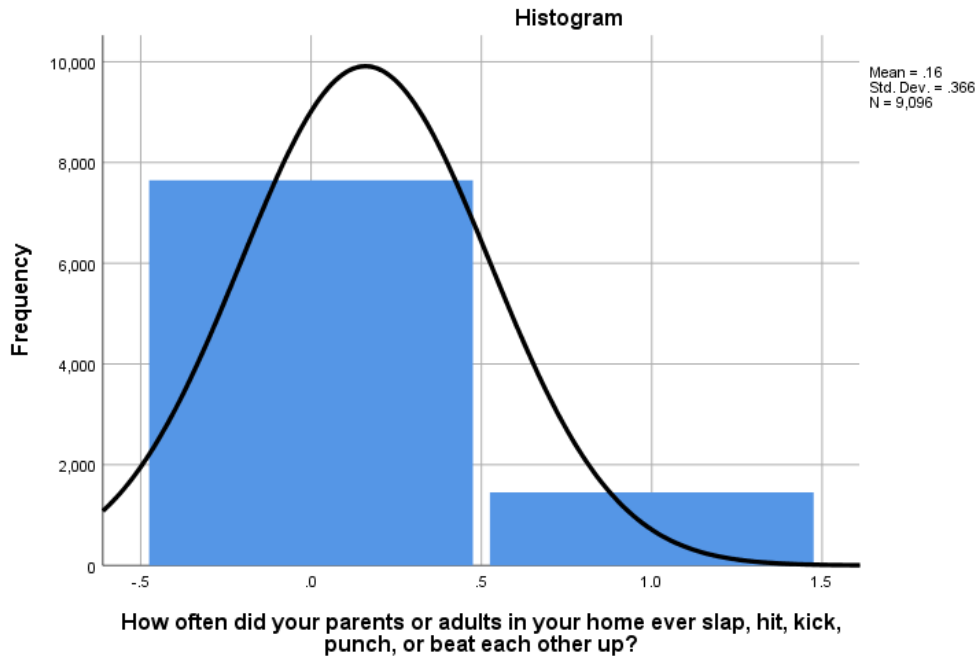


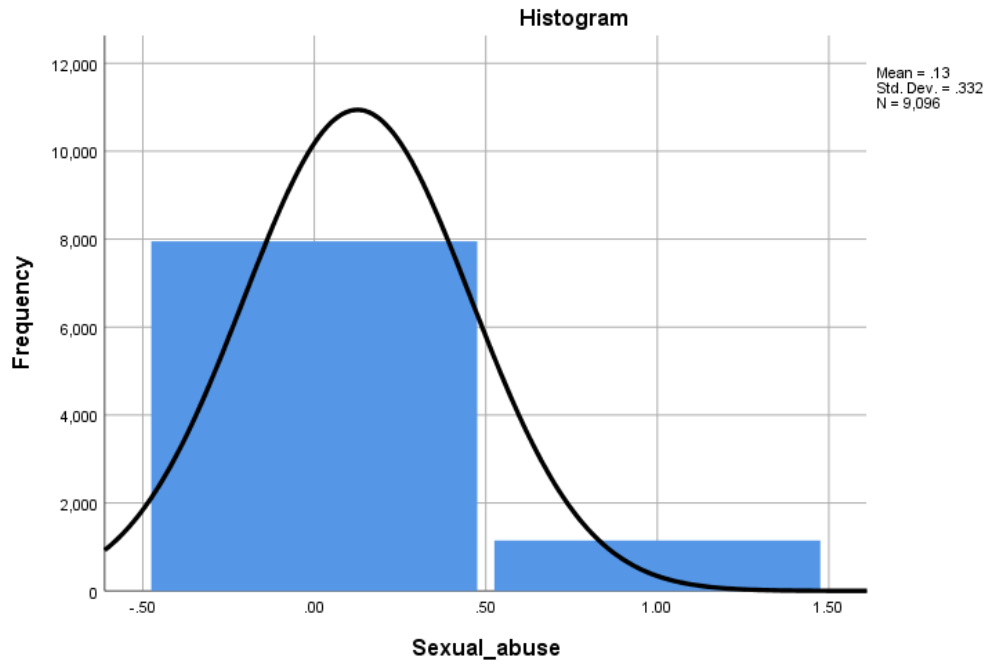






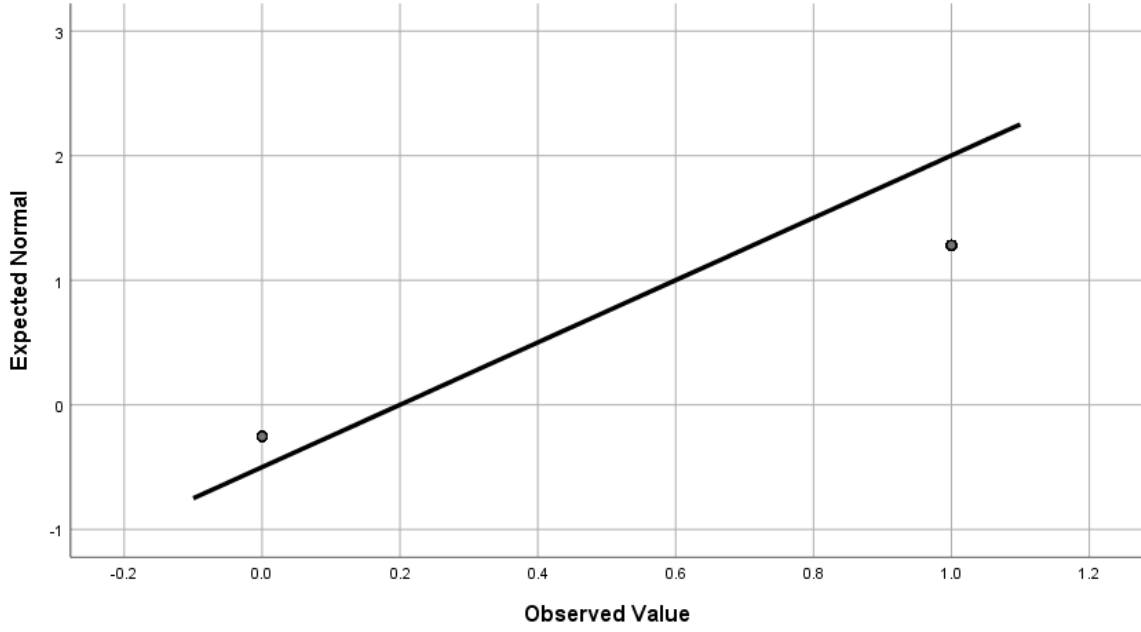




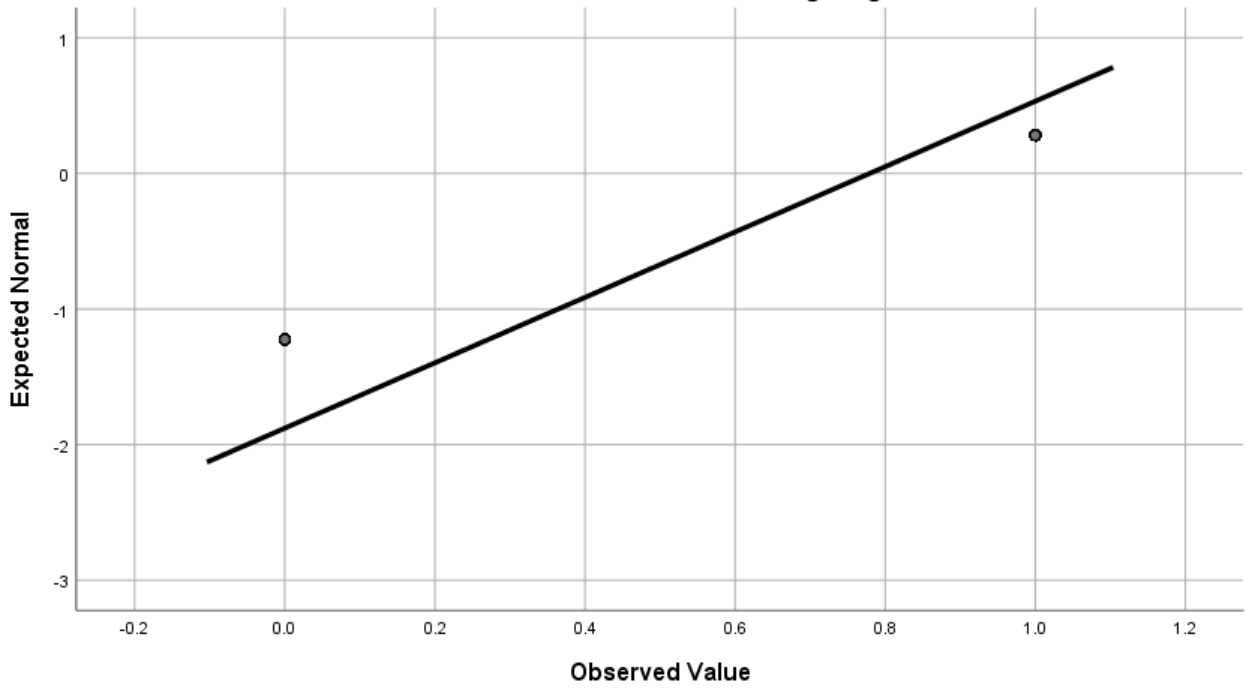


APPENDIX B
NORMAL Q-Q PLOTS OF VARIABLES

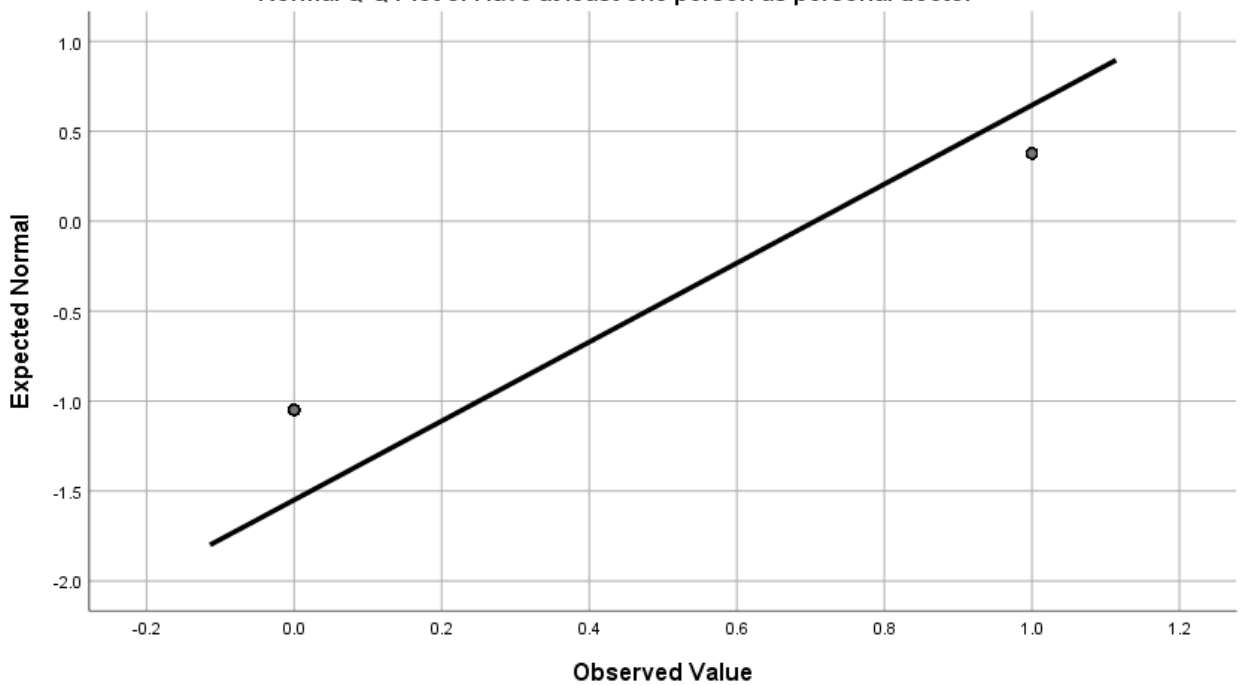
Normal Q-Q Plot of General Health Fair to Poor

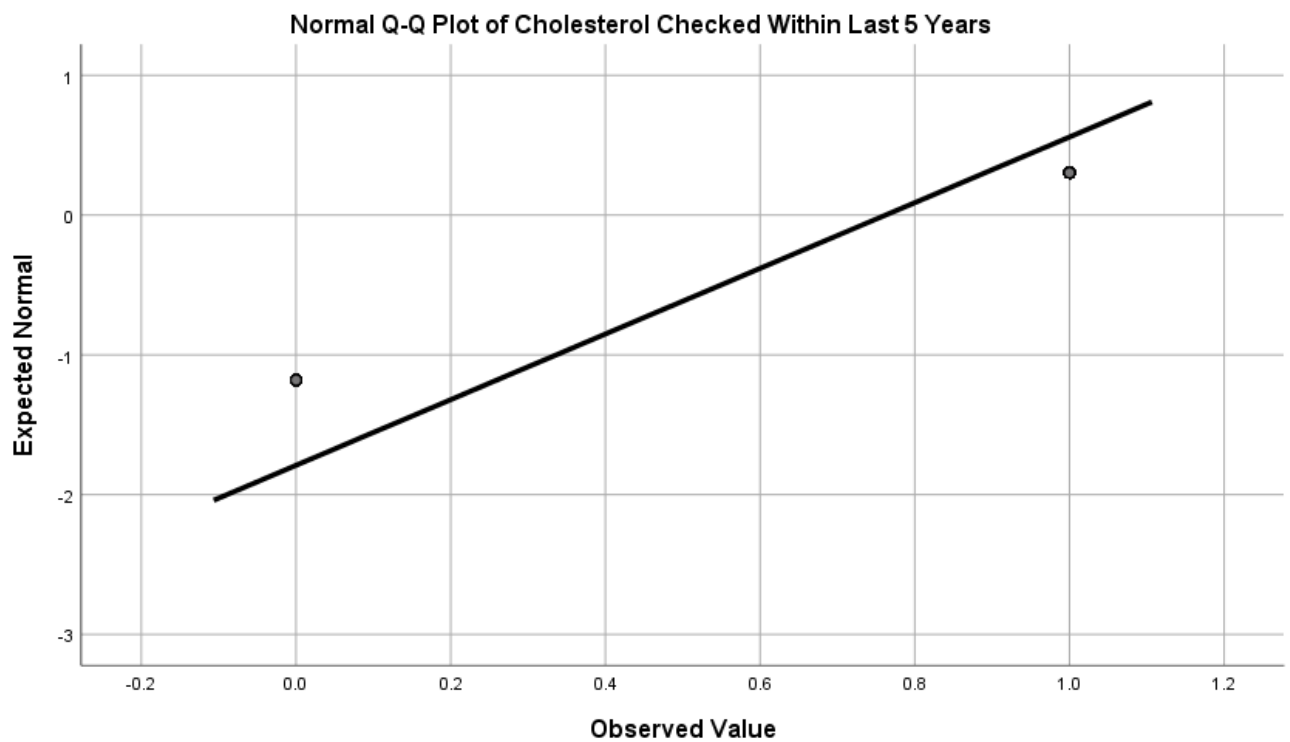
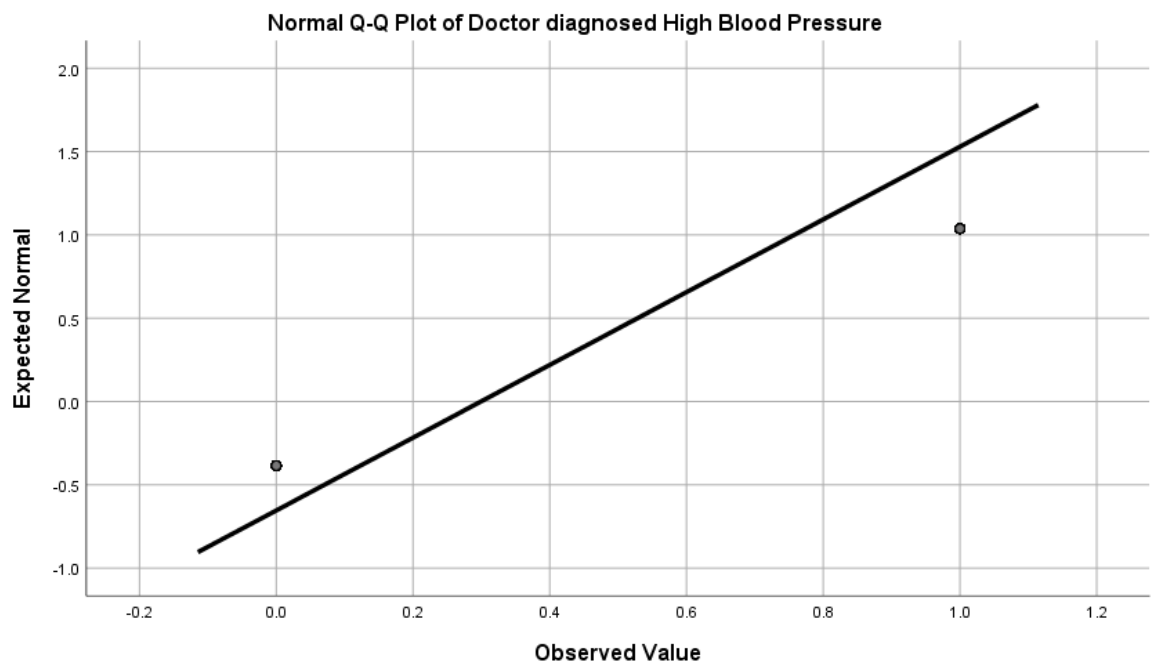
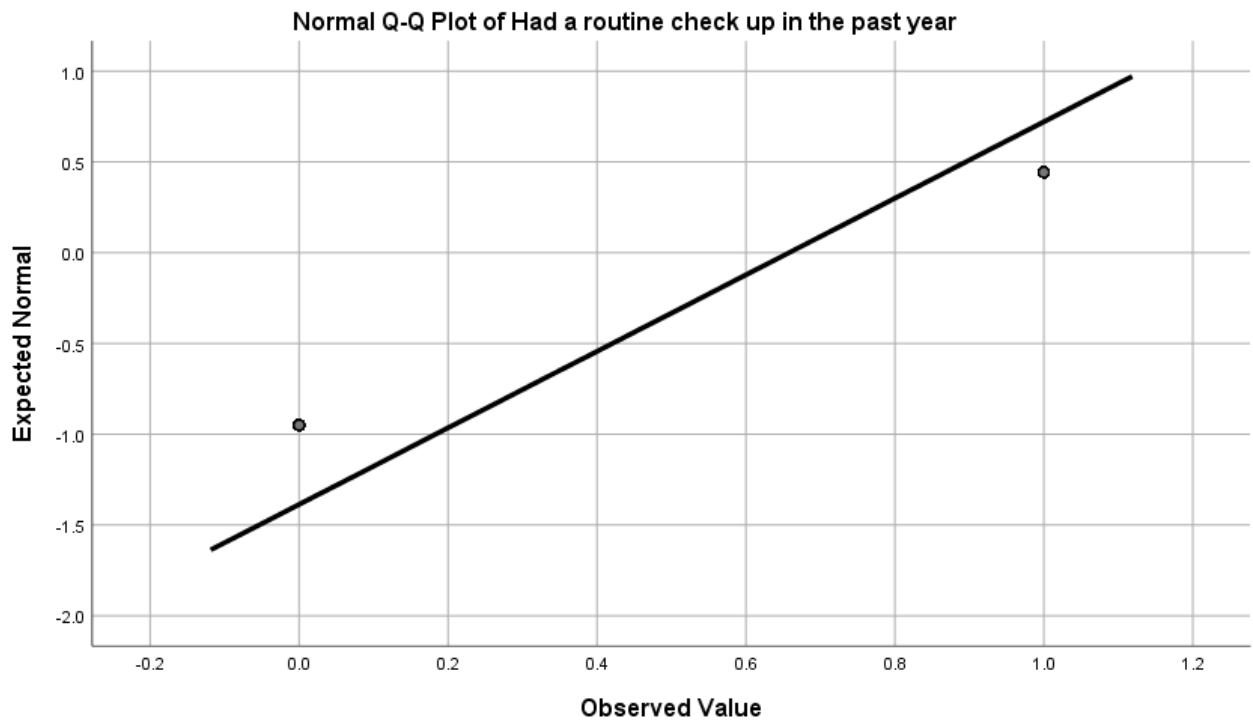


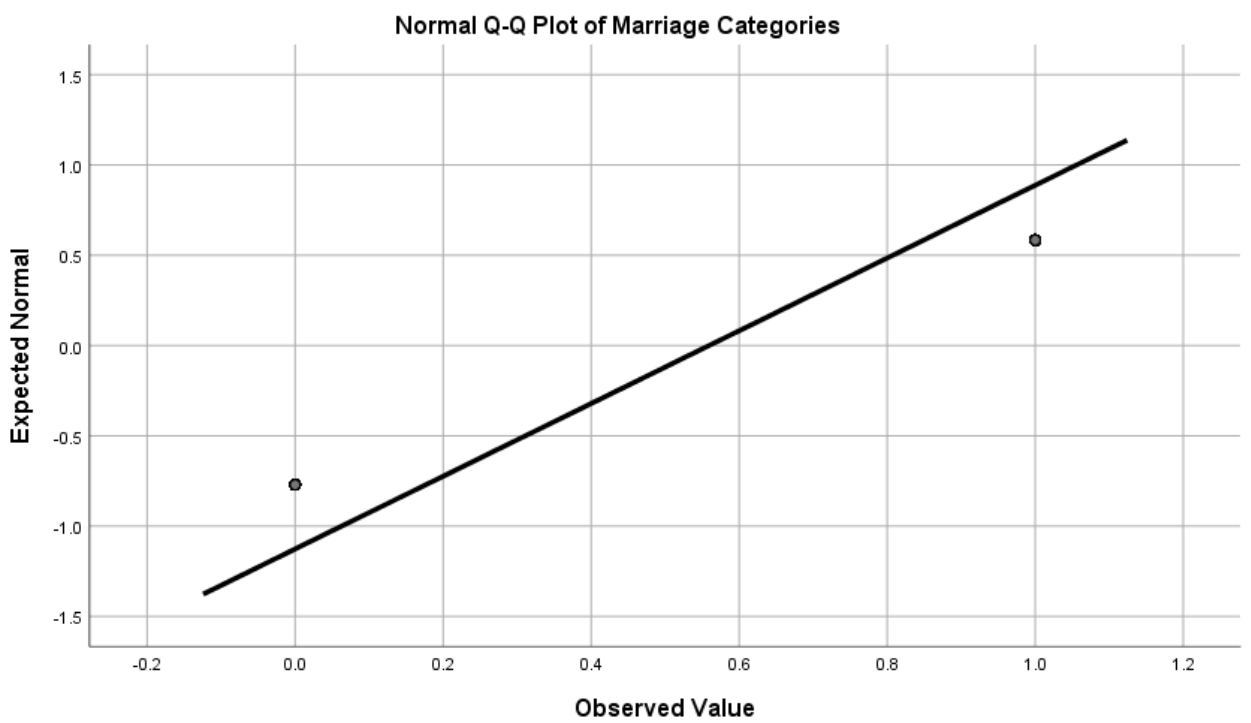
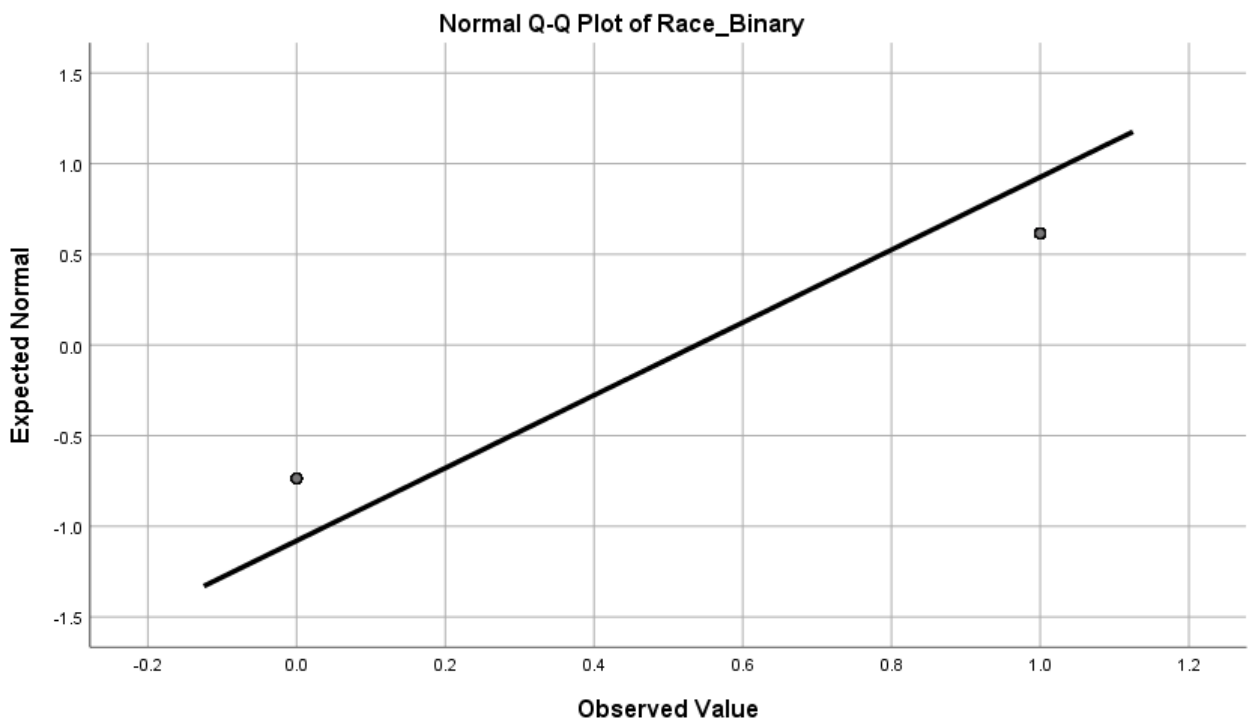
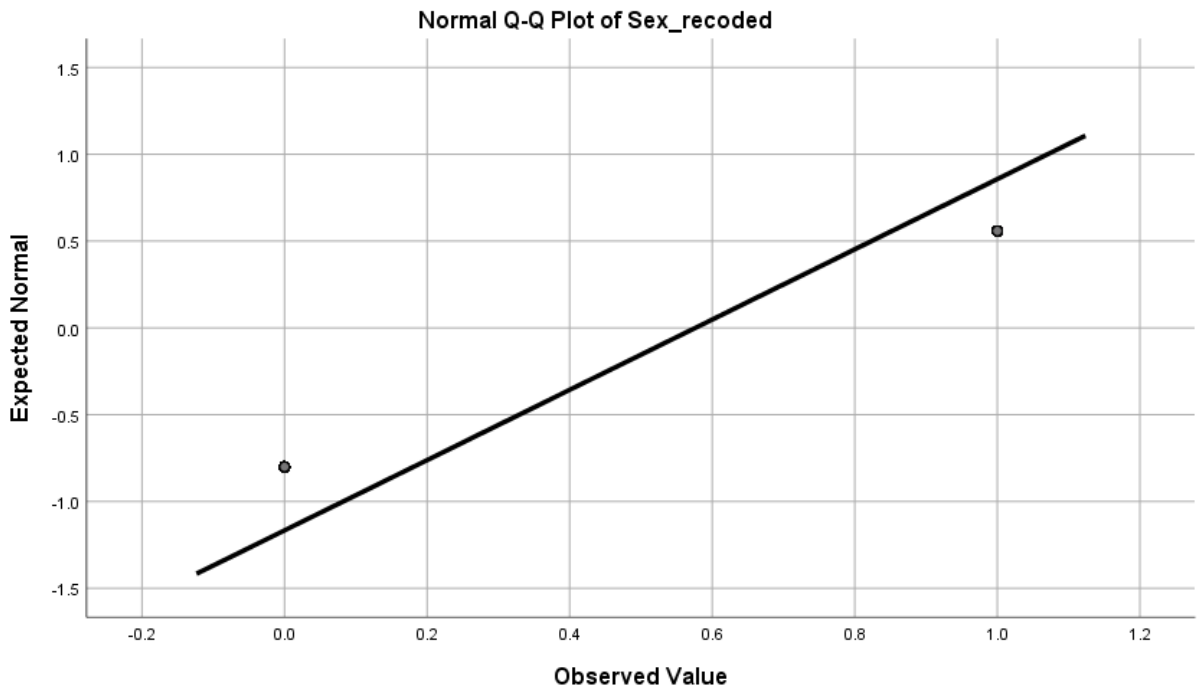
Normal Q-Q Plot of Has health insurance coverage - ages 18-64

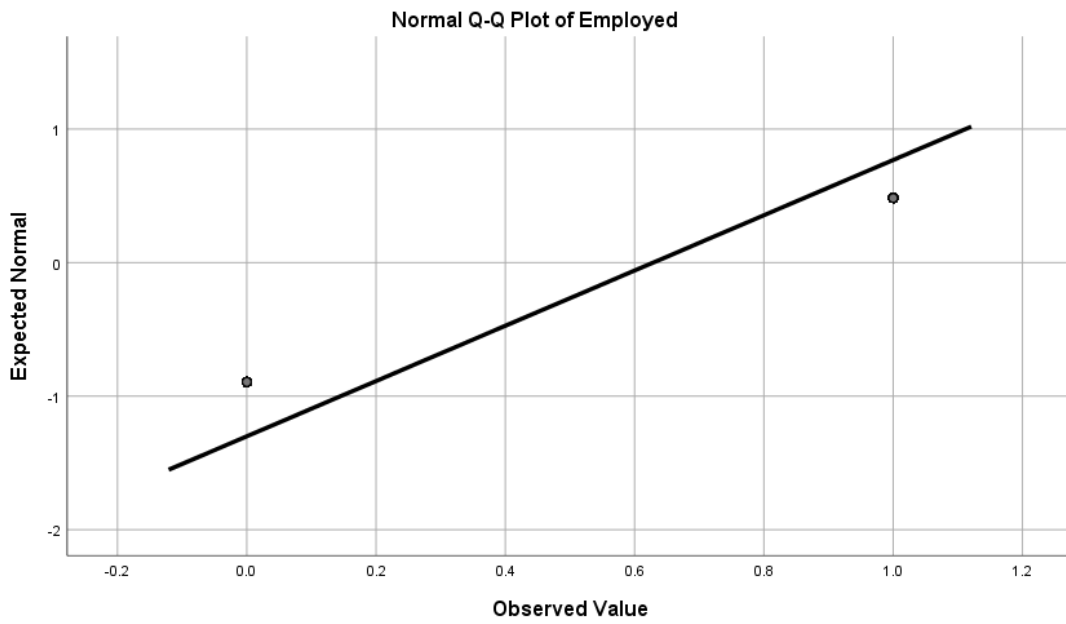
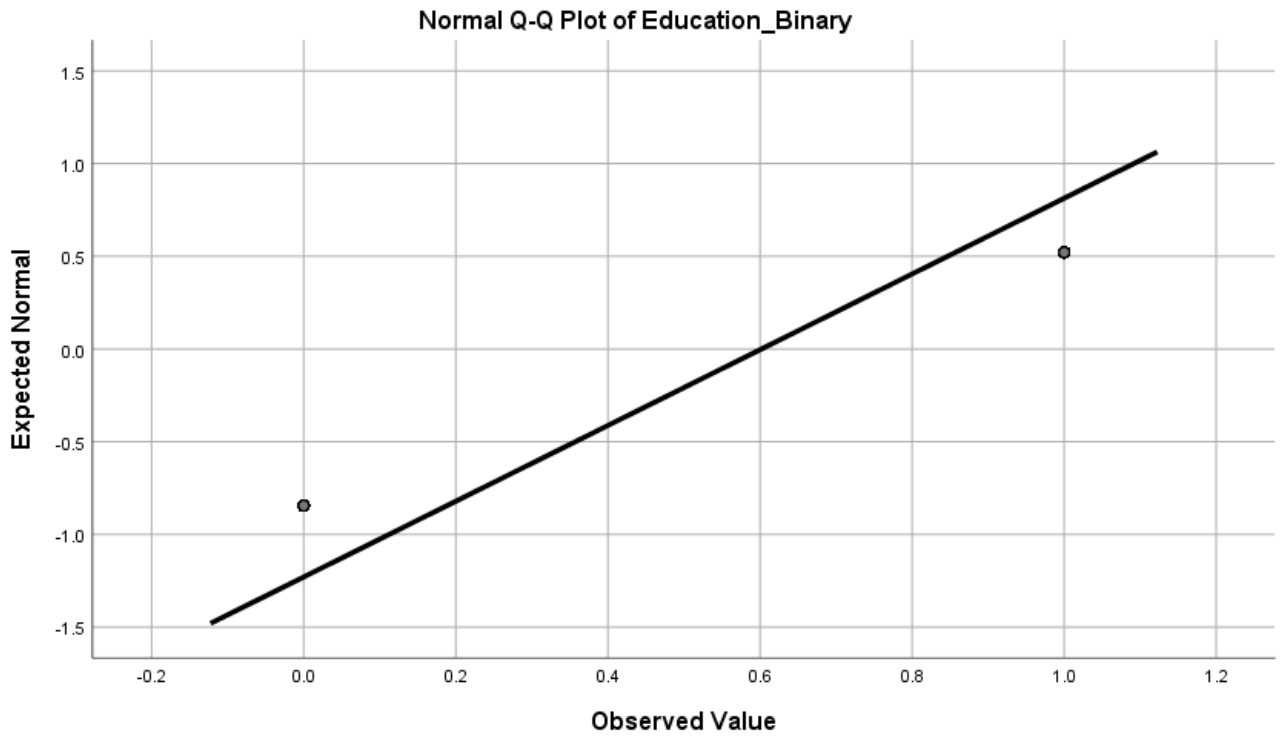


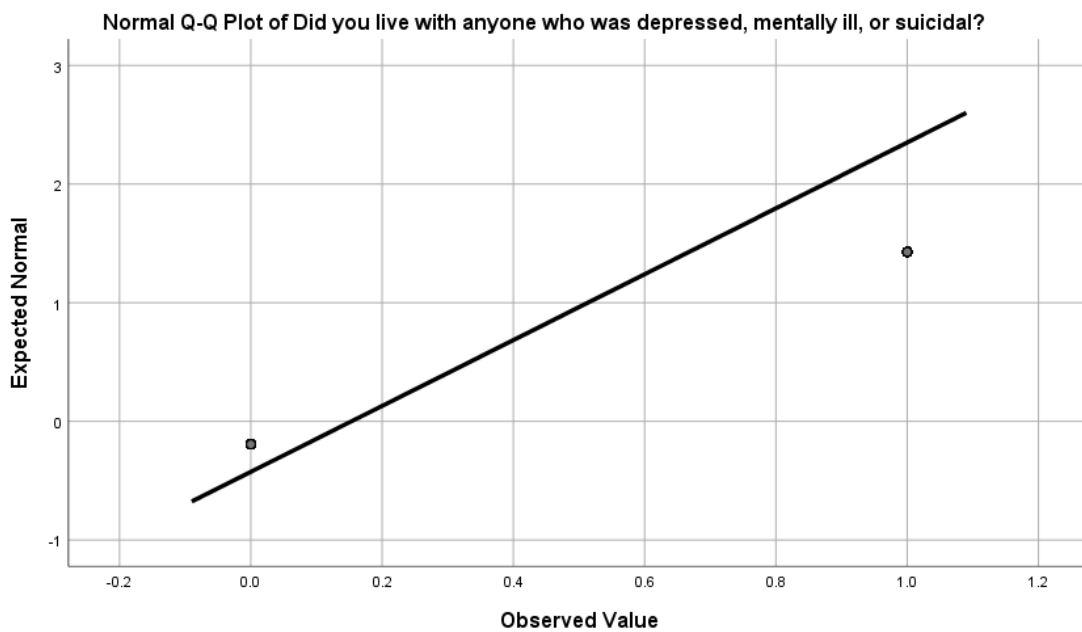
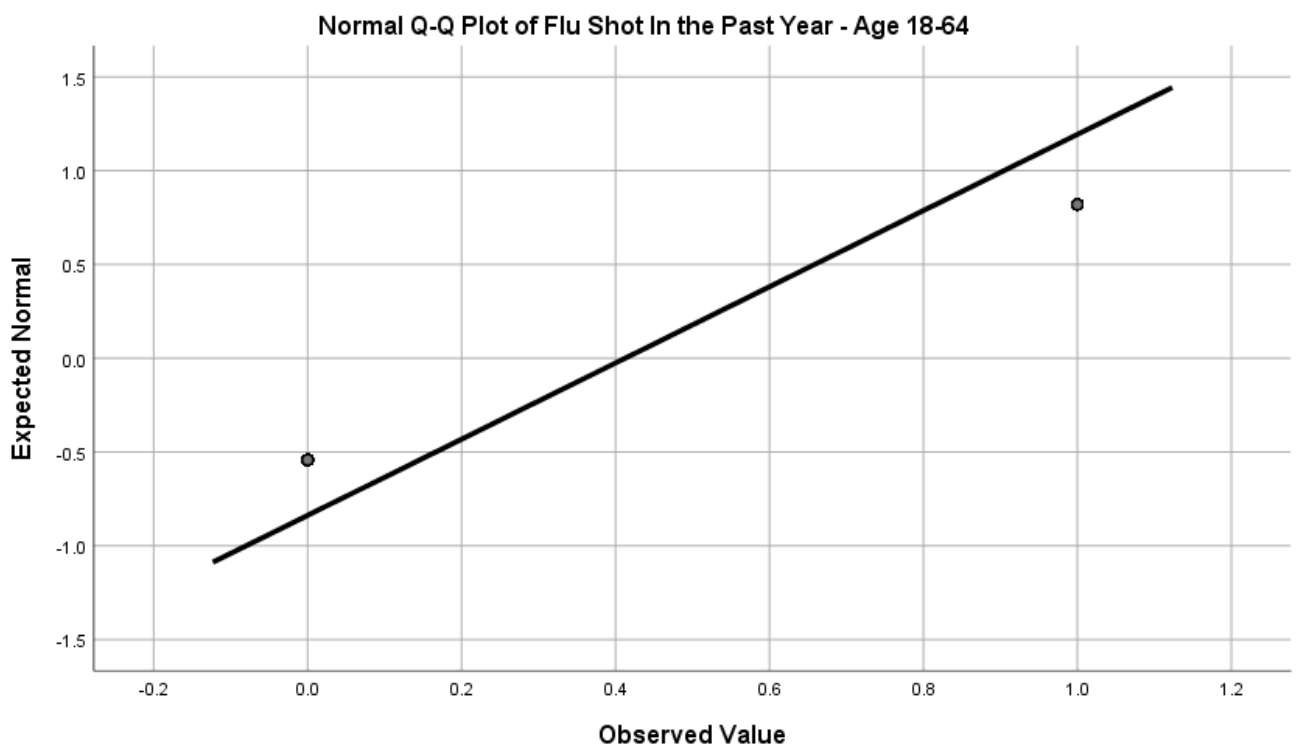
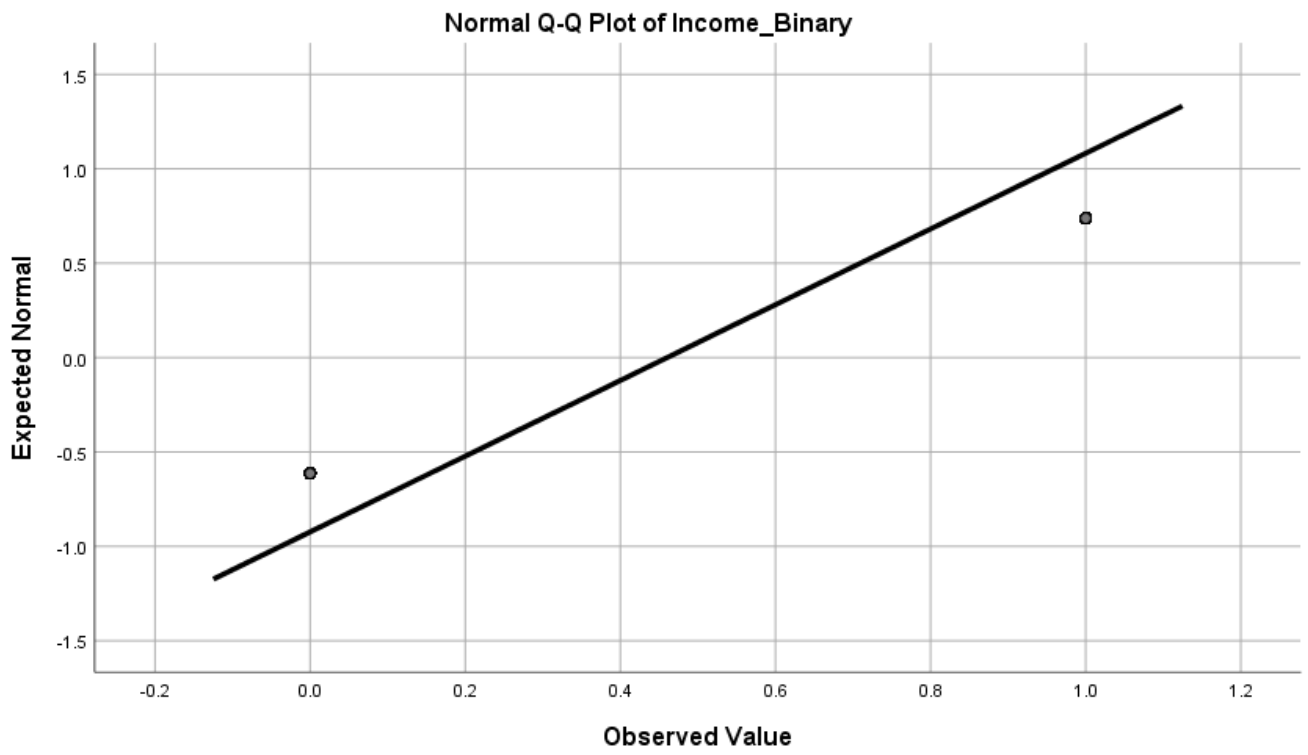
Normal Q-Q Plot of Have at least one person as personal doctor

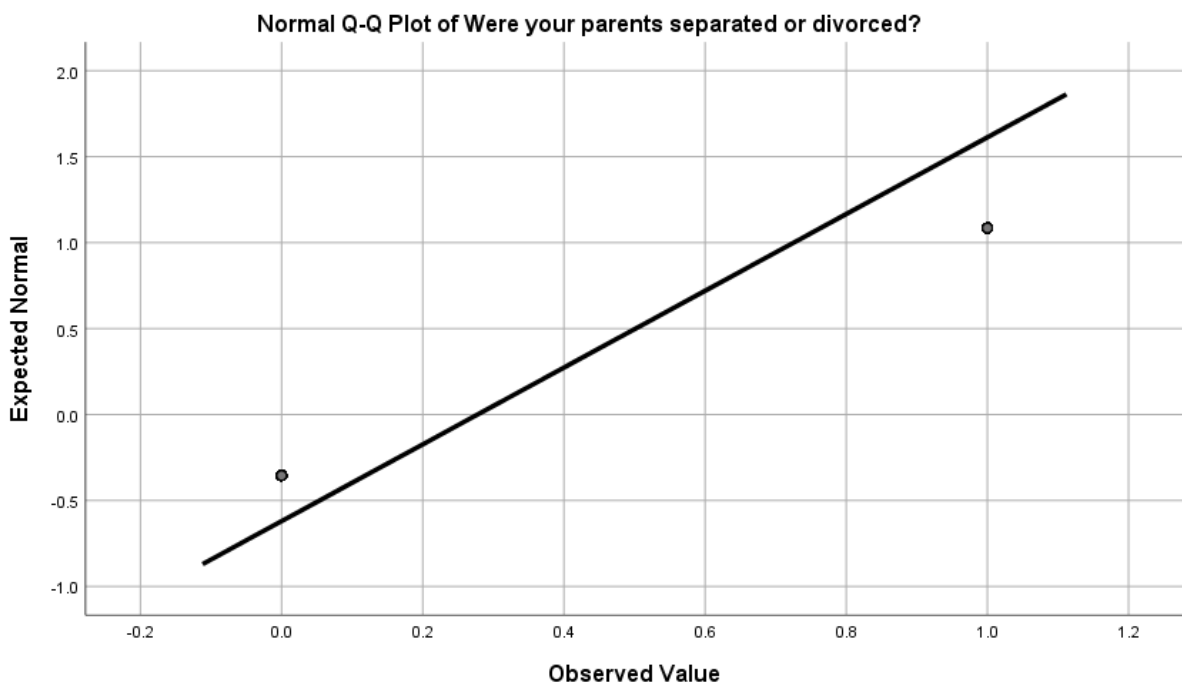
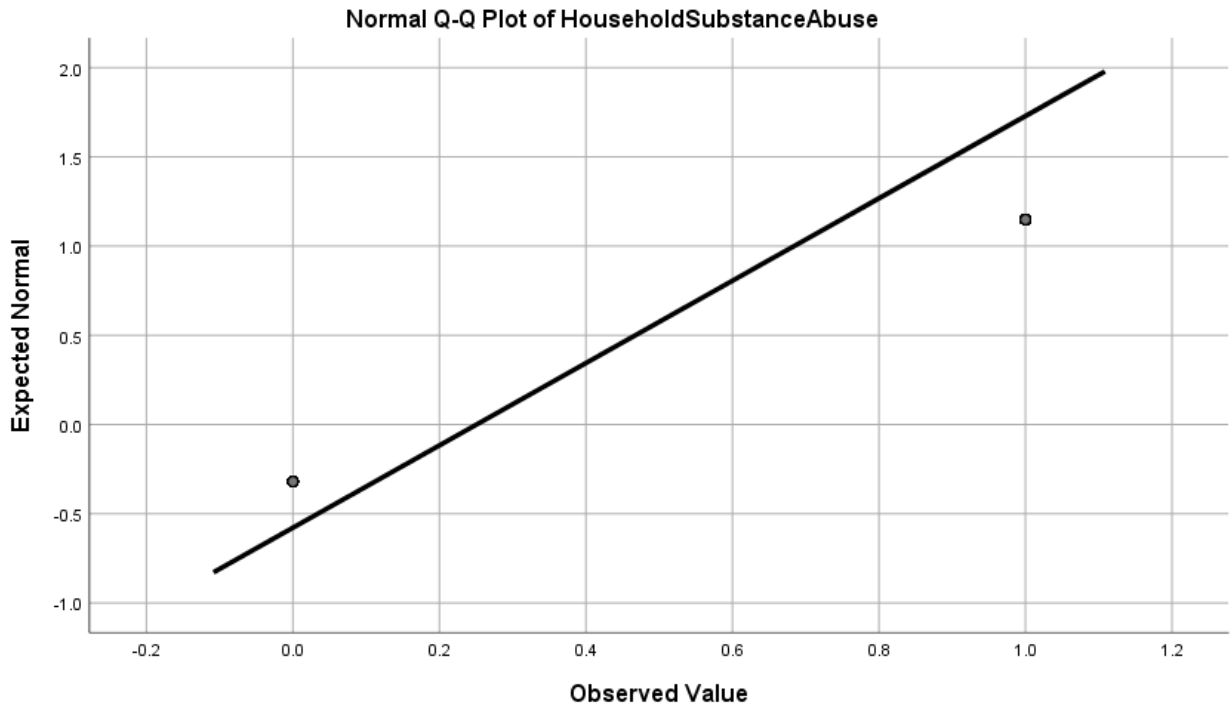




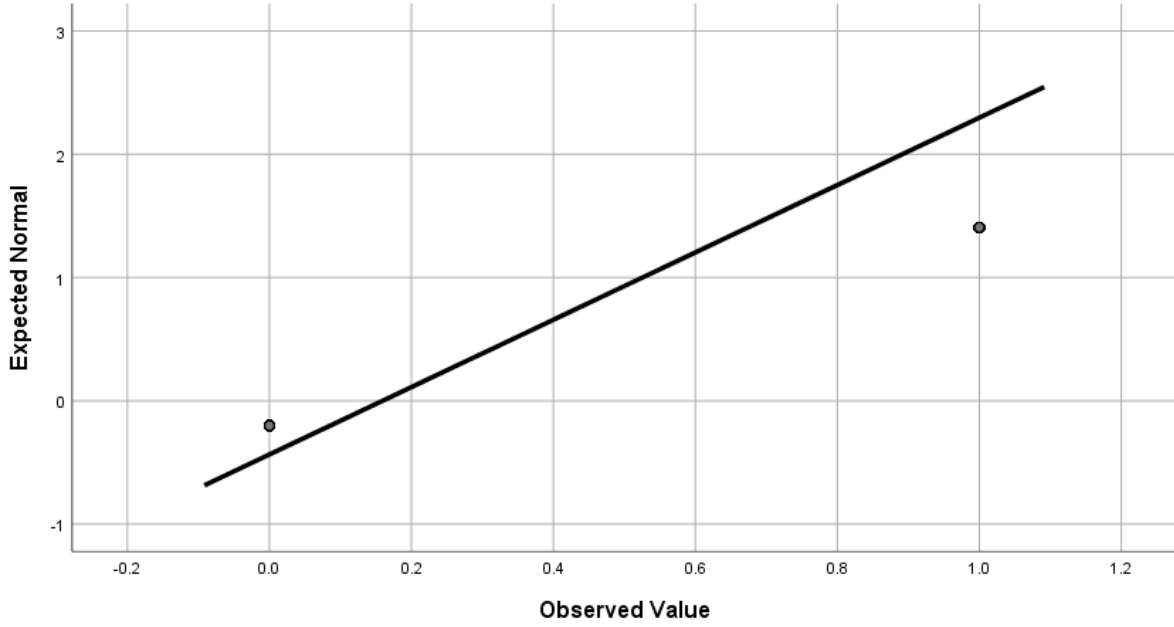




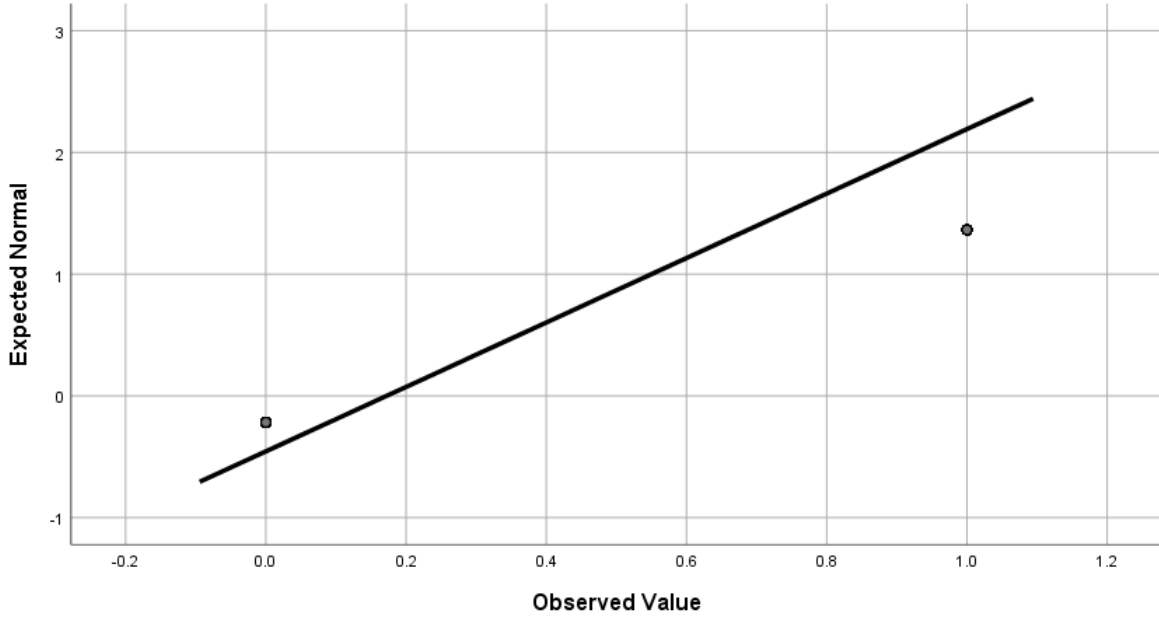




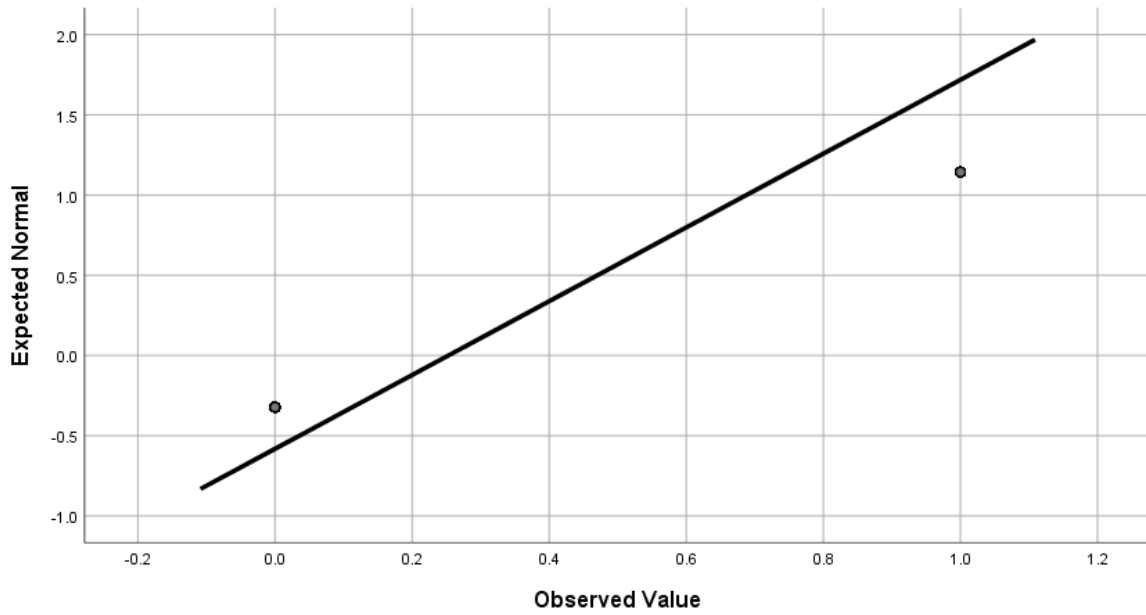
Normal Q-Q Plot of How often did your parents or adults in your home ever slap, hit, kick, punch, or beat each other up?

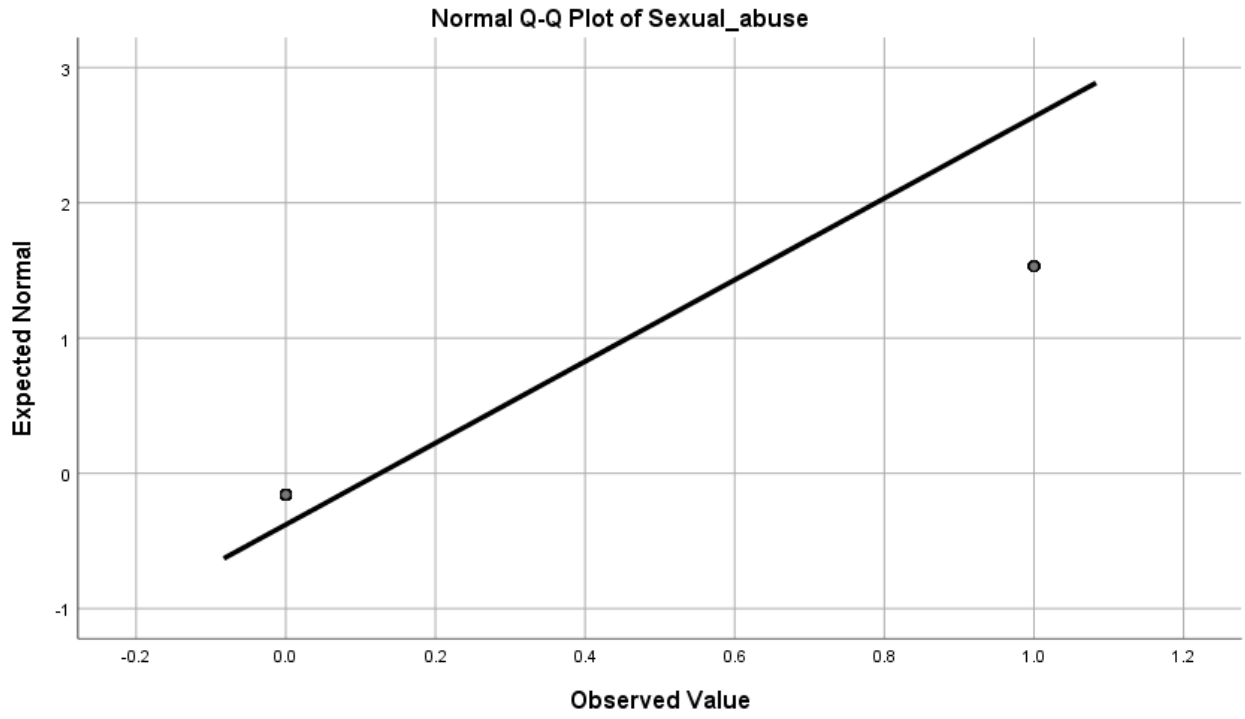


Normal Q-Q Plot of Before age 18, how often did a parent or adult in your home ever hit, beat, kick, or physically hurt you in any way?



Normal Q-Q Plot of How often did a parent or adult in your home ever swear at you, insult you, or put you down?





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