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**Strategies to Increase Human Immunodeficiency Virus Testing in Rural Areas of the
United States: A Systematic Review**

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Abstract

Purpose: HIV incidence continues to increase, with a large portion of new diagnoses found in rural areas of the United States. The worsening statistics in rural areas may be attributed to stigma alone and contribute to the lack of testing available for patients. The objective of this systematic review is to identify accessible and feasible strategies to increase HIV testing within the rural communities in the United States.

Methods: A systematic literature search of CINAHL Complete, MEDLINE with Full Text, and PsycINFO with restrictions of the English language and rural communities outside of the United States through August 2, 2018. Two independent investigators screened articles using

predetermined inclusion and exclusion criteria. This systematic review is registered through PROSPERO: CRD42018108637.

Findings: There were 14 different studies with specific interventions attempting to increase the rate of HIV testing in rural communities in the United States. Technology, faith-based stigma reduction, access, and provider interventions emerged as themes regarding HIV testing and stigma improvement.

Conclusion: There exists a body of literature that supports a number of specific interventions focusing on access, provider and patient perspective, and ways to decrease stigma that improve HIV testing and could be implemented in rural communities.

Keywords: Rural, HIV/AIDS, HIV testing/screening, stigma

Strategies to Increase Human Immunodeficiency Virus Testing in Rural Areas of the United States: A Systematic Review

Introduction

The significant advancements of antiretroviral therapy have transformed the approach to caring for patients with human immunodeficiency virus (HIV), into a manageable, chronic disease. For those who are motivated to take therapy and who have access to lifelong treatment, acquired immune deficiency syndrome (AIDS) related illnesses are no longer the primary threat to mortality (Deeks, Lewin, & Havlir, 2013). The United States (US) HIV epidemic has evolved over the past 30 years and new diagnoses are now found concentrated in socially marginalized and disenfranchised communities across underserved and geographically isolated areas often considered to be rural in nature (Behrends et al., 2018; Pellowski, Kalichman, Matthews, & Adler, 2013).

Defining “rural” is a multifaceted concept that can often be based on individual perceptions, geographic concepts, and population. Unfortunately, the definition frequently incorporates both stereotypes and personal experiences (Hart, Larson, & Lishner, 2005). The multidimensional concept of rural with no clear-cut distinction can make defining a rural area difficult. Is the concern geographic isolation or population density (MacGregor-Fors & Vazquez, 2019)? The term suggests pastoral landscapes, unique demographic structures and settlement patterns, isolation, low population density, extractive economic activities, and distinct sociocultural milieus (Hart et al., 2005). On average, rural populations have relatively more elderly people, more children, higher unemployment and underemployment rates, and lower population density with higher percentages of poor, uninsured, and underinsured residents (Hart et al., 2005). For purposes of this review, the use of “rural” is consistent with the US Census Bureau (Ratcliffe, Burd, Holder, & Fields, 2016) definition as an area outside the metropolitan city limits in which residents have limited access to primary care and public health department services because of the distance, lack of transportation, and/or limited availability of services at satellite clinics (Hernandez, Mata, Vasquez, & Martinez, 2014). The literature suggests that being a rural resident alone is a significant risk factor for HIV related morbidity and mortality due to lower testing rates, later HIV diagnoses, later initiation of antiretroviral therapy, and consequently, increased HIV related mortality (Lopes, Eron, Mugavero, Miller, & Napravnik, 2017; Ohl & Perencevich, 2011; Schafer et al., 2017). Additionally, rural residents seeking HIV care may face stigma, social isolation, and other barriers to care such as long distances to a provider, limited transportation, and lack of access to providers with HIV expertise (Schafer et al., 2017).

Stigma, defined as “the dilemma of being different” or a characteristic perceived to be different from the norm of society (Phillips, Moneyham, & Tavakoli, 2011), is a modifiable risk factor for patients with HIV/AIDS (Rueda et al., 2016). Stigma regarding HIV has been reported to significantly impact care utilization and health outcomes, which includes perceived quality of life and medication adherence (Schafer et al., 2017; Sweeney & Venable, 2016; Varni, Miller, & Solomon, 2012). Societal stigmatization due to assumption and transmission about HIV/AIDS and associated behaviors plays a substantial role in the psycho-social well-being of individuals, especially those living in rural and traditionally conservative regions (Darlington & Hutson, 2017). Moreover, stigmatized people may sometimes be thought of as a category that is pejoratively regarded by the broader society and who are devalued, shunned, or otherwise lessened in life chances and in access to the humanizing benefit of free and unfettered social intercourse (Phillips et al., 2011). Many individuals believe that if one is following the community’s sociocultural expectations (e.g. being in a monogamous relationship or married), then HIV testing is unnecessary or inappropriate as is talking with one’s partner or spouse about HIV testing (De Jesus, Carrete, Maine, & Nalls, 2015). Unfortunately, many of those disproportionately affected by HIV/AIDS share these testing perceptions and communication barriers as evidenced by various patient quotes in the literature regarding testing stigma: “Getting an HIV test brings shame to the person who got tested and to one’s family; it implies one is engaging in immoral behavior” (De Jesus et al., 2015). “It’s still considered to be a gay disease.” “It is lonely, even the most well-intentioned people are afraid of HIV. I feel sorrow, sadness, grief. I think about wanting a companion to grow old with. I am a sexual being. I think about never having sex with anyone again” (Zukoski & Thorburn, 2009).

HIV impacts rural communities in southern areas of the United States where cultural conservatism and policies such as abstinence-based sex education have contributed to high levels of HIV-related stigma (Reif et al., 2015; Schafer et al., 2017). Rural areas often have other increased risk factors for increased HIV transmission such as higher rates of poverty, opioid abuse, and lower educational attainment (Aldous et al., 2012; Kinsler, Wong, Sayles, Davis, & Cunningham, 2007). Furthermore, studies have shown that fear of stigma has deterred individuals from being tested for HIV and from disclosing their seropositive or seronegative status to sexual partners, family, and friends (Kinsler et al., 2007). Patients with HIV in rural communities have reported perceptions of their health care providers as acting uncomfortable or treating them in an inferior manner, which greatly affects their use of medical services (Kinsler et al., 2007). Patients with HIV may feel a great deal of pressure, discomfort, and stigma when with a health care provider where they should feel the safest.

As of 2006, the Centers for Disease Control and Prevention (CDC) recommends that all people ages 13-64 receive an HIV test at least once (Center for Disease Control and Prevention [CDC], 2019). It is also recommended that adults and teens who are at higher risk of HIV should be tested at least once per year (CDC, 2019). Many healthcare providers are aware of the CDC guidelines but only 8% of providers will screen patients regardless of the risk (Korthuis et al., 2011; Zheng, Suneja, Chou, & Arya, 2014). Lack of time and other priorities at the time of visit were major indicators to not test and ubiquitous challenges to clinical practice (Korthuis et al., 2011). Other barriers identified by physicians are current HIV-related policies (third party reimbursement, requirement for written consent), stigma, lack of confidentiality in nonurban communities, practice financial environment, physician attitudes, and patient acceptance (Schafer

et al., 2017). This provider stigma can be perceived by patients. “Because they won’t touch you. They act scared to touch you. They put on gloves right away-just to touch your skin-like they don’t know HIV is not spread that way” (Zukoski & Thorburn, 2009).

Population characteristics can influence testing rates in rural areas also. For example, only 34.6% of men that have sex with men in a Hispanic community outside of Durham, North Carolina reported ever being tested (Sena, Hammer, Wilson, Zeveloff, & Gamble, 2010). Until recently, the persons most affected by HIV/AIDS in rural areas have been men who have sex with men, many of whom were diagnosed with AIDS and treated in an urban area before returning to a rural community (Castaneda, 2000). In nonurban South Florida, an area of high HIV prevalence, only 21% of a population of migrant and seasonal farmworkers have been tested for HIV (Schafer et al., 2017). Based upon the aforementioned definition of rural, Native American communities make up a considerable amount rural medicine and adversities among the United States. Additionally, Native American tribes, specifically reported by research in Alaska, often refuse any open discussion regarding multiple issues their communities face, such as sex, physical and sexual violence against women and children, substance abuse, or fetal alcohol syndrome. Mental illness and suicide are also not addressed because it is believed if he/she discusses something bad or taboo then he/she will make it happen (Speier, 2005). For example, when discussing the use of condoms as a method of prevention for individuals who choose not to practice a lifestyle of abstinence, one tribal council member exclaimed that “condoms are the government’s way of creating genocide among Alaska Natives, because if condoms are used young women won’t get pregnant, and if young women don’t get pregnant our people will not survive” (Speier, 2005). This is an example of the distrust that is indicative of historical trauma experienced by Native Americans in the United

States. HIV can be a daunting, uncomfortable, and at times upsetting, topic to discuss with health care providers, especially, other individuals in communities with specific cultural practices or religions (Foster, 2007). There is also stigma surrounding HIV data that is only applied to men that have sex with men. However, the CDC reports that heterosexual contact is the second most common cause of new HIV incidence especially in Hispanic and African American populations older than thirteen years old and spanning across states from Idaho to Texas (Linley et al., 2018). HIV stigma, limited access, cultural barriers, and power differentials between relationships, may be a few reasons why rural communities are not improving in HIV infection rate (Varni et al., 2012). Regardless of the risk factors of a particular patient, testing for HIV should be a discussion, and an option for patients even outside of primary care (Korthuis et al., 2011). In 2015, 40,000 people in the US received an HIV diagnosis, one in two people had been living with HIV three years or more, one in four people had been living with HIV seven years or more, and one in five had already progressed to AIDS (CDC, 2019). Of concern, 59% of heterosexual patients, who are at increased risk of HIV, saw a healthcare provider at least once a year and were still not tested (CDC, 2019). Despite the difficulty in finding epidemiological information pertinent to HIV/AIDS in rural areas of the US, available evidence indicates that the incidence and prevalence of HIV/AIDS have increased in rural areas (Castaneda, 2000).

There is an increasing need for HIV testing in rural areas of the US as evidenced by 52% of new HIV infections being in the rural south (CDC, 2019; Evangeli, Pady, & Wroe, 2016; Korthuis et al., 2011). There are many non-primary care settings in rural areas serving a high number of individuals that do not, but could, routinely offer HIV screening. Stigma, in rural areas especially, has hindered proper healthcare interventions and simple conversations shared with

patients. Stigma is not new to public health, nor is it new to HIV/AIDS (Valdiserri, 2002). In rural areas of the US, HIV-related stigma remains a significant barrier for routine HIV testing (Weis et al., 2009). Due to the rise of new heterosexual HIV infections, rural communities present a different and challenging context, especially for women. Moreover, individuals with HIV/AIDS in rural communities have been exposed to the disease locally and are most likely to be women, people identified as heterosexual, adolescents, those who are non-white, and heterosexual drug users (Castaneda, 2000). The levels of at-risk behavior in rural areas are similar to those in urban areas and in many instances, are much higher (Mallory, 2008).

While there are opportunities to improve HIV screening across all aspects of care, it is imperative to identify barriers of HIV testing that are negatively affecting rural healthcare in terms of patient and provider perceptions, access, and stigma as this population is disproportionately affected by HIV (Pellowski et al., 2013). The goal of this systematic review is to identify strategies that increase utilization of HIV testing in rural areas of the US.

Methodology

Electronic Database Search

A systematic literature search was completed utilizing EBSCOhost to search three electronic databases: CINAHL Complete, MEDLINE with Full Text, and PsycINFO. Search dates were limited to the past 20 years including publishing dates from 1997-2017. The search was limited to publications in the English language. The key search terms included were ‘HIV testing’, ‘Rural communities in the US’, ‘Stigma’, ‘HIV screening strategies in the United States’, ‘HIV testing in rural communities’, ‘Strategies to improve HIV testing in rural communities. The Boolean phrase ‘AND’ and ‘OR’ was applied between search terms to assist with the inclusion

criteria of studies. The online systematic review platform, Covidence, was used by two reviewers to independently screen, review, and extract data following PRISMA guidelines. See Table 1 for inclusion and exclusion criteria; disagreements were resolved via discussion. This systematic review is registered through PROSPERO; registration number: CRD42018108637.

Table 1

*Inclusion and Exclusion Criteria**

Inclusion	Exclusion
Male or female adults 13-85 years old with unknown or no access to a clinic, or office that provided HIV screening and testing	Individuals living in or receiving healthcare in an urban area of the United States
An unknown, positive, or past HIV test	Infants and children
Individuals living 60-90 miles from a city or urban area of the United States	Pregnant Women
Population of 60,000 residents or less in rural areas	Individuals who are HIV positive with a CD4 count <500
Studies providing intervention strategies to improve HIV screening in the rural setting	Age >85 years old
Studies within the United States	6 months-1 year of life remaining due to other comorbidities
English Language	Studies published prior to 1997 Rural areas outside the United States

*Table defines the inclusion and exclusion criteria used to assist in study validity and data to find interventions to increase HIV testing in rural areas of the United States

Study Selection

Studies selected for review included a strategy and/or intervention to improve screening for HIV such as reducing stigma, improving access, and education for the individual. The type of study designs included were pilot, observational, qualitative analysis, randomized control trials, and case reports. These studies also had to target a population consistent with the aforementioned definition of a rural community in the US.

Definition of Strategy or Interventions

Studies included were those that directly addressed a different approach to HIV screening in rural communities who face multiple barriers to adequate healthcare including access, poverty,

and stigma. Education approaches with pre- and post-test results, HIV screening follow-up, and feasible access to HIV screening with competent providers were all consistent themes amongst the included studies. Perceived stigma and discrimination that hindered any HIV testing in the past were the comparison. Outcomes of interest included reduced stigma regarding HIV screening and education, improved HIV testing rates, and patient/provider attitudes regarding further testing. The last search was performed on August 2, 2018.

Results

A systematic search was conducted and 634 references were identified. After 49 duplicates were removed, 585 titles and abstracts were screened with 546 deemed irrelevant. Thirty-nine full-text studies were assessed for eligibility with 25 excluded due to wrong outcomes, wrong interventions, wrong setting, wrong study design, and wrong patient population (see Figure 1 for PRISMA Flow Diagram). Studies were eligible if they met the inclusion and exclusion criteria of the clinical question and reported a strategy to reduce the stigma of HIV testing in a rural area. Fourteen studies were included for review. The study designs encompassed two randomized-controlled trials, two pilot studies, four qualitative analyses, four observational studies, a cross-sectional quasi experimental design study, and a descriptive cross-sectional survey.

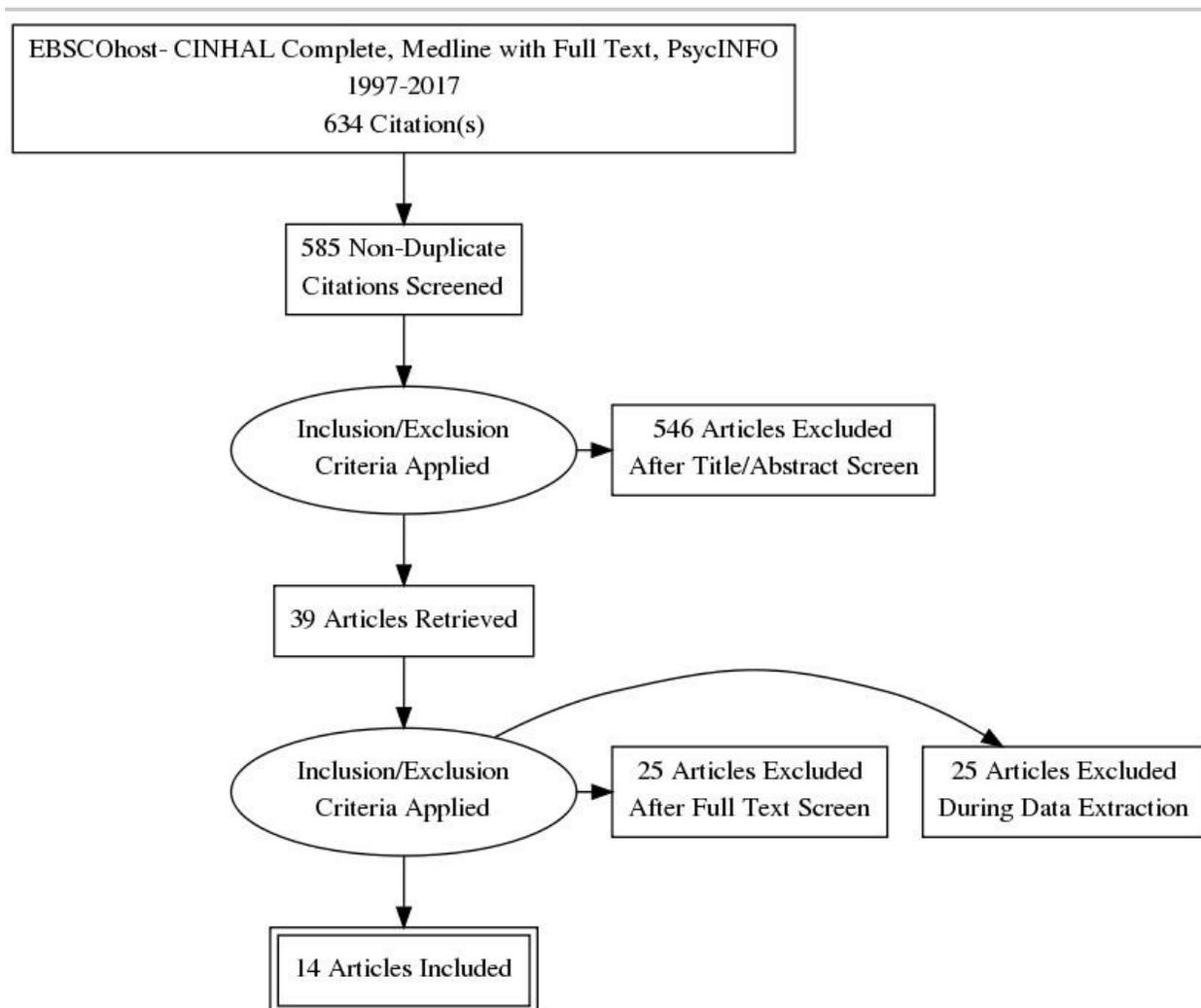


Figure 1. PRISMA Flow Diagram

Literature Review

The 14 included studies varied based upon demographics, participants, and interventions; however, they all consistently investigated a rural population. The following was organized based on thematic elements (see Table 2) identified pursuant to the systematic review such as the ability to increase access or decrease stigma, effect provider or patient perspectives, and access.

Table 2

*Study Characteristics**

Theme	Title	Authors, Year	Intervention	Outcome
Patient Attitude	Assessment of HIV/AIDS Prevention of Rural African American Baptist Leaders: Implications for Effective Partnerships for Capacity Building in American Communities	Payne-Foster, Cooper, Parton, Meeks, 2011	Eliciting information from Baptist leaders about HIV prevention activities in their congregation and influences of HIV activity prevention based on the geographical residence.	Significant use of faith-based models for HIV/AIDS prevention and Baptist leaders as an influence of HIV prevention in the Deep South.
Patient Attitude	Testing our FAITHH: HIV stigma and knowledge after a faith-based HIV stigma reduction intervention in the Rural South	Payne-Foster et. al, 2017	Examine efficacy of faith-based anti-stigma intervention in rural Alabama Baptist churches. Interventions through congregations to address community issues, health concern and stigma pertaining to HIV.	No significant reduction in HIV related stigma was observed but increased attitudes about testing was reported in over half that had never been tested. Social and structural factors for those not living with HIV was noted.
Patient Attitude	Recruitment Feasibility and HIV Prevention Intervention Acceptability Among Rural North Florida Blacks	Brown, 2010	Recruiting black community members in rural Florida to participate in HIV testing and return for follow-up results.	A community-based intervention worked in this community and could be successful in other rural populations. The HIV test Erasure proved feasible in this model.
Access	RURAL HIV: Brief Interventions for Felony Probationers	Oser, Leukefeld, Consentino-Boehm, Havens, 2006	Describing an HIV intervention for southern, rural probationers and to profile participants and their demographics and risk behaviors by degree of criminality	HIV interventions are needed to target rural probationers, especially those with an extensive arrest history because of high-risk behaviors such as illicit substance abuse and unprotected sex.
Access	Culturally Specific Health Care Model for Ensuring Health Care Use by Rural, Ethnically Diverse Families Affected by HIV/AIDS	Goicoechea-Balbona, 1997	Indigenous providers, coordinated, and social service methods to formulate preventions strategies for perinatal HIV transmission in primary care.	Interdisciplinary and indigenous provider use is imperative for striving for equity of all rural and diverse residents to decrease new HIV spread.
Access	A Randomized Clinical Trial of Two Telephone-Delivered, Mental	Heckman, Carlson, 2007	Two, telephone delivered, mental health interventions to facilitate change the	Telephone-delivered support groups have potential to increase

	Health Interventions for HIV-Infected Persons in Rural Areas of the United States		adjustment for people living with HIV/AIDS in rural communities.	perceptions and support of HIV related issues but practical significance of those not affected by HIV is limited.
Access	Effectiveness of Healthy Relationships Video-Group—A Videoconferencing Group Intervention for Women Living with HIV: Preliminary Findings from a Randomized Controlled Trial	Marhefka et. al, 2014	Video-conferencing intervention for women living with HIV in low prevalence, rural areas, to compare sexual behaviors and “prevention with positives” to adjust for different sexual behaviors.	Promising evidence found dissemination of HIV and risk reduction of video groups. Subpopulations need to be explored.
Access	A Routine HIV Screening Program in a South Carolina Community Health Center in an Area of Low HIV Prevalence	Weis et. al, 2009	Describing a routine HIV screening program in a community health center in South Carolina unless patients opt out. Predicting acceptance for screening rates and refusals.	Demonstrates implementation of routine HIV screening may work in smaller health care settings and in rural areas especially in the south.
Access	Community Outreach Along the U.S./Mexico Border: Developing HIV Health Education Strategies to Engage Rural Populations	Hernandez, Marta, Vasquez, Martinez, 2014	Applying strategies in disseminating HIV health education information and research in rural areas along the U.S./Mexico border. needs assessment conducted in clinics serving rural areas to enhance dissemination and outreach efforts and to inform the development of culturally and linguistically appropriate health education materials. Mobile campaigns directly went into communities.	These strategies may be useful if there are general providers who understand specific barriers and promote health equity and sexual knowledge and education regarding HIV.
Provider Attitude	HIV testing in community pharmacies and retail clinics: A model to expand access to screening for HIV infection	Weidle et.al, 2014	Implementing confidential HIV testing and counseling using pharmacy and retail clinic staff.	Feasible model for offering rapid, point of care HIV testing. Effectiveness could meet the needs of underserved, rural areas.
Provider Attitude	A Training Program for Nurses and Other Health Professionals in Rural-Based Settings on Screening and Clinical	Lifson et. al, 2009	Program that focused on HIV, STIs, and hepatitis and was designed to enhance participants’ ability to conduct sexual histories and risks, educate about risk reduction and prevention, screen for and	Nurses and other health care professional should be at the forefront for HIV prevention, screening, and clinical

	Management of HIV and Other Sexually Transmitted Infections		diagnose infections, clinically manage clients with positive screening test results, access prevention and other educational materials and conduct other clinical and public health activities in rural settings.	management in rural communities and specific training should be a priority in these areas.
Provider Attitude	HIV Testing and HIV/AIDS Treatment Services in Rural Counties in 10 Southern States: Service Provider Perspectives	Sutton, Anthony, Vila, McLellan-Lemal, Weidle, 2010	Surveys sent to providers of 10 different southern states to understand the barriers of accessibility and prevalence of HIV testing.	Trusting the provider-patient relationship, inappropriate infrastructure, HIV perception and distance to testing my need to change for states with little access. Surveys sent to providers willing to explain the barriers may be useful for change.
Provider Attitude	What Makes Me Screen for HIV? Perceived Barriers and Facilitators to conducting Recommended Routine HIV Testing among Primary Care Physicians in the Southeastern United States	White et. al, 2015	In depth interviews with primary care providers in the southeast as to why or why not recommend a HIV test. Some physicians recommended routine HIV testing in their practice to destigmatize HIV testing.	Multilevel approaches should be done to enhance physician HIV testing in the primary care setting in the rural southeast. Physicians also recommended better advertisement in these communities to enhance screening.
Provider Attitude	A Quality Analysis of Provider Barriers and Solutions to HIV Testing for Substance Users in a Small, Largely Rural Southern State	Wright, Curran, Stewart, Booth, 2013	HIV testing program implemented in rural substance abuse treatment centers. Identifying barriers to this method from substance abuse providers.	Not enough funding has been able to actively implement this model and systems must change to prioritize resources for HIV.

*General study characteristics with study theme as noted in literature review

The first theme encompassed faith-based interventions regarding HIV awareness and screening, likely due to the cultural importance of church attendance, especially in African American communities (Payne-Foster et al., 2018; Payne-Foster, Cooper, Parton, & Meeks, 2011). Churches have a rich history of driving social change locally, nationally, and being involved in efforts to combat diseases such as breast cancer, diabetes, and cardiovascular disease (Payne-Foster et al., 2018). Tying in recruitment feasibility and intervention location in churches can be

of use in rural communities (Weis et al., 2009). Two studies addressed how rural Baptist leaders implemented HIV interventions in their congregations to improve HIV knowledge and acceptance (Payne-Foster et al., 2018; Payne-Foster et al., 2011). Both faith-based interventions demonstrated an increase in HIV education and willingness to screen. One study sought to elicit written surveys with HIV information specifically for Baptist pastors to share with their congregation (Payne-Foster et al., 2011). The other study directly tested an anti-stigma intervention with a pre- and post-assessment among congregation groups (Payne-Foster et al., 2018). Both appeared to improve the perception of stigma, which should lead to improved HIV testing rates within the community.

The sense of community may contribute to intervention success and is specifically an important topic in African American communities (Brown, 2010; Payne-Foster et al., 2018; Payne-Foster et al., 2011). As mentioned previously, the role of the provider can affect HIV screening. Five reports focused on different healthcare provider perspectives and attitudes regarding HIV and screening with different HIV intervention approaches. The key use of culturally specific providers assisting in collaboration and bridging language barriers to target culturally specific communities regarding HIV proved useful (Goicoechea-Balbona, 1997). A decrease in stigma seems to be rooted in cultural ethos of a rural community, whether it be religious or grass root community providers, for these interventions to be successful. Even in rural areas with substance abuse centers, some providers mention that the priority of HIV remains low and institutional silos in healthcare must end (Goicoechea-Balbona, 1997; Wright, Curran, Stewart, & Booth, 2013).

Specific training models for nurses and other healthcare workers practicing in a rural setting can be simple and affordable with interventions as easy as learning to take a strong sexual

history and perform HIV risk assessments (Lifson et al., 2009). Knowledge of when to screen for HIV, addressing specific barriers, such as distrust, and confidentiality for screening have all become interventions themselves, especially in rural communities (Lifson et al., 2009; Sutton, Anthony, Vila, McLellan-Lemal, & Weidle, 2010; White et al., 2015). Healthcare providers appear to support the delegations of different HIV interventions regardless of barriers improving outcomes and quality of life (Goicoechea-Balbona, 1997; Lifson et al., 2009; Sutton et al., 2010; White et al., 2015; Wright et al., 2013). These distinct rural areas promoted what worked regarding culturally specific sexual roles and promoted safer sex practices through community involvement to strengthen HIV awareness and testing (Hernandez et al., 2014; Oser, Leukefeld, Cosentino-Boehm, & Havens, 2006). Providing culturally specific care can contribute to improved HIV awareness and screening.

Apart from provider and patient attitudes, access to care also remains a significant barrier in rural areas. There were a few strategies reported in the literature that focus on improving access to HIV screening through technology and pharmacies. With access being a barrier to proper healthcare in rural areas, technology can promote HIV screening along with better emotional and coping skills, privacy, and quality of life (Heckman & Carlson, 2007; Marhefka et al., 2014). Furthermore, other novel approaches to expanding access included offering rapid HIV tests at community pharmacies, which was a beneficial measurement due to public health accessibility and low cost (Sutton et al., 2010; Weidle et al., 2014). Staff willingness, confidentiality, and point of care access allows HIV screening to be a feasible intervention within a community pharmacy (Weidle et al., 2014). Documented intervention success and site specific feasibility are important factors to consider when identifying strategies to improve access in rural communities.

Discussion

This review identified a number of strategies that can help decrease the stigma that may be among the primary barriers that prevents optimal care for patients with HIV in rural communities. These interventions have demonstrated the ability to improve HIV testing, access, and education within rural healthcare. Throughout the 14 included studies, authors all recognized the challenges in developing interventions that reduce HIV-stigma, increase knowledge, improve risk perceptions, and testing accessibility. These studies also recognized that the study participants in rural communities had limited resources on current up to date HIV information, and were still engaging in relatively high-risk behavior (Basta, Stambaugh, & Fisher, 2015; Castaneda, 2000; Ohl et al., 2013; Payne-Foster et al., 2018; Relf et al., 2015; Speier, 2005; Varas-Diaz et al., 2013; Weidle et al., 2014). Socioeconomic factors, geography, cultural context, and evolving epidemics of injection drug use are coalescing to move the HIV epidemic into the populations where people are dispersed and healthcare resources limited (Pellowski et al., 2013; Schafer et al., 2017). However, whether it be telehealth-based communication and care (Marhefka et al., 2014; Ohl et al., 2013), church-focused HIV educational groups (Payne-Foster et al., 2018; Payne-Foster et al., 2011), healthcare provider education and access (Goicoechea-Balbona, 1997; Lifson et al., 2009; Sutton et al., 2010; White et al., 2015; Wright et al., 2013), or even HIV testing and screening in the prison system and community pharmacy (Oser et al., 2006; Weidle et al., 2014), HIV stigma and limited access to care and education will continue to significantly contribute to HIV/AIDS mortality (Payne-Foster et al., 2018). An important component of HIV care will also be placed in the hands of nurses. Nurses employed in rural communities and remote areas are crucial to the

delivery of high quality healthcare and can seek to improve HIV care within rural areas by employing the strategies identified in this review (Oosterbroek, Yonge, & Myrick, 2017).

There is a need to empower rural communities, healthcare providers, and nurses to increase HIV testing and reduce the stigma of screening. There appears to be a growing concern regarding the epidemiology of women and HIV/AIDS in rural communities. Women in rural areas are often overlooked as their needs remain a low priority at local, state, and national levels (Castaneda, 2000). Although the prevalence of HIV/AIDS in women were reportedly lower at the start of the HIV epidemic, the model and implication to deliver service was male-centered (Castaneda, 2000). Furthermore, shame and stigmatization associated with many co-occurring risk factors facing all rural community natives create taboo topics, which generates another barrier to any future HIV/AIDS education and system development (Speier, 2005; Sutton et al., 2010). It is exceedingly difficult to reverse the trends of high-risk behavior and may even be considered “too prohibited to discuss” (Speier, 2005; Young & Zhu, 2012). In regard to all women, every social and physical setting that makes up a rural community will construct women’s day-to-day experiences and their abilities for personal change and self-determination to stay healthy (Castaneda, 2000). Women, especially those residing in rural areas, should always be encouraged to get tested for HIV regardless of risk status and behavior.

There is no single answer that would singularly improve HIV testing in rural communities. A faith-based intervention in rural Alabama may not have the same impact in a migrant community in Florida. However, the rural community leadership is a highly valuable resource that can help educate community members about HIV risk factors and treatment management due to potential

trust and confidentiality issues that seem to hinder HIV testing and progress (Ohl & Perencevich, 2011; Payne-Foster et al., 2018; Weidle et al., 2014).

Technological advances, such as telehealth communication or video support groups, may improve rates of HIV testing by reducing missed clinic visits and improving medication compliance (Schafer et al., 2017). Being aware of a community and its specific afflictions is an important component of being an effective healthcare provider to these communities especially in rural areas. Since rural communities often have different experiences and adversities, the various ways of care extension should be applied to accommodate the communities' specific needs. Despite tremendous advances in HIV management across the continuum of care, there are considerable opportunities in this non-urban epidemic. These challenges include establishing and using consistent definitions of rurality, contextualizing each phase along the continuum for the local population, and addressing the barriers unique to rural communities that affect every step of care from testing to lifestyle management and compliance with care (Basta et al., 2015; Castaneda, 2000; Schafer et al., 2017; Speier, 2005). While there is a paucity of data currently available, researchers with a community focus may find well placed and appropriate contributions to HIV testing in rural areas. Regardless of scarce data, interventions should be encouraged in rooted communities to aid in HIV testing and contribution to help make a difference in rural areas.

Study Limitations

In order to accurately capture the existing body of literature, authors included a wide variety of study designs, which limited the ability to uniformly assess the risk of bias in individual reports. Reporting bias may have been a limitation itself since all the reviewed studies had interventions that improved HIV testing rates with positive outcomes from the authors and the

feasible, comprehensive and accessible care that was offered. Relevant literature may have been missed due to the inclusion criteria of ‘English language’, ‘United States’, and ‘rural communities in the United States’. There were studies evaluated that pertained to the stigma of HIV and HIV testing in rural communities, however, they were not applicable to the clinical question. Last, as not all rural communities are the same or experience the same challenges, the studies reviewed may not be directly applicable to all rural communities/populations.

Conclusion

This review identified that interventions focusing on access, provider and patient perspective, and ways to decrease stigma can improve HIV testing in rural communities. Stigma remains a considerable problem in rural areas and may be intensified where there is less tolerance of diverse lifestyles, greater fear of HIV and less anonymity (Zukoski & Thorburn, 2009). This nonurban HIV epidemic poses a challenge for healthcare providers and nurses to increase HIV testing, reduce HIV infections, and improve care. These strategies, along with health provider optimism, creativity, and knowledge of specific communities will enhance HIV patient care. A sustained effort is needed to support research, ultimately, seeking to understand the barriers that exist across the HIV rural continuum and the development of interventions to overcome these barriers.

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