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Author manuscript

J Assoc Nurses AIDS Care. Author manuscript; available in PMC 2022 March 24.

Published in final edited form as:

J Assoc Nurses AIDS Care. 2022 ; 33(1): 33–44. doi:10.1097/JNC.0000000000000297.

Socioeconomic, Psychosocial, and Clinical Factors Associated With Employment in Women With HIV in the United States: A Correlational Study

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Authors' Contributions

All authors on this article meet the four criteria for authorship as identified by the International Committee of Medical Journal Editors (ICMJE); all authors have contributed to the conception and design of the study, drafted or have been involved in revising this manuscript, reviewed the final version of this manuscript before submission, and agreed to be accountable for all aspects of the work. Specifically, using the CRediT taxonomy, the specific contributions of each author is as follows: Conceptualization, Methodology, and Writing (original draft): J. M. Wise, A. Azuero, D. Konkle-Parker, J. L. Raper, K. Heaton, D. E. Vance, and M.-C. Kempf; Conceptualization and Design: E. Yelin, K. M. Weber, and M. Fischl; Data Curation and Formal Analysis: J. M. Wise and A. Azuero; Funding Acquisition: J. M. Wise, D. Konkle-Parker, K. Heaton, A. A. Adimora, G. Wingood, T. E.Wilson, E. Golub, D. Merenstein, M. Fischl, and M.-C. Kempf; Project Administration & Investigation: J. M. Wise; Supervision: A. Azuero, D. Konkle-Parker, J. L.Raper,K. Heaton, D. E.Vance, and M.-C. Kempf; Visualization: J. M. Wise, D. E. Vance, and M.-C. Kempf; Validation: A. Azuero, D. Konkle-Parker, and M.-C. Kempf; Writing (original): J. M. Wise, A. Azuero, D. Konkle-Parker, J. L. Raper, K. Heaton, D. E. Vance, and M.-C. Kempf; and Writing (review and editing): J. M. Wise, D. Konkle-Parker, D. E. Vance, A. A. Adimora, G. Wingood, E. Golub, S. Levin, T. E. Wilson, E. Yelin, K. M. Weber, M. Fischl, and M.-C. Kempf.

Disclosures

The authors report no real or perceived vested interests related to this article that could be construed as a conflict of interest.

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Abstract

Employment is a social determinant of health, and women living with HIV (WLWH) are often underemployed. This correlational study examined the socioeconomic, psychosocial, and clinical factors associated with employment among WLWH (n = 1,357) and women at risk for HIV (n = 560). Descriptive and inferential statistics were used to evaluate factors associated with employment status. Employment was associated ($p \leq .05$) with better socioeconomic status and quality of life (QOL), less tobacco and substance use, and better physical, psychological, and cognitive health. Among WLWH, employment was associated ($p \leq .05$) with improved adherence to HIV care visits and HIV RNA viral suppression. Using multivariable regression modeling, differences were found between WLWH and women at risk for HIV. Among WLWH, household income, QOL, education, and time providing childcare remained associated with employment in adjusted multivariable analyses ($R^2 = .272$, $p < .001$). A better understanding of the psychosocial and structural factors affecting employment is needed to reduce occupational disparities among WLWH.

Keywords

cohort study; employment; psychosocial; socioeconomic; women living with HIV

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As HIV infection has transitioned into a chronic, manageable disease, the focus has shifted from acute disease management to living and aging successfully with HIV. Employment is key to successful aging in general and has been associated with improved mental health, physical health, and greater satisfaction with life (Kordovski et al., 2017; Vance et al., 2015). For many, employment provides purpose and shapes their identity, contributing to greater quality of life (QOL; Leonardi & Scaratti, 2018; Unanue et al., 2017). For people living with HIV (PLWH), employment may counter the negative psychosocial impacts (i.e., depression, social isolation) associated with HIV infection and may be associated with better HIV-associated outcomes (i.e., viral suppression, reduced morbidity and mortality; Kordovski et al., 2017; Vance et al., 2019). Yet, in spite of the many benefits of employment, the majority of PLWH (~60%) do not work (Conyers & Datti, 2011; Institute of Medicine, 2010) compared with approximately 40% of the general population in the United States (Trading Economics, 2021).

Although the literature provides evidence that personal, social, and health contexts influence employment, the historical trajectory of HIV infection has created a unique environment, including policies that affect the ability of PLWH to enter or reenter the workforce (Garrow, 2016; Gómez et al., 2016). Years of disability enrollment, inadequacy of job history, and insufficient human resources and networks needed to leverage employment opportunities are thought to have influenced employment acquisition and maintenance among this population (Verbooy et al., 2018); however, little is known about the underlying structural and personal contexts that are associated with employment among PLWH.

Furthermore, women living with HIV (WLWH) may have distinctive contexts compared with men living with HIV that negatively influence their ability to acquire and maintain employment (Bielecky et al., 2015; Bokma et al., 2017; Brody et al., 2014; International Labour Organization, 2017). Dray-Spira et al. (2008) found that WLWH were less likely to be hired and more likely to lose their jobs compared with men living with HIV. Although this mimics the pattern reflective of the general population (International Labour Organization, 2017), the interactive effect of being a WLWH on employment, considering gender and race disparities, poor socioeconomic status, and HIV stigma, has yet to be comprehensively examined. Therefore, the purpose of this study was to examine the comprehensive clinical, personal, and social contexts associated with employment among WLWH. Understanding the characteristics and factors associated with employment among WLWH is the first step in designing policies and interventions that aim to reduce occupational disparities among WLWH.

Methods

This study was conducted as a secondary analysis using data from the Women's Interagency HIV Study (WIHS). All participants were consented under the parent study, and the University of Alabama at Birmingham's institutional review board approved this research. WIHS was initiated in 1993 in response to the growing HIV epidemic among women in the United States and currently follows over 2,300 women who are living with or at risk for HIV. WIHS is representative of the adult population of WLWH and women at risk for HIV (WARH) in the United States and follows participants at nine sites throughout the United

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States (Adimora et al., 2018). Although eligibility differs across each of the four recruitment waves, during the most recent enrollment period, WIHS recruited WLWH between 25 and 60 years of age, who were never on a subtherapeutic highly active antiretroviral therapy regimen, except for during the prenatal period, or first-generation antiretroviral therapy (stavudine, didanosine, zidovudine, or zalcitabine; Adimora et al., 2018). WARH were sociodemographically similar to WLWH and enrolled if they reported high-risk exposure during the previous 5 years (i.e., having sex with a known man living with HIV; having unprotected sex with three or more men or protected sex with six or more men; having sex for trade; engaging in intravenous drug use or the use of crack, cocaine, heroin, or methamphetamines; being diagnosed with a sexually transmitted infection; or having a partner who reported any of these high-risk activities). Demographics and criteria for earlier recruitment are described elsewhere (Adimora et al., 2018).

WIHS participants underwent comprehensive study visits every 6 months to evaluate the clinical, psychological, and socioeconomic impact of living with HIV. Cognitive testing is administered every 2 years, in rotating intervals (Adimora et al., 2018). All women who participated in WIHS visits between April and October 2018 (visit 48) were younger than 65 years and responded to the WIHS question, “Are you currently employed,” were included in this analysis. Women 65 years of age and older were excluded from analyses because they are past the cutoff for traditional working age and may have contexts that would confound the interpretation of the analysis (Organisation for Economic Co-operation and Development, 2018).

Clinical Measures

Physical health indicators, previously supported to be associated with employment (Gómez et al., 2016; Hergenrather et al., 2016), were selected to assess the relationship between physical health and employment among WLWH. HIV care indicators (i.e., HIV viral load ≤200 copies/mL, CD4 count/mm^3, HIV medication adherence, and the ability to keep scheduled HIV care appointments) were assessed through self-report and/or blood draw to better depict the relationship between HIV-related clinical variables and employment. Other health indicators (i.e., hypertension, diabetes, obesity, and anemia) that have been shown to influence capacity for employment and efficiency at work (Leonardi & Scaratti, 2018; Mori et al., 2019; Verbooy et al., 2018) were selected to further delineate the relationships between employment and common comorbidities associated with HIV infection. We defined hypertension and diabetes by clinical readings (blood pressure ≥140/90 mm Hg, fasting blood glucose ≥126 mg/dL, or hemoglobin A1C value ≥6.5%), self-reported diagnosis, or use of medications to control either condition. Anemia was defined by hemoglobin <12 g/dL. Body mass index ≥30 kg/m^2 was used as an indicator of obesity. Health-related QOL was assessed using an abbreviated version of Bozette’s instrument (Bozzette et al., 1995) to clarify the relationships between emotional well-being, fatigue, pain, and limitations in physical, social, or role function, and employment among WLWH. Finally, health behaviors previously associated with unemployment (i.e., current smoking status, number of alcoholic drinks per week, and recreational drug use; Lund et al., 2019) were assessed to evaluate the relationship between health behaviors and employment among WLWH and WARH.

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Psychological Measures

Psychological health indicators, such as cognitive function and emotional well-being, have been previously associated with behaviors and skill sets associated with employment (i.e., decision making, problem solving, goal setting, and effectively interacting with other people; Dale et al., 2014; National Center for Injury Prevention and Control, 2018; National Institute of Mental Health, 2018). Evidence suggests that cognitive function may be impaired in WLWH secondary to HIV-specific pathophysiology as well as socio-behavioral factors associated with living with HIV (i.e., decreased motivation to engage in stimulating activities related to depression and HIV stigma).

Thus, the relationship between cognitive function and employment among WLWH was assessed through a battery of tests designed to examine specific domains of cognitive function, including the Hopkins Verbal Learning Test—Revised (learning and memory), Trail Making Test Part B (executive function), Stroop Test (executive function), Letter–Number Sequencing testing (attention), Symbol Digit Modalities Test (speed), Grooved Pegboard testing (motor), and semantic and fluency testing (verbal). Demographically adjusted *T*-scores were created for each cognitive domain, consistent with other large-scale HIV cohorts, and a global score was computed for women completing at least four measures. Cognitive domain scores ranged from 1 to 9, with scores greater than 5 being indicative of cognitive impairment (Rubin et al., 2017). Indicators of emotional well-being previously associated with employment (i.e., symptoms of depression, stress, and anxiety; internalized HIV stigma; and perceived adequacy of social support) were assessed using the Center for Epidemiological Studies—Depression Scale (Radloff, 1977), Perceived Stress Scale (Cohen et al., 1983), Generalized Anxiety Scale-7 (Spitzer et al., 2006), HIV Stigma Scale (Berger, 2001), and the emotional/informational and functional subscales of the Medical Outcomes Study Social Support Survey (Sherbourne & Stewart, 1991). Depressive and anxiety symptoms were categorized based on the threshold for clinical evaluation for depression (Center for Epidemiological Studies-Depression Scale score ≥ 16; Radloff, 1977) and anxiety (Generalized Anxiety Scale-7 score ≥ 10; Spitzer et al., 2006), and perceived stress was categorized based on the previously established range for high stress (Perceived Stress Scale score ≥ 27; Cohen et al., 1983). Internalized HIV stigma was treated as a continuous variable, with scores ranging from 1 to 4, and higher scores indicating greater negative attitudes related to HIV infection. Indicators of emotional/informational and functional social support were treated as continuous variables, with scores ranging from 1 to 5, and higher scores indicating greater support.

Socioeconomic Measures

Socioeconomic status has been associated with employment through multifaceted routes, altering the ability to leverage social- and resource-based opportunities that influence employment (Gómez et al., 2016; Pellowski et al., 2018). In this study, age, race, marital status, childcare responsibility, household income, educational attainment, employment status, access to medical insurance, and housing stability were assessed via self-report. Race was categorized as Black/African American, White, American Indian/Alaskan Native, Asian, Hawaiian Native, Multi-racial, or Other. Marital status was categorized as living with spouse/partner, or other (i.e., never married, widowed, separated, divorced, or

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other). Childcare responsibility was assessed as a continuous variable by hours per week the participant provides childcare. Household income was categorized by whether the participant reported a household income of ≤$12,000 USD per year. Educational attainment was categorized by whether the participant had attended/graduated college. Employment was assessed by asking: “Are you currently employed (for pay, full time or part time)?” Access to medical insurance was assessed by asking: “Since your last study visit, have you received assistance from the AIDS Drug Assistance Program or any other Ryan White Program?” or “Have you had health insurance, such as Blue Cross, Medicaid, or Medicare?” Housing stability was assessed by asking the following two questions: “Where are you living now?” and “How long have you stayed at the place you stayed last night?”

Statistical Analysis

Variables of interest were selected based on a priori literature review of the clinical, psychological, and socioeconomic factors previously associated with employment and common among WLWH. Descriptive statistics were used to characterize variables of interest by employment and HIV status. Inferential statistics and simple regression modeling were used to examine the relationships between variables of interest and employment among WLWH and WARH. Hierarchical, multivariable regression modeling was performed to better elucidate the relationships between clinical health indicators (i.e., cognitive function, QOL, smoking status, HIV viral load ≤200 copies/mL, and adherence to scheduled HIV care appointments), socioeconomic indicators (i.e., having attended or graduated college, having a household income ≤$12,000 USD, hours per week providing childcare, and minority race status), psychological indicators (i.e., social support, symptoms of stress and depression, and internalized HIV stigma), and employment among WLWH. Other variables were considered for inclusion in multivariable analysis (i.e., hypertension, diabetes, obesity, housing stability, and anxiety) but excluded after collinearity among variables was assessed. Table 1 describes the variables used in hierarchical regression in detail, including how each variable was defined and coded. IBM SPSS Statistics for Windows (Version 24). software was used to conduct all analyses.

Results

WLWH (n = 1,449) and WARH (n = 619), who attended a routine WIHS visit between October 2017 and March 2018 (visit 48), were included in the original data set. Women who were younger than 65 years (n = 1,967) and responded to the WIHS question: “Are you currently employed?” (n = 1,917) were included in the final analyses. Table 2 describes characteristics of women included in the final analysis, including indicators of socioeconomic status and clinical and psychological health. The majority of women were living with HIV (71%, n = 1,357), and 29% (n = 560) were women without HIV infection. On average, women in our study were 49.8 years of age, African American or Black (64.0%), and not married or living with a partner (68.8%). Most (66%) reported receiving a high school diploma, and 36.5% had attended or graduated college. Few (30.4%) reported being responsible for a child younger than 19 years, and those who did report childcare responsibilities provided childcare an average of 10.9 hr per week. Although most were not

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employed (59.3%), those reporting employment (37.9%) worked an average of 36.1 hr per week.

Associations between clinical, psychological, and socioeconomic variables of interest and employment were similar between WLWH and WARH. Employment was associated with improved QOL ($p \leq .01$), global neurocognitive function ($p \leq .01$), and psychological health (i.e., less depressive symptomology, stress, anxiety) for both WLWH and WARH ($p \leq .01$). Employment was also associated with better overall health, with women who were employed being less likely to have an indicator of hypertension or diabetes and having less symptom burden related to fatigue and pain ($p \leq .01$). Furthermore, women who were employed were more likely to report fewer health risk behaviors, such as decreased cigarette and recreational drug use ($p \leq .01$). Among WLWH, women who reported employment were less likely to have missed an HIV care appointment in the past 6 months ($p \leq .05$) and more likely to report HIV viral suppression (HIV RNA ≤200 copies/mL; $p \leq .05$). Better socioeconomic status (i.e., having attended college and higher household income [$p \leq .01$]) and living in a house or apartment ($p \leq .05$) were also associated with employment across groups.

Table 3 presents the results of the hierarchical regression modeling analysis for employment among WLWH. Model 1 included clinical factors previously associated with employment, including HIV viral load suppression, adherence to HIV care appointments, neurocognitive function, QOL, and cigarette use. The first model explained 11.8% of the variance of employment among WLWH ($p < .001$). In Model 2, we added socioeconomic factors shown to be associated with employment, including education, income, and number of hours providing childcare. Model 2 explained 26.9% of the variance of employment among WLWH ($p < .001$). Finally, in Model 3, we added psychosocial factors shown to be associated with employment, including internalized HIV stigma, depression, stress, and the availability of emotional/informational or tangible social support. The final model explained 27.2% ($p < .001$) of the variance of employment among WLWH. QOL ($\beta = 0.343$, $p < .001$), having a household income ≤$12,000 USD/year ($\beta = -0.297$, $p < .001$), having attended college ($\beta = 0.188$, $p < .001$), and time spent providing childcare ($\beta = 0.107$, $p < .05$) were all significantly associated with employment while controlling for global neurocognitive function, psychological health, and HIV-specific outcomes (i.e., viral load suppression and adherence to HIV care appointments).

The same modeling was conducted for WARH, excluding HIV-specific measures (i.e., viral load suppression, adherence to HIV care appointments, and internalized HIV stigma). Model 1 (the clinical model) explained 25.9% ($p < .001$) of the variance of employment among WARH. Model 2, which added socioeconomic context, explained 34.1% ($p < .001$) of the variance in employment among WARH. Our final model, which included psychosocial factors, explained 35.4% ($p < .001$) of the variance of employment among WARH. Household income ≤$12,000 USD/year ($\beta = -0.350$, $p < .001$), QOL ($\beta = 0.314$, $p < .001$), tangible social support ($\beta = -0.245$, $p < .05$), and cigarette use ($\beta = -0.206$, $p < .05$) were all significantly associated with employment while controlling for global neurocognitive function and psychological health characteristics.

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Discussion

The purpose of this study was to examine the association between clinical, socioeconomic, and psychosocial factors and employment among WLWH and WARH. We found that for both WLWH and WARH, employment was associated with favorable health outcomes (i.e., fewer comorbidities), socioeconomic indices (i.e., income and educational attainment), and psychosocial health (i.e., social support, psychological well-being, and health behaviors). Furthermore, among WLWH, employment was associated with better adherence to HIV care appointments, viral load suppression, and lower levels of internalized HIV stigma, which is plausibly related to increased structure and improved sense of worth associated with employment (Vance et al., 2015). Our models demonstrated the strongest associations for socioeconomic variables on employment. Although our analyses were cross-sectional in nature, and longitudinal risk analyses would have been more informative, our results corroborate the current body of research that HIV infection is a socioeconomic disease, and that socioeconomic disparities negatively influence health status and the ability to access and maintain employment (Collaborative on Health and the Environment, 2019; Pellowski et al., 2018). Furthermore, our work adds to the evidence that employment is beneficial to health and that unemployment negatively affects physical health, emotional well-being, and socioeconomic status (Drydakis, 2015; Hergenrather et al., 2016; Vance et al., 2015). In addition, our work corroborates the larger body of evidence, that as HIV care management has improved, living with HIV has decreased the impact of HIV disease on employment, as seen by the similarities in association between WLWH and WARH (Dray-Spira et al., 2012; Verbooy et al., 2018). Rather, the contexts associated with living with HIV (i.e., socioeconomic status, general physical health, and psychosocial health) seem to have a stronger relationship with employment status among WLWH. Thus, WLWH who are able to work should consider reengaging (or entering) the workforce to achieve the many benefits of employment (i.e., health, well-being, self-determination, autonomy, empowerment; Degroote et al., 2014; Kordovski et al., 2017; Leonardi & Scaratti, 2018; Unanue et al., 2017).

Based on the literature and the results of this study, employment is associated with better adherence to antiretroviral medications, improved ability to keep HIV care appointments, and less burden related to the negative psychosocial effects of living with HIV (Hergenrather et al., 2016). Although the argument can be made that WLWH who attend to their health and have better emotional well-being are more likely to be employed to begin with, longitudinal studies suggest that employment is predictive of improved physical health, psychological health, and QOL, whereas unemployment is predictive of worse physical and psychological health (Hergenrather et al., 2015a, 2015b). Thus, failure to encourage employment among WLWH may actually be depriving them of improved health and well-being. Viewed in this context, WLWH should consider employment if they are able to work and remove the barriers that prevent their re-entry.

One strategy in reducing occupational disparities among WLWH is to educate health care providers on the benefits of employment for WLWH. Notably, employment increases income but also has been shown to improve self-worth, self-care, health, and QOL (Hergenrather et al., 2016). Furthermore, employment not only improves QOL of

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the employed but also affects familial, community, and economic outcomes, thereby contributing to society as a whole (Kaori Fujishiro, 2017; National Institute for Occupational Safety and Health, 2017). Providers must be aware of the unique barriers that may hinder reengagement with the work-force, so that appropriate interventions can be initiated to mitigate barriers and improve employment for better health among WLWH. As an example, long-term disability enrollment and social isolation related to HIV stigma may negatively affect the psychosocial and cognitive function among WLWH (Hergenrather et al., 2015b, 2016; Vance et al., 2016). Yet, psychosocial functioning (i.e., stress management, emotional coping, and interpersonal navigation/communication) and cognitive function (i.e., planning, prioritizing, and problem solving) are critical to both employment acquisition and maintenance, and impairments in these domains must be addressed to reduce occupational disparities among WLWH (Bielecky et al., 2015; Davis-Street et al., 2016; McGurk et al., 2016; Vance et al., 2015). Understanding these barriers, health care providers (i.e., physicians, advance practice practitioners, nurses, social workers, and case managers) are in a key position to discuss employment with WLWH, take inventory of their occupational needs, and refer them to comprehensive services that facilitate more positive outcomes (Gallant et al., 2011).

Although vocational rehabilitation serves an important role in improving employment outcomes for WLWH, other interventions, such as cognitive training and cognitive behavioral therapies, have been shown to improve cognitive function, stress management, and psychological health (respectively) among WLWH (Hemmati Sabet et al., 2013; Hofmann & Gómez, 2017; Vance et al., 2019). Moreover, the need for a more holistic conceptualization of vocational rehabilitation should be considered for WLWH, who may need assistance developing the skillsets associated with the management of interpersonal relationships (i.e., emotional and social intelligence, interpersonal communication, self-advocacy, and boundary setting), as well as assistance developing a sense of personal empowerment (i.e., self-efficacy, self-worth), that is associated with employment (Dale et al., 2014; Garcia et al., 2019; Macsinga et al., 2015). Additionally, although our data indicated that employment was associated with less internalized HIV stigma, concerns over disclosure, stigmatization, and discrimination still serve as an important barrier to employment among WLWH (Miedema et al., 2017). Thus, these concerns must be recognized as a vocational need of WLWH who desire to engage with the workforce. Guidance about workplace HIV self-disclosure and methods to manage HIV stigma should be provided to empower WLWH to best navigate this critical barrier (Miedema et al., 2017; Wagener et al., 2015).

In addition to the aforementioned interventions, which seek to mitigate psychosocial barriers to employment and occupational productivity among WLWH, interventions to improve the overall benefit of employment among WLWH must also be considered. Notably, the benefits of employment are moderated by the characteristics of employment. Jobs that provide greater autonomy, social cohesiveness, purpose, organizational support, and stability are associated with better health and occupational outcomes (Hergenrather et al., 2016; Rueda et al., 2015). Yet, the ability to attain high-quality employment is largely contingent on educational attainment, a common barrier among WLWH (Collaborative on Health and the Environment, 2019; Pellowski et al., 2013). Therefore, interventions to improve

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educational attainment among WLWH must be implemented. Although this may seem daunting due to the complexities of factors influencing the attainment of higher education (i.e., poverty, social class, discrimination, conflicting responsibilities, and disparities in academic achievement), there are interventions that have demonstrated efficacy in improving access to higher education among lower socioeconomic populations, with implications for policy and practice (Sosu et al., 2018). For example, outreach programs that increase knowledge of the application process, improve skillsets and attributes that improve applicant competitiveness (i.e., interpersonal skillsets and persuasive writing techniques), and link applicants to the financial planning resources necessary to fund college have demonstrated efficacy in improving college enrollment in individuals with lower socioeconomic status (Sosu et al., 2016; Wilson et al., 2012). Programs that provide additional mentorship to facilitate more effective study strategies, stress management, and time management have demonstrated efficacy in improving graduation rates among disadvantaged students once they have enrolled (Wilson et al., 2012). Although these interventions may not be best implemented by health care providers, a knowledge of the local resources (such as outreach and mentorship programs) that are supported to improve educational attainment and, thus, quality employment outcomes among WLWH is needed to better link WLWH to these beneficial services. Moreover, health care providers are in a key position to collaborate with policy makers on the benefits of education on employment and its implications for WLWH.

Although our work substantially contributes to the literature and helps elucidate the relationships between socioeconomic and psychosocial disparities, employment, and clinical outcomes among WLWH, we acknowledge several limitations. First, this study was cross-sectional in nature; therefore, we cannot determine causal relationships between socioeconomic, psychosocial, and health-related factors and employment among WLWH. Second, it should be considered that employment may actually be a marker for other key characteristics associated with improved health and QOL, such as financial autonomy, self-determination, and intrinsic motivation—all factors that were not measured in our study. Additionally, the relationships between the socioeconomic environment, employment, and personal outcomes (i.e., physical and psychological health) are complex and largely dependent on personal traits, which we were unable to examine in the current analysis. Therefore, future research should seek to examine personal traits (i.e., personality, emotional and social intelligence, personal empowerment, hardiness, resilience, and locus of control) that may moderate employment outcomes among WLWH. Finally, we recognize that women participating in this study were enrolled in WIHS, which likely provides them with greater access to health and psychosocial resources compared with the general population.

However, WIHS demographically represents WLWH and WARH in the United States, which at large should reflect the distribution of socioeconomic and psychosocial resources among the general population.

Conclusion

Employment is considered a social determinant of health, influencing access to resources and social power and predicting overall health and well-being. Although HIV infection no longer prevents WLWH from working, substantial socioeconomic and psychosocial

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barriers exist that affect employment and, thus, deprive WLWH of the acquisition of its socioeconomic, psychosocial, and clinical benefits. To improve QOL, health, and the social status of WLWH, future interventions and policy must recognize the holistic impact of socioeconomic, psychosocial, and health-related contexts influencing employment among WLWH and take steps to improve access to quality employment options among this vulnerable population.

Funding

This research was funded by the Deep South Center for Occupational Health and Safety (NIOSH-T42OH008436; PI: C. Lungu); the University of Alabama at Birmingham (UAB) Center For AIDS Research, an NIH-funded program (P30 AI027767-31; PI: M. Saag) that was made possible by the NIAID, NCI, NICHD, NHLBI, NIDA, NIMH, NIA, NIDDK, NIGMS, NIMHD, FIC, NIDCR, and OAR; and by the Women's Interagency HIV Study (WIHS), now the MACS/WIHS Combined Cohort Study (MWCCS), an NIH-funded program (MWCCS PIs: I. Ofotokun, A. Sheth, and G. Wingood, U01-HL14624; K. Anastos and A. Sharma, U01-HL146204; D. Gustafson and T. Wilson, U01-HL146202; G. D'Souza, S. Gange, and E. Golub, U01-HL146193; M. Cohen and A. French, U01-HL146245; B. Aouizerat, J. Price, and P. Tien, U01-HL146242; S. Kassaye and D. Merenstein, U01-HL146205; M. Alcaide, M. Fischl, and D. Jones, U01-HL146203; M. Kempf, J. Dionne-Odom, and D. Konkle-Parker, U01-HL146192; and A. Adimora, U01-HL146194) that was made possible by the NHLBI, NICHD, NHGRI, NIA, NIDCR, NIAID, NIMH, NIDA, NINR, NCI, NIAAA, NNIDCD, and NIDDK.

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Key Considerations

- Many women living with HIV (WLWH) are now capable of working and may enjoy improved health and quality of life by engaging in work.
- Yet, WLWH may not work due to undeveloped skillsets related to the ability to navigate interpersonal relationships and efficiently advocate for themselves.
- Executive function deficits (e.g., organization, planning, and prioritizing) may also exist, hindering the ability to get and maintain employment.
- Vocational needs should be established as part of the overall health care plan to identify deficits and link WLWH to resources likely to improve employment outcomes.

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Table 1.

Variables of Interest

Construct	Variable	Meaning	Measure
	Cognition	Demographically adjusted T-scores were created for each cognitive domain (i.e., learning, memory, executive, attention, speed, verbal, and motor); a global score was computed for participants completing at least 4 measures	Scores ranged from 1 to 9, with scores greater than 5 indicating cognitive impairment
Clinical health	Quality of life	Quality of life was calculated through Bozette's equation: physical function (fx) × 0.2 + pain × 0.17 + fatigue × 0.28 + emotional well-being × 0.2 + social fx × 0.05 + role fx × 0.1	Scores are continuous and range from 0 to 100; higher scores indicate greater quality of life
	Smoking status	Currently smoking based on current visit or last reported visit	0 = no 1 = yes
	HIV viral load ≤200 copies/mL	Clinical threshold for HIV viral load suppression	0 = no 1 = yes
	Missed HIV care appointments	Missed HIV care appointments in the last 6 months	1 = yes 2 = no
Socioeconomic status	Education	Attended or graduated college	0 = no 1 = yes
	Household income	<$12,000 USD per year	0 = no 1 = yes
	Time providing childcare	Hours per week providing childcare	Scores are continuous and range from 0 to 42
	Race	Minority race (i.e., African American, Hispanic, Asian American/Pacific Islander, Native American/Alaskan, or other)	0 = no 1 = yes
Psychosocial health	Emotional/informational support	Availability of someone to provide affection, companionship, encouragement, guidance, and advice	Mean scores are continuous and range from 1 to 5; higher scores indicate greater support
	Tangible support	Availability of someone to assist with life's functions, including childcare, housekeeping, and the provision of financial assistance	Mean scores are continuous and range from 1 to 5. Higher scores indicate greater support
	Stress symptomology	Perceived Stress Scores ≥27, indicating high stress	0 = no 1 = yes
	Depressive symptomology	CES-D Scores ≥16, the clinical threshold for depression evaluation	0 = no 1 = yes
	Internalized HIV stigma	Negative thoughts or attitudes toward self related to HIV infection	Mean scores are continuous and range from 1 to 4; higher scores indicate greater negative attitudes/thoughts

Note. CES-D = Center for Epidemiologic Studies Depression Scale.

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Table 2.

Participant Characteristics by HIV Status

	Women at Risk for HIV (*n* = 560), *n* (%)	Women Living With HIV (*n* = 1,357), *n* (%)	Entire WIHS Cohort (*N* = 1,917), *n* (%)
Race			
Black/African American	353 (63.0)	873 (64.3)	1,226 (64.0)
White	50 (8.9)	143 (10.5)	193 (10.1)
American Indian/Alaskan Native	10 (1.8)	23 (1.7)	33 (1.7)
Asian	5 (0.9)	4 (0.3)	9 (0.5)
Hawaiian Native	1 (0.2)	2 (0.1)	3 (0.2)
Multi-racial	105 (18.8)	199 (14.7)	304 (15.9)
Other	36 (6.4)	107 (7.9)	143 (7.5)
Socioeconomic characteristics			
Age >50 years	277 (49.5)	794 (58.5)	1,071 (55.9)
Attended college	204 (36.5)	480 (35.4)	684 (35.7)
Married/living with partner	164 (30.2)	355 (26.8)	519 (27.8)
Provides care for own child	159 (28.4)	286 (21.1)	445 (23.2)
Household income ≤12,000	246 (45.7)	632 (48.8)	878 (45.8)
Resides in house or apartment	525 (93.8)	1,305 (96.2)	1,830 (95.5)
Duration of residence ≥6 months	478 (91.0)	1,199 (91.9)	1,677 (91.6)
Clinical health characteristics			
Obesity[a]	320 (57.1)	724 (53.4)	1,044 (54.5)
Diabetes[b]	139 (24.8)	324 (23.9)	463 (24.2)
Hypertension[c]	279 (49.8)	692 (51.0)	971 (50.7)
Anemia[d]	153 (27.3)	365 (26.9)	518 (27.0)
Cognitive impairment[e]	124 (25.5)	337 (24.8)	461 (28.2)
Health insurance	484 (86.6)	1,338 (98.9)	1,822 (95.3)
Cigarette use	246 (43.9)	495 (36.5)	741 (38.7)
Alcohol use >7 drinks/week	71 (12.7)	94 (7.0)	165 (8.6)

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	Women at Risk for HIV (*n* = 560), *n* (%)	Women Living With HIV (*n* = 1,357), *n* (%)	Entire WIHS Cohort (*N* = 1,917), *n* (%)
Recreational drug use	178 (31.8)	342 (25.3)	520 (27.2)
IV drug use	3 (0.5)	5 (0.4)	8 (0.4)
Psychological health characteristics			
Depressive Symptoms Score ≥16[f]	176 (31.4)	428 (31.5)	604 (31.5)
Anxiety Symptom Scores ≥10[g]	117 (20.9)	272 (20.0)	389 (20.3)
Perceived Stress Scores ≥27[h]	213 (38.0)	449 (33.1)	669 (34.5)

Note. HAND = HIV-Associated Neurocognitive Disorder.

[a]Body mass index ≥30 kg/m^2.

[b]Fasting blood glucose ≥126 mg/dL, HbA1C ≥6.5%, use of antidiabetic medications, or self-report.

[c]Blood pressure ≥140/90 mm Hg, use of antihypertensive medications, or self-report.

[d]Hemoglobin <12 g/dL.

[e]HAND score >5.

[f]Threshold for clinical evaluation for depression.

[g]Threshold for clinical evaluation for anxiety.

[h]Previously established threshold for high stress.

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Table 3.

Multivariable Regression Modeling of Employment Among WLWH and WARH

	WARH			WLWH		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	β	β	β	β	β	β
Global neurocognitive function	−0.115*	−0.051	−0.058	−0.056	−0.001	−0.007
Quality of life[a]	0.390*	0.316*	0.314*	0.350*	0.326*	0.343*
Current smoking status	−0.233*	−0.192*	−0.206*	−0.013	0.020	0.023
HIV viral load ≤200 copies/mL	—	—	—	0.027	0.009	0.009
Missed HIV care appointments	—	—	—	0.029	0.010	0.017
Education		−0.039	−0.051		0.188*	0.196*
Household income		−0.320*	0.350*		−0.297*	−0.287*
Time providing childcare		−0.058	−0.078		−0.107*	0.107*
Emotional/informational support			0.122			−0.075
Tangible support			−0.245*			−0.025
Stress symptomology			−0.048			−0.094
Depressive symptomology			0.012			0.012
Internalized HIV stigma						0.045
SE of the estimate	0.428	0.403	0.399	0.470	0.428	0.426
R^2	0.272	0.364	0.392	0.132	0.288	0.304
Adjusted R^2	00.259	0.341	0.354	0.118	0.269	0.272
Model significance	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Note. WARH = women at risk for HIV; WLWH = women living with HIV. Dependent variable: employment status;

*$p < .05$.

[a]Quality of life (0.2 × physical function (fx) + 0.17 × pain + 0.28 × fatigue + 0.2 × emotional well-being + 0.05 × social fx + 0.1 × role fx).