

Chronic kidney disease and adverse childhood experiences



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Abstract

Chronic diseases affect millions of Americans and can have debilitating and sometimes

fatal effects. Annual healthcare spending is constituted mostly on chronic diseases. One of the most prevalent chronic diseases is chronic kidney disease (CKD), which can require dialysis and later kidney transplant. Millions of Americans also face adverse childhood experiences (ACEs) including child abuse, neglect, and household dysfunction that impact their development and physical and mental health. These ACEs have shown dose-response relationships with chronic diseases such as liver disease, heart disease, and chronic obstructive pulmonary disease (COPD). This study explores the dose-response relationship between ACEs exposure and later development of CKD in adulthood. Surveys distributed to patients with CKD throughout Pennsylvania were administered. Those that participated in the survey then had the option to participate in a qualitative interview. Data from the survey and interviews demonstrated a dose-response relationship between ACEs and CKD. Further studies will need to be conducted to support the findings of this study.

Introduction

While significant advances have and continue to be made in the medical and public health fields, chronic diseases still impact millions of Americans and account for the majority of health care spending in the United States. These chronic diseases include cancer, heart disease, chronic obstructive pulmonary disease, diabetes, arthritis, Alzheimer's disease, and chronic

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kidney disease (Buttorff, Ruder, & Bauman 2017). Sixty-percent of adults in the United States have a chronic disease and 40% of adults have two or more of these chronic diseases (Buttorff, Ruder, & Bauman 2017). This high prevalence of chronic disease accounts for 90% of annual healthcare spending, making it crucial to prevent the incidence of these diseases (Buttorff, Ruder, & Bauman 2017). There are risk factors associated with these diseases such as poor nutrition and lack of exercise, but other risk factors need to be identified as well.

Environmental and/or genetic factors may contribute to these diseases.

There is a long-standing debate in the field of psychology on whether nature or nurture affects human behavior. In this debate, nature is considered the genetic inheritance and other biological factors of a person while nurture is considered the product of exposure, experience, and learning on individual (Zaky 2015). While some believe that nature or nurture has act independently on human behavior, it is more widely accepted that nature and nurture interact with each other in human development and behavior (Zaky 2015). Environmental and genetic interactions can be detrimental or beneficial to development and behavior depending on if the interactions are positive or negative. A stressful environment can cause genes to express themselves in different ways than if leading to increased risk of various diseases.

Literature Review

Chronic Kidney Disease

Chronic kidney disease (CKD) affects more than 30 million adults in the United States

(Draws & Rahmen 2015). Chronic kidney disease (CKD) is defined as gradual loss of kidney function over time. Kidneys are no longer able to filter blood correctly. There are five stages of chronic kidney disease, defined by how well the blood is able to filter out waste. A blood test is conducted to determine this. Stage one is very mild kidney disease, but the kidneys are still able to function properly and stage five is complete kidney failure. Stages two, three, and four are characterized by increasing damage and inability to filter waste.

The two main causes of CKD are hypertension (high blood pressure) and diabetes, (Draws & Rahmen 2015) with diabetes being the 7th leading cause of death in the United States (Heron 2018). Obesity commonly causes or is comorbid with hypertension and diabetes as well as chronic kidney disease (Draws & Rahmen 2015). In the United States, the prevalence of obesity continues to climb dramatically. While the reasons for this substantial increase are not completely known, scientists and researchers believe there are a multitude of factors contributing to this public health epidemic (Wright & Aronne 2012). These reasons include, greater accessibility to foods, particularly foods high in fat and sugar, decline in physical activity levels, and side effects of common medications (Wright & Aronne 2012). As obesity rates continue to rise, consequently prevalence of hypertension and diabetes will also increase, leading to greater prevalence of CKD.

Progression of CKD will lead to the need for treatment in the form of dialysis or kidney

transplant (Draws & Rahmen 2015). Patients on dialysis usually spend several days a week at

dialysis centers using hemodialysis or use hemodialysis or peritoneal dialysis at home. Hemodialysis requires the use of an outside machine called a dialyzer that filters a person's blood (NIDDK 2018). A person receives minor surgery to create a vascular (in the veins) access in the arm through which the person connects to the dialyzer (NIDDK 2018). Once this access is created, depending on the patient, the person will go to a dialysis center and receive hemodialysis three times a week for several hours during the day or use a dialyzer at home in order to have a more flexible schedule (NIDDK 2018). Peritoneal dialysis is also an option for those who do not want to go to a dialysis center multiple times a week (NIDDK 2018). A catheter is placed surgically in the abdomen (NIDDK 2018). Then every few hours, a solution is dispensed into this catheter which filters the blood (NIDDK 2018). After filtration has been completed, the fluid is drained from the abdomen and new solution is added (NIDDK 2018). While this can be completed at home, peritoneal dialysis still requires a great deal of time.

This extensive time commitment to keeping their kidneys functioning prevents many from employment, spending time with family and friends and overall negatively affects their quality of life (Tonelli et al. 2011). In order to extend life expectancy and improve quality of life, nephrologists advocate for patients to get placed on the national transplant waiting list to receive a

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kidney (Tonelli et al. 2011). Currently, however, the average wait time for a deceased donor transplant is 5-7 years, meaning unfortunately thousands of patients on dialysis do not receive a transplant. There has been an increase in living donor transplantation as patients receive better outcomes from living donor transplant including less time on dialysis, reduced risk of kidney rejection, and improved quality of life, which has helped mitigate the wait time problems with deceased donor transplant (Lumsdaine et al. 2005).

Adverse Childhood Experiences

To prevent the development of CKD, it is important to understand other risk factors

associated with the etiology of CKD. In other similar chronic diseases such as liver disease

(Dong, Dube, Felitti, Giles, Anda 2003), heart disease (Dong et al. 2004), and chronic

obstructive pulmonary disease (Anda, Brown, Dube, Bremner, Felitti 2008), having experienced

childhood abuse, neglect and/or household dysfunction has increased the risk for these diseases.

Researchers from this study defined these instances of childhood abuse, neglect, and household dysfunction as Adverse Childhood Experiences (ACEs) (Felitti et al. 1998). These ACEs are further subdivided into ten categories: emotional, physical, and sexual abuse, emotional and physical

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neglect, domestic violence, household substance abuse, mental illness in household, parental separation or divorce, and criminal household member (Felitti et al. 1998). Further studies based on the CDC-Kaiser Permanent study have identified other ACEs based on the demographics of the region being studied, including but not limited to, one's neighborhood, racism, and bullying (Wade et al. 2016). Additionally, studies have shown that those who identify as a person of color and those of low socioeconomic status report greater ACEs exposure (Merrick, Ford, Ports, & Guinn 2018).

Similarly, persons of color and of low socioeconomic status have a higher risk of chronic

kidney disease (Draws & Rahmen 2015). While exact reasons for this are still being investigated,

it is important to note the similarities between risk for CKD and risk for ACEs.

As previously

stated, diabetes is one of the leading causes of CKD. There have been several studies

demonstrating an association between ACEs and diabetes (Huange et al. 2015). Based on the

evidence of a dose-response relationship between ACEs and diabetes and other chronic diseases

and illnesses, it seems like that ACEs exposure would also show a dose-response relationship

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with CKD is imperative for understanding the etiology of CKD and creating preventative

measures. These preventative measures can in turn decrease the rate of CKD, leading to lower

rates of dialysis and transplantation, and lower morbidity. Is there a relationship between ACEs and development of CKD and if so what is that relationship? It is hypothesized that similar to past studies, there will be a dose-response relationship between ACEs exposure and developing CKD.

Methods

Definitions

Adverse Childhood Experiences (ACEs) are defined as abuse, neglect, and family/household challenges that occurred in the first 18 years of life. Abuse can be further categorized into emotional, physical, and sexual abuse.

Neglect is broken down into emotional and physical neglect. Household challenges include domestic violence, household substance abuse, mental illness in household, parental separation or divorce, and a criminal household member. This is based on the criteria for ACES of the CDC-Kaiser

Permanent ACEs study.

Study Design, Survey, and Interviews

A cross-sectional study design was employed in order to study the prevalence of ACEs experienced by those with CKD. A survey was administered in order to gather data from a large sample. The survey to

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assess ACEs was a modified version of the Center for Disease Control's Behavioral Risk Factor Surveillance System Adverse Childhood Experience (ACE) module. This survey included 11 questions assessing the different ACEs that could have been experienced. These questions were designed to have limited answer options, yes/no format or how often a particular event may have occurred in the cases of abuse. This survey was chosen as it had already been developed and well-tested on a national scale. An additional open-ended section was added to allow participants to identify childhood adversities that may not have been identified. Having an open-ended section also allows for further revision of ACEs surveys in the future to better capture childhood experiences.

The qualitative interview that was conducted post-survey for those who qualified reiterated some of the survey questions, but also allowed for more elaboration. This allowed for more detailed information regarding the ACEs the participants faced and the development of their life and health.

Demographic questions such as race, ethnicity, current household income, relationship status, having children etc. were asked first to understand participant backgrounds. Questions for the adapted ACEs surveys were then reiterated in an open-ended format to allow participants to further explain their experiences. Those who responded to the open-ended section on the survey identifying other childhood adversities not captured by the limited answer options were then given the opportunity to elaborate on these experiences. Psychologists who specialize in trauma assessment and treatment were consulted during creation of the interview guide and also provided training to the interviewers on how to appropriately ask questions

of sensitive nature and properly handle any emotions that may arise during the interview process. Interviews were recorded and transcribed in order to ensure all data was captured. Two independent coders then coded the transcriptions using MAXQDA and a code book developed for the study. Interrater reliability was established through MAXQDA's reliability tools.

Population and Recruitment

Participants were recruited throughout the state of Pennsylvania by employing major university-based health systems. University of Pittsburgh Medical Center (UPMC) and Penn Medicine were chosen to recruit participants as they are located in the two major cities of Pennsylvania, Pittsburgh and Philadelphia, but also have extensive outpatient centers throughout suburban and rural areas of Pennsylvania. This allowed for a wide recruitment of participants from a variety of demographic areas. Penn Medicine and University of Pittsburgh Medical Center also have well-developed kidney transplant programs and treat patients with various kidney related diseases, including chronic kidney disease (CKD). Nephrologists at UPMC and Penn Medicine were contacted to help with recruitment.

Participants were eligible if they were eighteen years or older, were residents of the state of Pennsylvania, had been diagnosed with CKD, and did not have other organ failure or history of other organ failure. Other comorbidities were not excluded as CKD is commonly comorbid with other health conditions including various mental illnesses, diabetes, high blood pressure, which are the primary causes of CKD, and lung and heart conditions/diseases.

Complications from diabetes and high blood pressure can extend beyond

CKD, so excluding participants with other health issues would create an extremely small sample size. Nephrologists recruited participants at their appointments by explaining the study and what participation would entail. After obtaining informed consent, the participants were given paper copies of the surveys, prepaid envelope to mail back the surveys, and a list of contacts for the study participant team. Participants were compensated with a \$10 gift card for their time.

Those who responded to the survey having experienced one or more ACEs were invited for qualitative interviews. If study participants were in the Philadelphia region, they were asked to come for an in-person interview. Participants in the Pittsburgh region, rural areas of Pennsylvania, or were physically unable to come for an in-person interview, a tele-interview was conducted. The tele-interview was conducted via a secure HIPAA-compliant network and participants were informed of this to ensure protection of information. Recruitment occurred over the course of two years and there were a total of 100 participants in the study.

Discussion

Expected Results

This study aimed to identify a relationship between ACEs and development of CKD. It was hypothesized that a dose-response relationship would be found between ACEs and CKD. Indeed, a dose-response relationship was found between having experienced one or more ACEs and CKD. Compared to those who participated in the study that had no ACEs, those who had experienced one or more ACEs were found to have been diagnosed with CKD <https://assignbuster.com/chronic-kidney-disease-and-adverse-childhood-experiences/>

at a younger age and were at more advanced stages of CKD. Additionally, those who had experienced one or more ACEs tended to have other comorbid health conditions including anxiety, depression, obesity, hypertension, and diabetes. These conditions have also been shown to have a dose-response relationship with ACEs, which also demonstrates a possible relationship in progression of disease based on chronic stress during childhood. This was seen across race, socioeconomic status, location in Pennsylvania (urban, rural, suburban), and ethnic factors. While there may be differences between groups and variations may exist between those of varying races, ethnicities, socioeconomic statuses etc. this was not assessed at this time. These results are expected based on the results of the original ACEs study that shows a dose-response relationship between ACEs and other chronic diseases (Felitti et al. 1998).

Strengths

There are several strengths to this study. Elaboration during qualitative interviews was

vital in understanding the extent and magnitude of these experiences and provided a rich

understanding of how these experiences impacted health and development as the participants

entered into adulthood. Many previous studies have just employed limited answer surveys, so

this allowed better understanding of the implications of childhood adversity on health. The

sample was also diverse as participants represented an array of races, ethnicities, socioeconomic

statuses, religions etc. Participants were also recruited from across Pennsylvania, so the sample

was not limited to just one location.

Limitations

Some limitations of this study include external validity. While there were participants

recruited from throughout Pennsylvania, these results may not be generalizable on a regional,

national, or global scale. Also, those that volunteered to participate in the study may not be

representative of the entire population as volunteers have different characteristics than those who

did not volunteer. The definition of ACEs may also have been limited in its scope. Other regions,

such as Philadelphia, have created their own ACEs criteria to better represent the community

they are assessing. While there was an open-ended section and a qualitative interview to help

mitigate this issue, participants may have been unaware that an experience during their childhood

would classify as an adversity, so they may not have thought to discuss it.

Further ACEs surveys

will need to be developed to better assess these experiences.

Implications

This study has greater informed CKD and ACEs research and practice.

Understanding psychosocial risk factors that can contribute to the development of CKD will better inform treatment and prevention. Similarly, understanding other diseases that may be caused by ACEs exposure can help in screening for ACEs as well as diseases that those who have experienced ACEs may be at risk for. Additionally, it will encourage greater prevention and treatment of ACEs in order to help prevent later poor health outcomes including CKD. Finally, this study can encourage further study into the relationship between stress, particularly childhood stress, and development of CKD.

Future Directions

While the findings were significant, further studies should investigate the relationship

between ACEs and CKD. As this was the first study investigating this relationship, it is

important to see if further studies discover similar findings. These studies should especially

occur in other regions throughout the United States to see what differences and similarities there

are in samples and their experiences. Further investigations should also identify other adversities

that may be faced during childhood and use these as part of their assessments

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