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The occurrence of chronic kidney disease among African American aged 65 years and above in the United States

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Abstract

This paper focuses on chronic kidney disease (CKD) among African American adults over 65 years old in the USA. CKD is a progressive illness that affects more than 800 million people worldwide, with a higher prevalence among older individuals, women, racial minorities, and those with comorbidities such as diabetes mellitus and hypertension. African Americans have a higher prevalence of CKD, along with risk factors such as obesity, diabetes, and hypertension. The paper investigates the occurrence of CKD in this population and explores the etiology of the disease, including non-modifiable risk factors like genetics and modifiable risk factors such as hypertension and metabolic factors.

Keywords: Chronic Kidney Disease (CKD); TCF7L2 (Transcription Factor 7); MTHFS (Metheny tetrahydrofolate Synthetase)

1 Introduction

Chronic kidney disease is the main chronic health problems of unknown etiology among the elderly population of America. The regions such as Central America are among the common hotspots for the disease especially when it comes to African American elderlies (Aguilar & Madero, 2019). Chronic kidney disease is a progressive illness that affects over 800 million people worldwide, representing more than 10% of the general population (Kovesdy, 2022). Prevalence of CKD is higher in older individuals, women, racial minorities, and those with comorbidities such as diabetes mellitus and hypertension. Advanced stages of CKD have been found to disproportionately affect African Americans over the age of 65, with mortality rates 15% higher than their White counterparts in the same age group (Laster, 2018). The paper highlights the prevalence of CKD among African American elderly aged more than 65 years. It also emphasizes the risk factors associated with the disease along with the application of health interventions to decrease the morbidity associated with the disease in the specific population.

Chronic kidney disease (CKD) is diagnosed by identifying markers of kidney damage, including abnormalities, hematuria, or albuminuria, that persist for at least three months, as well as a decreased glomerular filtration rate (GFR) of less than 60 mL/min per 1.73 m^2 (Chapter 1: Definition and classification of CKD, 2013). The severity of CKD is classified into five stages based on the level of GFR, with G1 being the mildest (GFR ≥90 mL/min/1.73 m2) and G5 being the most severe (GFR <15 mL/min/1.73 m2) (Huffstater et al., 2020). Most studies use estimated GFR (eGFR) to diagnose and report on the prevalence of CKD stages 3-5, while other studies combine albuminuria (albumin-to-creatinine ratio of >30 mg/g) and decreased eGFR to report on CKD stages 1-5.

African Americans make up 13% of the US population and, along with Native Americans, have the highest rates of premature morbidity and mortality for most medical conditions in the country (Laster et al., 2018). From 2015 to 2016, the age-adjusted prevalence of CKD stages 1-4 among non-Hispanic Whites, non-Hispanic Blacks, and Mexican

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Americans was 13%, 16.5%, and 15.3%, respectively (Hamler et al., 2018). The reasons for these racial disparities in CKD are complex and multifactorial and may include differences in socioeconomic status, access to healthcare, genetic predisposition, lifestyle factors, and environmental exposures. Prevalence of CKD risk factors (such as diabetes mellitus, hypertension, and obesity), genetic causes, lifestyle and cultural differences, and socioeconomic disparities.

1.1 Research Question

To investigate the Occurrence of Chronic Kidney Disease in African American adults 65 years old and above in the USA.

2 Etiology

CKD is often associated with diabetes and hypertension, which are the most common risk factors. African American adults over the age of 65 have a higher prevalence of obesity/overweight (76.3% vs 68.5%), diabetes (18% vs 9.6%, including both physician-diagnosed and undiagnosed disease), and hypertension (43.3% vs 29.1%) than their white counterparts. (Laster et al., 2018). Furthermore, African Americans are twice as likely as whites to have elevated albuminuria, another important CKD progression factor (Vart et al., 2020).

According to studies, Diabetes mellitus and hypertension are the leading causes of CKD in cities, whereas CKD of unknown etiology, glomerulonephritis, and kidney stones are common in rural areas (Laster et al., 2018)

2.1 Non-Modifiable CKD Risk Factors

The progression of chronic kidney disease is adversely affected by non-modifiable factors such as older age, male gender, and non-Caucasian ethnicity, including African Americans, Afro-Caribbean individuals, Hispanics, and Asians (South Asians and Pacific Asians) (Vart et al., 2020). Genetic factors also contribute to the progression of chronic kidney disease. In a population-based cohort study, it was found that single nucleotide polymorphisms in genes TCF7L2 and MTHFS were associated with diabetic nephropathy and CKD progression. The study also revealed that polymorphisms in genes related to renal scarring and the renin-angiotensin-aldosterone system were influential in CKD progression. (Kovesdy, 2022).

2.2 Modifiable CKD Risk Factors

Several factors have been identified as contributors to the progression of CKD, including systemic hypertension, proteinuria, and metabolic factors. Hypertension is a major cause of ESRD worldwide, and it is the second leading cause in the United States, after diabetes. Glomerular hypertension resulting from the transmission of systemic hypertension into glomerular capillary beds is thought to play a role in the development of glomerulosclerosis. (Huffstater et al., 2020). However, moderate-level albuminuria (A2) is not considered a reliable marker for CKD progression, as reducing albuminuria can lead to both improvement and worsening of CKD progression. Other factors like obesity, smoking, insulin resistance, dyslipidemia, and hyperuricemia have also been implicated in the development and progression of CKD. (Huffstater et al., 2020). The other modifiable risk factor associated with CKD is cardiovascular diseases which shorten the lifespan of a person by enhancing the risk of cardiovascular death and its improvement to ESRD. Cardiovascular diseases are the main cause of death among blacks with CKD (Tyson et al., 2019). The mortality rates of blacks who have CKD are more than twice as high as in blacks with normal kidney function. Social Determinants of Health is another example of modifiable CKD risk factors.

CKD affects low-income people by affecting educational attainment, income, insurance, and community-level assets and deficits (Vart et al., 2020). Older African Americans, as a group, continue to bear the socioeconomic, political, and health consequences of structural racism, which influence how African Americans perceive care (Vart et al., 2020). For older African Americans, racial identity influences healthcare system navigation, and thus chronic illness self-management behaviors. Modifiable factors for CKD include occupational factors. CKD primarily affects farm workers due to excessive heat exposure, which causes frequent dehydration episodes and subsequent acute kidney injury (AKI) episodes (Laster et al., 2018). According to Hamler et al. (2018), Hispanic agricultural workers in California and Florida are more susceptible to heat stress.

- Conclusion

African Americans have more than 2-fold greater odds than whites of having elevated albuminuria, another important CKD progression factor (Vart et al., 2020). Not only the genetic factors but socioeconomic factors are also the key players for prevalence of chronic kidney disease in African Americans. The socioeconomic conditions are also playing as major determinant in risk factors for other diseases such as hypertension diabetes, occupational disorders which eventually

lead to CKD. To decrease the incidence of CKD it is important to introduce public health interventions to control such problems.

3 Application of Theory

The Trans-theoretical model (TTM) can be used effectively to reduce mental stress and other negative impacts faced due to socioeconomic determinants by motivating people to physical exercise as it has been observed sedentary lifestyle has been a contributing factor to increased mental stress, obesity, hypertension, and metabolic disorders (Chironda et al., 2019; Evangelidis et al., 2019). As the disease problem is associated with long-lasting stressors, it is very important to implement a behavior change strategy to bring a prolonged health change. It is also important to ensure the behavior change must not be broken by any relapse or the triggering factor or any exciting cause. Also, there is a need to use a methodology which should be acceptable to the cultural dimensions of the indigenous groups. As one of the socioeconomic determinants for health disparities and stress had been discrimination against the community, therefore, approach shall be culture centered, with a high level of community engagement for potential implementation and effectiveness among old age individuals of African American community (Harding & Oetzel, 2019).

The six components of the TTM are pre-contemplation, contemplation, preparation, action, maintenance, and termination which can be used to resolve as well as avoid the morbidities of chronic kidney disease. The first stage is the pre- contemplation stage (Chao et al., 2022). At this stage, people lack awareness about the threat of unhealthy behavior. patients become aware of the high risk of smoking, alcoholism, high sodium diet in people already suffering from kidney disease, inadequate water intake, etc (Chao et al., 2022). In the second stage which is the contemplation stage, people begin to understand the adverse effects of poor occupational behavior, poor diet, unhealthy lifestyle, overeating, etc. People must be motivated to perform various activities like yoga, exercises and eliminate unhealthy habits such as smoking, alcoholism, etc. In the preparation stage, people are ready to plan and look for options to prevent health problems. People look for various available options to obtain and maintain a healthy diet style such as the DASH to prevent morbidities in the high-risk group (Chao et al., 2022). This stage involves developing self-motivation which can be done with the help of motivational interviewing like Cognitive Behavioral Therapies. The next phase is the action stage in which

People act such as start doing exercises and physical activities. People also join peer support groups and mental health support groups. After Action stage, there is a Maintenance stage. Maintenance is a difficult process especially when the person is already suffering from severe stress due to chronic disease and socio-economic issues. At this stage, efforts are done to avoid the relapse the patient and keep him engaged in positive health behavior (Chao et al., 2022). The termination stage is the last phase of the TTM where a patient becomes self-motivated and satisfied by his involvement in positive health behavior which brings consistency in maintaining the behavior (Miller & Connelly, 2020).

- Conclusion

As the disease problem is associated with long-lasting stressors, it is very important to implement a behavior change strategy to bring a prolonged health change. Also, behavior change must not be broken by any relapse or the triggering factor or any exciting cause. The TTM has been useful in several studies on quitting smoking, improving eating habits, and encouraging physical activity. Although it can be used similarly for prevention of progression of CKD, but it shall encompass multiple goals of diet management, stress management and consistency in medications together.

4 Interventions

The approaches should include innovative methods which should follow not only the preventive measures for CKD and the comorbidities associated with the disease. The diseases such as hypertension and diabetes are found to be associated with stress and therefore methods should be devised to stress coping and management. Also, other associated problems like obesity should be controlled via exercise and a healthy diet or DASH diet in high-risk individuals. This could be done by using the health models such as TTM for behavior change. Old-age individuals in African American group are more likely to suffer stress and obesity-related disorders due to socioeconomic factors and associated sufferings therefore controlled behavior is a viable option for the prevention of CKD (Harding et al., 2019; Vart et al., 2020). The following interventions could be used to achieve positive health outcomes:

4.1 Screening

Screening, primarily of high-risk individuals, is being implemented globally. The KDOQI guidelines recommend screening high-risk populations, which include older African Americans with hypertension, diabetes mellitus, and those

over the age of 65. Urinalysis, a urine albumin-creatinine ratio (ACR), serum creatinine measurement, and GFR estimation, preferably using the chronic kidney disease epidemiology collaboration (CKD-EPI) equation (Tyson et al., 2019). It is the most cost-effective approach, and no evidence exists to support screening asymptomatic individuals in the general population for CKD. National Kidney Foundation screening program screened persons in African American communities with or at risk for CKD, during the Kidney Early Evaluation Program (KEEP), and found uninsured KEEP participants were 72% more likely to develop ESKD and out of which 82% were at the risk of mortality (Laster et al., 2018). Early evaluation is always advantageous to prevent the progression and incidences of disease.

4.2 DASH diet

Diet is a major disease modifier of both hypertension and CVD. Therefore, identifying dietary patterns which improve hypertension control rates among blacks with CKD could positively impact kidney and CVD outcomes for this patient population. The Dietary Approaches to Stop Hypertension diet (DASH), which is high in fruits, vegetables, whole grains, low-fat dairy, nuts, and legumes, and reduced in sweets and saturated fat, is endorsed nationally and abroad to treat hypertension in adults with normal kidney function (Vaz de Melo Ribeiro et al., 2020). DASH has been demonstrated in randomized controlled trials to lower blood pressure (BP) more effectively in blacks compared to whites (Wesson et al., 2020). In a study conducted by Chen et al, DASH Diet lowers blood pressure by enhancing natriuresis and modulating the renin–angiotensin–aldosterone system (Chen et al., 2019). Therefore, it is plausible to say DASH would lower BP more favorably in black elderlies with CKD compared to ones with normal kidney function (Tyson et al., 2019). Sodium reduction is the only diet modification which is currently endorsed by national and international kidney disease guidelines to lower BP in adults with CKD (Tyson et al., 2019).

4.3 Deterrence and Patient Education

All high-risk groups of patients such as Diabetic patients, and hypertensives, should not only be screened for CKD but also be counseled about the symptoms and signs of CKD. Patients with CKD should be taught about the following interventions at home. Eighty percent to eighty- five of patients with CKD have hypertension, and all patients should be instructed to measure blood pressure daily and to keep a log of blood pressure, and daily weights (Tyson et al., 2019). It is observed the discussion with patients by nutritionists or physicians about a low-protein diet slowed the progression of CKD significantly by controlling the consumption of potassium- containing foods (Chu et al., 2020). All patients with advanced CKD should be instructed about the need to control phosphorus levels. Community group programs for adults could help to educate them.

- Conclusion

Old-age individuals in African American group are more likely to suffer stress and obesity-related disorders due to socioeconomic factors and associated sufferings therefore controlled behavior is a viable option for the prevention of CKD (Harding et al., 2019; Vart et al., 2020). Public health interventions shall be designed as per the target group to achieve maximum outreach and benefit.

5 Public Health Implications

By promoting a behavior change, health professionals can encourage the measures which could be beneficial in the prevention and management of a disease. For example, smoking is highly associated with hypertension in African Americans above age 65 years. Also, hypertension is a risk factor for CKD in the targeted population group. The public health interventions like awareness, education, and behavior change therapies could reduce smoking habits thus reducing the incidence of CKD (Chen et al., 2019). Moreover, other factors such as obesity could be prevented via health risk management programs which focus on diet management. The TTM can be used in the prevention of smoking, obesity prevention, stress management, socioeconomic distress, etc. The research and studies should be done to evaluate the impact of the strategies and policies implemented to improve the prevalence of the disease.

This will make the population less vulnerable to adversities and help to achieve a positive health outcome.

6 Conclusion

CKD is one of the most prevalent chronic diseases across the world. America is among the hotspot for the incidence of CKD and among Americans African Americans of the age group above 65 years suffer adversely. Although the disease is associated with many non-modifiable risk factors but could be prevented by using planned and long-acting public health interventions for the management of modifiable risk factors among high-risk individuals. Short-term strategies could

be beneficial in disease management and improving the quality of life of patients already suffering. Also, by using behavioral therapies the negative health behavior could be modified to achieve positive health outcomes along with decreasing morbidity and mortality rates.

Compliance with ethical standards

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Disclosure of Conflict of Interest

The authors declare no conflicts of interest that could have influenced the design, implementation, or interpretation of the study findings. This research was conducted with the sole purpose of advancing scientific knowledge and promoting public health. The authors have no financial or personal relationships that could have influenced the work reported in this manuscript.

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