Prostate Cancer Screening Ramifications for African American Males in California

RESEARCH ARTICLE

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Abstract

In 2014, PC was the second most detected cancer and a common newly diagnosed cancer among men, representing 28% (22,080) of the total cases of the disease occurring in California (CDPH, 2015). Additionally, one in six men will have PC, and about one in 38 will die from the disease (CDPH, 2015; Centers for Disease Control and Prevention [CD], 2014). In the United States and California in particular, AA men exhibit extreme numbers of PC-related deaths and the shortest survival rate of any racial and ethnic group (ACS, 2009; Jones, Underwood, & Rivers, 2007). The PC death rate for AA men is about 20% higher than among Whites (Allen et al., 2007). Some recent efforts have been made to promote screening for PC. For instance, early detection and removal of the precancerous prostate or detecting and treating cancer in its early stages substantially reduces the number of deaths associated with the condition (ACS, 2015; CDPH, 2015; CDC, 2016). In 2015, ACS established basic guidelines by recommending that all AA men aged 45 be screened for PC with PSA and DRE for PC (ACS, 2005; CDC, 2008).

Despite many advanced public health efforts implemented by recommendations regarding this health issue, the screening rate among AA men remains low (Weinrich, 2006; Woods, Montgomery, Herring, Gardner, & Stokols, 2004; Wu & Modlin, 2012). Researchers have reported that AA men experience higher onus at a younger age, and more progressive phases of the disease when detected, compared to Whites (Fyffe, Hudson, Fagan, & Brown 2008; Jemal, Siegel, Xu, & Ward, 2010). However, research is needed that more closely examines the factors exhibited by AA men that contribute to the low PCS rate. Such research could help healthcare providers identify and address amendable barriers preventing AA men from PCS (Plowden, 2003, 2006; Wu & Modlin, 2012).

Introduction

Age, African heritage, familial history, and specific innate hereditary conditions are some of the associated deep-rooted risk influences for the disease (CDPH, 2015; Toles, 2008; Weinrich, 2006); however, research is lacking that examines these factors specifically among AA men. The rate of PC occurrence and death among AA men in California, especially Los Angeles County, is high (Atulomah, Olanrewaju, Amosu, & Adedeji, 2010; CCR, 2015; CDPH, 2014). However, researchers have indicated that there is insufficient understanding of the factors determinative of PCS among AA men (Barati, Hidarnia, Allahverdipour, & Niknami, 2015; Wu & Modlin, 2012). In the current study, I investigated the factors associated with PCS and AA men in Los Angeles County, California. I examined if and to what extent the following variables are correlated with PCS: age, education, income, marital status, access to care, and family support. These variables were chosen as they align with the Social-Ecological Model (SEM) which suggests that social-ecological factors (such as personal factors, social factors, and community factors) affect injury, violence, and health.

The purpose of this research study was to examine the factors that affect AA men's participation in PCS in Los Angeles (L.A.) County, California. This is important because a significant racial disparity exists in PC screening participation among AA men in California and the United States (NIH, 2015). Despite the lack of consensus on established guidelines for PCS, AA men are at a higher risk of acquiring and dying from PC (Atulomah et al., 2010; CCR, 2015, CDPH, 2014; Drake, Shelten, Gilligen, & Allen, 2010; Haque et al., 2009). Previous researchers have demonstrated conflicting results regarding the associations between PCS and racial/ethnic background (Haque et al., 2009).

Critical factors in this investigation related to participation in PCS or adherence to recommended screening methods (ACS, 2017; CDPH, 2017; Wu & Modlin, 2012). The variables of focus for this study included age, education, income, marital status, access to care, and family support. This study and its research questions were guided by the social-ecological model (SEM) to investigate the influence of socioeconomic factors on AA men's PCS (ACS, 2017; Cheng et al., 2009; Taylor et al., 2006; Wilt et al., 2001; Wu & Modlin, 2012). Ultimately, the results from this study can help inform targeted screening and culturally appropriate approaches to increase the PCS rate among AA men and therefore substantially decrease the disparity observed between PC cases and deaths (Wu & Modlin, 2012).

Background

The SEM set out to understand AA men's participation in PC screening. The basis of the SEM is to develop general strategies for planning and assessing programs to promote community health (CDC, 2015; Stokols, 1992, 1996). The variables of focus in the current study aligned with the different social-ecological factors of the SEM: age, education, income, marital status, access to healthcare, and family support.

The SEM is a system model for which I used a multi-level approach to examine AA PCS (see CDC, 2015). Social-ecological ideations began with Murray Bookchin. McLeroy, Bibeau, Steckler, and Glanz (1988) used the SEM as a tool for a health campaign, originating from Bronfenbrenner's (1979) ecology theory. Essentially, the SEM has been used to understand factors that influence violence, injury, and health conditions. The SEM involves individual, relationship, community, and societal factors and how they interact to lead to violence, injury, and health conditions. In this study, I measured individual, relationship, and community/societal factors including age, education, income, marital status, access to care, and family support

among AA men in L.A. to better understand if, and to what extent, these variables are correlated with PCS participation rates.

Researchers have previously indicated that more research is needed to increase adherence to PCS among AA men in California (NIH, 2009; Reynolds, 2008). The results from this study could help promote PCS participation, and thereby promote a reduction in the mortality rate associated with PC among AA men (Friedman, Corwin, Dominick, & Rose, 2009; Hughes, Sellers, Fraser, Teague, & Knight, 2007; Reynolds, 2008). Study outcomes could also facilitate changes in attitudes, behaviors, and lifestyles of AA men about early PCS activities.

Additionally, AA community stakeholders, including for-profit and non-profit organizations, could mobilize PCS reeducation, awareness, and advocacy. Ultimately, knowledge of the factors that affect PCS and early PCS or early detection of the disease in AA men in California may save and extend their lives (Bloom, Hayes, Sauders, & Flatt, 2009; CCR, 2014; CDPH, 2015; Fielding & Briss, 2006). Early intervention approaches or health promotion measures advance positive social change on both the individual and community levels.

Interpretative Literature

Within the state of California, there is an ethnic inequality evident in PC and PCS rates (CCR, 2015; CDPH, 2017) particularly among AA men (Chen et al., 2016; Odedina et al., 2009). In comparison to other ethnic groups, AA men are more likely to have PC (ACS, 2017; CCR, 2017; CDC 2015; CDPH, 2017). To address this problem, the purpose of this study was to examine the factors that affect participation in PCS among AA me in L.A. County. Various socioeconomic factors related to PCS among AA men were examined with the goal of determining which factors are associated with PCS among this demographic group, particularly age, education, income, marital status, and access to healthcare.

In L.A. County, California, AA deaths related to PC cancer are excessive when compared with White men. AA men use healthcare services less and undergo PCS tests less than White men. The literature-review materials related to PC and screening among AA men in L.A. County presented a series of relevant contextual factors. Some relevant contextual factors pertinent to AA PCS are age, education, income, ethnicity, SES, marital status, supports, and access to healthcare, and family history.

The exploration of associations between these factors and PC helped determine why AA men do not fully participate in PCS. I adapted SEM to frame the investigation of the variables concerning AA men's PCS (see Crosby, Kegler, & DiClemente, 2002; Glanz, Marcus, & Rimer, 1997; Glanz, Rimer, & Lewis, 2002; Norman & Conner, 1996). The goal of many researchers involved in health behavior is to recognize the bases of health behaviors and the progression of health behavior changes (Campbell et al., 2007; Crosby et al., 2002; Glanz et al., 1997; McLeroy et al., 1988).

Barriers are to be understood as a subscale of the health-belief operational construct that prevents or diminishes health promotion measures (Orji, Vassileva, & Mandryk, 2012). Benefits constitute a subscale of the health-belief instrument that assesses the worthiness of health choices and their effectiveness in reducing the risk or seriousness of health outcomes or events (Jones et al., 2015). For instance, cancer is a deadly disease that affects over 1 million people per year in the United States (Lin & Plevritis, 2012; Murphy, Kochanek, Xu, & Heron, 2015). Unscreened and untreated cancer will ultimately cause death (Lin & Plevritis, 2012; Murphy et al., 2015).

Digital rectal exam (DRE) is a form of rectal examination using DRE procedures and protocols. During the DRE procedure, the examiner or physician inserts a lubricated, gloved finger into the rectum to examine a variety of maladies, including PC. Through the process, the

physician determines the condition of the rectum and prostate gland by the enlargement, hardness, or abnormality of growth around the prostate gland, which is located just in front of the rectum (Kowalik et al., 2012).

Early detection must be comprehended as a Timely discovery of cancer cells could promote increased survival rates. Evidence suggests that early detection reduces the likelihood of higher mortality from cancer (Institute of Medicine and National Research Council, 2003). Health behavior is an individual's characteristics such as values, attitudes, objectives, awareness, emotional state, and traits that contribute to healthy choices (Morrison, 2007). Health disparities are the differences in access to or availability of facilities and services. Disproportionate variations in the occurrence, frequency, and mortality of unfavorable health outcomes or events present in a population (HealthyPeople2020, 2017; Hoffman et al., 2001).

Health factors are factors that affect one's health and well-being. The social, economic, cultural, and physical environment in which people live has a significant effect on their health and welfare (Robert Wood Johnson Foundation, 2015). Health literacy would be understandable form the angle of the U.S. Department of Health and Human Service as pertaining to health literacy as the degree to which individuals can obtain, process, and understand necessary health information and services needed to make appropriate health decisions (Benjamin, 2010). Individuals with limited health literacy may have trouble reading and understanding food labels, completing health assessment forms, communicating symptoms to a clinician, measuring medications, navigating the healthcare system, or following self-care instructions (Benjamin, 2010).

Middle SES: Middle SES is a class of people in the middle of a social hierarchy. The very definition of the term middle SES is highly political and vigorously contested by various

schools of political and economic philosophy (APA, 2018). Prostate cancer is a malignant tumor of the prostate gland (Beers & Berkow, 1999). Prostate-specific antigen (PSA) is a well-known biomarker associated with the PC test used for sensitivity and specificity screening (ACS, 2010; Vashi, 2010). PSA is a glycoprotein produced almost exclusively by the prostate gland (Beers & Berkow, 1999). Men with prostatic diseases may have high serum PSA levels because of enhanced production of PSA (Beers & Berkow, 1999). Social-ecology Model (SEM) is a methodology that involves an environmental, communitarian, and reconstructive assessment of society (Bookchin, 2007; Stokols, 1992).

Social-economic status (SES) is an economic and sociologic measurement that represents a person's or a family's economic and social position based on their income, education, and occupation (American Psychological Association [APA], 2018). Adults who have lower levels of educational attainment, who are unemployed, or who live at, near, or below the U.S. federal poverty level are considered to have a low SES (APA, 2018; CDC, 2014). Wealth, or upper class includes those from higher class social backgrounds who tend to be more successful in achieving career goals and are generally better prepared for the world of work due to their relatively better access to resources such as career offices, guidance counselors, better schools, high-level "social actors," and familial experience with higher education (Diemer & Ali, 2009).

AA men in the current study were from a local county (as suggested by Cary et al., 2015; Owens, Jackson, Thomas, Friedman, & Hébert, 2015). Selection bias could have been problematic because the selected participants may not have been interested in PCS. Therefore, future studies are needed to further explore factors affecting AA men's participation or lack of interest in PCS to gain additional objective information or perspectives/experiences regarding

PCS (Forrester-Anderson, 2005; Gonzalez, Consedine, McKierman, & Spencer, 2008; James et al., 2017).

The study's sample characteristics such as healthcare access, insurance affordability, and work status may have limited study findings. Most of the selected sample population may have been insured and may have had a prior PCS (Allen, Kennedy, Wilson-Glover, & Gilligan, 2007). Underinsured and uninsured men may not be well-represented in the study. In such cases, future studies of factors affecting prostate screening behavior among AA men in L.A. County should be multi-site studies and should include proportionally uninsured and underinsured men (see Cheng et al., 2009; Chornokur, Dalton, Borysova, & Kumar, 2011; Myers-Walls, Ballard, Darling, & Myers-Bowman, 2011; National Cancer Institute, 2015).

Improvement in community-based healthcare approaches could come about as a result of the information resultant from this study, thereby increasing the awareness of PCS in vulnerable AA communities and among stakeholders' affiliates. Policymakers may incorporate the findings of this study in order to support meaningful policy implementation and promote higher turnout rates for PCS among AA men in L.A. County. Also, results of this study could lower healthcare related costs and high hospital bills associated with late PC diagnosis. A healthier AA community means healthier people and workforce for the county. The institutional and policy levels of the SEM framework could be activated to promote social change as a result of this study.

Methodology and Design

This is a quantitative research study using secondary data were collected and analyzed. The quantitative methodology was appropriate because the data collected were numerical and continuous, as opposed to text (which calls for qualitative methods). I also used a correlational

design because my aim was to determine if there is a relationship between social-ecological factors and PCS among AA men, and if so, the strength and directions of the relationships (i.e., positive or negative correlations). This sample consisted only of AA men. The selected men were people born in the United States who identify as AA (ACS, 2014; Cheng et al., 2009; Elder et al., 2014).

The targeted population for this study was AA men residing in L.A. County. In this county, the ethnicity or racial composition of the residents are 44.0% non-Hispanic Whites, 39.2% Hispanic Americans, and 8.8% non-Hispanic AAs (CDPH, 2015). In L.A. County, geographic-information-systems analysis demonstrates that 10% of AA men are concentrated densely within a 20-mile radius (CCR, 2015; CDPH, 2015). Secondary data were collected for this study. Ethnicity was a critical inclusion criterion. Only individuals identified as AA men were included in this study. Individuals with no prior diagnosis or symptoms of PC who were at least 45 years of age were included the study. Individuals with no evidence or diagnosis of mental illness also were included. A sample of men aged 45 years and older from secondary data sources (see Kim & Seo, 2013). The inclusion criteria were AA men who were never screened for PCS or those with abnormal test results in addition to a biopsy or cancer diagnosis. The exclusion criteria involved AA men who did not understand or speak English.

The descriptive statistics provided information on participants' characteristics and distribution (i.e., central tendencies, standard deviations, ranges, and frequencies) for each specified variable. The levels of measurement for each variable determined the type of descriptive statistics performed (central tendency, mean, standard deviation, or frequency). Variables with an interval or a ratio level of measurements were measured with initial tendency estimations. Variables with nominal or ordinal levels of measures were measured by frequencies

or proportions (aligned with Kim & Seo, 2013). Explore factors influencing PCS behavior or adherence to PCS among AA men in California. The methods and procedures used to address the research questions regarding factors affecting cancer screening are relevant in understanding the low adherence rate of PCS among AA men. Factors such as age, education, and income were evaluated in this study. Family history, race, healthcare-insurance, marital status, culture, attitudes, and beliefs may affect health-seeking behavior.

The predetermined alpha value (Type I error/false positive) for this study was 5%. The insignificant premise is excluded from this study based on the predetermined alpha value if the predictable p-value is less than or equal to .05. In contrast, the estimated p-value is higher than .05 if it fails to discard the insignificant premise. The odds ratio is a form of effect size, and it is the preferred effect size estimated by default using binary logistic regression.

The following are the research questions and hypotheses for this current study:

$H_0 1$: No association exists between age and PCS participation rates among AA men in L.A County.

$H_a 1$: An association exists between age and PCS participation rates among AA men in L.A County.

RQ2: Does an association exist between education and PCS participation rates among AA men in L.A. County?

$H_0 2$: No association exists between education and PCS participation rates among AA men L.A County.

$H_a 2$: An association exists between education and PCS participation rates among AA men L.A County.

RQ3: Does an association exist between income and PCS participation rates among AA men in L.A. County?

$H_0 3$: No association exists between income and PCS participation rates among AA men L.A County.

$H_a 3$: An association exists between income and PCS participation rates among AA men L.A County.

RQ4: Does an association exist between marital status and PCS participation rates among AA men in L.A. County?

$H_0 4$: No association exists between marital status and PCS participation rates among AA men in L.A. County.

$H_a 4$: An association exists between marital status and PCS participation rates among AA men in LA County.

RQQ5: Does an association exist between access to healthcare and PCS participation rates among AA men in L.A. County?

$H_0 5$: No association exists between access to healthcare and PCS participation rates among AA men in L.A. County.

$H_a 5$: An association exists between access to healthcare and PCS participation rates among AA men in L.A. County.

RQ6: Does an association exist between family support and PCS participation rates among AA men in L.A. County?

$H_0 6$: No association exists between family support and PCS participation rates among AA men in L.A. County.

H_a6: An association exists between family support and PCS participation rates among AA men in L.A. County.

Because secondary data were used in this study, I had no known direct contact with the participants. Based on the dictionary information and the recruitment/enrollment protocols and documents, the researcher verified the authenticity, ethics, and validity of the informed consent. The secondary data set is identified as well, so participants' information is protected.

Findings

Descriptive Data Analysis

For this project, the main dependent variable is whether someone has ever had a prostate screening. Results revealed that 40.1% ($n = 220$) have not had a screening and 58.8% ($n = 314$) have as shown below in Table 1

Table 1

Descriptive Statistics: Ever Had a Prostate Screening

	Frequency	Percent
No	220	41.2
Yes	314	58.8

Note: $N = 534$

The data collected were analyzed with a focus on the independent variables. For education, the most common group was High School Diploma (HSD) or lower (32.3%, $n = 162$), while 16.7% ($n = 89$) had a BA/BS degree. The most common marital status was married (48.4%, $n = 243$), and 48.8% of the sample was single without kids ($n = 245$). Table 2 summarizes the independent variables.

Table 1

Frequencies for Categorical Independent Variables

		Frequency	Percent
Education	Grade 1-8	18	3.4
	Grade 9-11	39	7.3
	Grade 12/H.S. diploma	117	21.9
	Some college	109	20.4
	Vocational school	21	3.9
	AA Or AS degree	50	9.4
	BA Or BS degree	89	16.7
	Some Grad. school	8	1.5
	MA Or MS degree	62	11.6
	Ph.D. or equivalent	21	3.9
Marital status	Married	260	48.7
	Living w/partner	20	3.7
	Wid/Sep/Div	167	31.3
	Never married	87	16.3
Family support	Single adult, 21+	260	48.7
	Married, no kids	197	36.9
	Married with kids	62	11.6
	Single with kids	15	2.8

Note: $N = 53$

Further analysis was done on the interval level variables (age and income). The mean age for the sample was 61.58 years (*SD* = 10.71) with a range from 45 to 85 years, whereas the mean annual income was $61,140 (*SD* = 54,816), with a range of $ 0 to $300,000, as shown in Table 3.

Table 3

Descriptive Statistics for Continuous Independent Variables

	Mean	Std. Deviation	Minimum	Maximum
Age	61.58	10.71	45	85
Respondent's earnings last month	61,140	54,816	0	300,000

Note: *N* = 534

In the state of California, AA men were found to be more likely to have PC. In line with this assertion, the purpose of this study was to examine the factors that affect participation in PCS among AA men in L.A. County. To achieve this purpose, archival data collected using the California Health Interview Survey of 2009 were used, particularly data collected from AA men who have undergone PSA screening. An examination of the data indicated that among the AA males included in the sample, differences in PCS status and history are significantly associated with age, working status, education, marital status, access to healthcare, and family support. After a stepwise logistic regression was run on the six variables, only age, education, and income remained as significant predictors of PC screening. Interaction variables that combined age and education with types of family support types were created. Both age and education remained significant predictors of PC screening as did age when combined with married with no kids' family support type.

In the state of California, it was observed that AA males have higher rates of PC as compared to men of other ethnicities (ACS, 2017; CDPH, 2015). AA men are 50% more prone to developing PC than men from other racial or ethnic groups (Adeloye et al., 2016; CDPH, 2015; Hoffman et al., 2001; Hudson et al., 2014). However, while the mortality and risk disparities of PC in AA men in comparison to other racial groups is a public health concern (Chen et al., 2016; Odedina et al., 2009), there is a paucity of research on the factors that are associated with PCS rates among AA men (NIH, 2009; Plowden, 2003, 2006; Reynolds, 2008; Wu & Modlin, 2012). Therefore, in this study, I investigated the factors associated with PCS rates and AA men in L.A. County, California. Specifically, I examined if, and to what extent, the following variables are correlated with PCS participation rates: age, education, income, marital status, access to care, and family support.

AA men were more likely to have PC in L.A. County, California. AA men at the age of 18 had a PC diagnosis rate of 2.3%, while AA men above the age of 40 had a 58% chance of never having underwent a PCS. AA men who had undergone a specific screening had their PCS as a part of a routine medical examination and use private insurance and/or Medicare to pay for it. Lastly, men who were married had the highest rate PCS participation.

RQ1: Does an association exist between age and PCS participation rates among AA men in L.A. County? Using data collected from the L.A. SEER registry on AA males who have undergone PCS, I uncovered that the largest groups were aged between 60 to 64 years (21%). AA males aged between 55 to 59 years made up 20.9% of the population, and the third largest group was males aged between 50 to 54 years (17.2%), with remaining age groups making up the difference.

RQ2: Does an association exist between education and PCS participation rates among AA men in L.A. County? Upon statistical analysis, the results indicated a statistical relationship between educational attainment and prostate screening. Education was also a significant predictor of screenings; as the odds of having a screening increased by about 1.2%. Research participants with an AA or graduate education were the most likely to have had a screening (AA = 68.0%; Graduate 69%) compared to other education levels.

RQ3: Does an association exist between income and PCS participation rates among AA men in L.A. County? Quantitative analysis demonstrated that there was a statistically significant relationship between income and PCS. Income increased the odds of screening, with those with income levels of more than 100K having a screening level of 69%.

RQ4: Does an association exist between marital status and PCS participation rates among AA men in L.A. County? The results of the study indicated that there was a statistically significant relationship between marital status and PCS, while the secondary data found that 52.3% of AA males who undergone PCS were married and 29% were single. The study findings indicated that married people or those in relationships were more likely to have had a PC screening (65%) than those who were not (52%).

RQ5: Does an association exist between access to healthcare-insurance and PCS participation rates among AA men in L.A. County? Being uninsured decreased the odds of screening by 1.2%, when controlling for the other variables. There was a statistically significant relationship between access and PCS. Participants who had insurance for the last 12 months were more likely to have ever had a screening (61.3%), compared to those who had not (31.1%).

RQ6: Does an association exist between family support and PCS participation rates among AA men in L.A. County? There was a statistically significant relationship between family support

and PCS. Participants who were married with no kids had the highest level of screening (71.1%) while those who were single with no kids had the lowest level (46.7%).

<div align="center">**Recommendations**</div>

While quantitative analysis results were used to identify that five of the six factors listed in this study were significantly associated with PCS among AA men, there remains opportunities for future research. This study yielded many interesting results, but there are still avenues for future research. One such avenue would be focusing on the collection of data through first person questionnaires or by inquiring with relevant community organizations if they already have such information. Additional data that could be relevant to future research are: how many AA men were ever diagnosed with prostate cancer, their PSA screening history, their reasons for PSA screening, the number of PSA screenings, and their insurance statuses. Each of these elements can also enable further insight into the subject being studied. These variables could be paired or contrasted with other statistics to demonstrate just how deep the problem goes.

This study was only performed within the L.A. area. Other cities might have their own environmental, interpersonal, or intrapersonal factors that could affect outcomes. Applying the SEM to various locations could help determine which one of these variables are the most important for PCS and outreach. Along with location, comparative analysis was performed on the variable of race. Belonging to the AA racial group increased the odds of screenings by 9.4% whereas for the White racial group increased the odds by 2.09%. However, comparing differing races and their view of PCS and the interrelationships between variables can also identify the socioeconomic factors that may be limiting the AA community in encouraging PCS in AA men.

Conclusion

The purpose of this quantitative research study was to examine the factors that affect AA men's participation in PCS in L.A. County. This is important because a significant racial disparity exist in PC screening participation among AA men in California and the U.S. (NIH, 2015). Six research questions were posed to address the research questions. Routine health screening can increase early detection of PC-onset. It is especially important for high-risk individuals such as AA men with a history of PC. Isolating variables that could prevent a man from participating PCS should help improve early screening rates. L.A. County was chosen as it has an extremely high rate among AA men with compared to other geographic locations. The literature found that much of the lack of screenings was due to diminished knowledge and education about the risk factors associated with PC. AA men often lacked the needed medical advice to provide a proper understanding of the importance of screening because of the medical history of AAs.

Family history, race, culture, attitudes, and beliefs may all shape opinions regarding PCS, thereby creating a gap in the knowledge. The results of this study indicated that all the six research questions were shown to be statistically significant. The statistically significant results tended to be intrapersonal and interpersonal factors according to the SEM. Environmental factors were found to be mixed, providing an opportunity to revise and review the SEM. The study also provided data regarding statistics on the descriptive nature and frequency of occurrence of PC in L.A. County for AA men. It resulted in numerous recommendations for future research and the positive implications for social change that can occur by advancing such research in the future.

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