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| Local Service Category: | **Mental Health Services** |
| Amount Available**:** | **To be determined** |
| Unit Cost | |
| Budget Requirements or Restrictions **(TRG Only)**: | Maximum of 10% of budget for Administrative Cost. |
| DSHS Service Category Definition | Mental Health Services include psychological and psychiatric treatment and counseling services offered to individuals with a diagnosed mental illness, conducted in a family/couples, group or individual setting, based on a detailed treatment plan, and provided by a mental health professional licensed or authorized within the State to provide such services, typically including psychiatrists, psychologists, and licensed clinical social workers.<br>Mental health counseling services includes outpatient mental health therapy and counseling (individual and family/couple) provided solely by Mental Health Practitioners licensed in the State of Texas.<br>Mental health services include:<br>• Mental Health Assessment<br>• Treatment Planning<br>• Treatment Provision<br>• Individual psychotherapy<br>• Family psychotherapy<br>• Conjoint psychotherapy<br>• Group psychotherapy<br>• Psychiatric medication assessment, prescription and monitoring<br>• Psychotropic medication management<br>• Drop-In Psychotherapy Groups<br>• Emergency/Crisis Intervention<br>General mental health therapy, counseling and short-term (based on the mental health professional's judgment) bereavement support is available for family members or significant others of people living with HIV. |
| Local Service Category Definition: | **Individual Therapy/counseling** is defined as 1:1 or family-based crisis intervention and/or mental health therapy provided by a licensed mental health practitioner to an eligible person living with HIV.<br>**Family/Couples Therapy/Counseling** is defined as crisis intervention and/or mental health therapy provided by a licensed mental health practitioner to a family or couple (opposite-sex, same-sex, transgendered or non-gender conforming) that includes an eligible person living with HIV.<br>**Support Groups** are defined as professionally led (licensed therapists or counselor) groups that comprise people living with HIV, family members, or significant others for the purpose of providing emotional support directly related to the stress of caring for people living with HIV. |
| Target Population (age, gender, geographic, race, ethnicity, etc.): | People living with HIV and affected individuals living within the Houston HIV Service Delivery Area (HSDA). |
| Services to be Provided: | Agencies are encouraged to have available to PLWH all modes of counseling services, i.e., crisis, individual, family, and group. Sessions may be conducted in-home. Agency must provide professional support group sessions led by a licensed counselor. |

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| Service Unit Definition(s) **(TRG Only)**: | **Individual Crisis Intervention and/or Therapy:**<br>A unit of service is defined as an individual counseling session lasting a minimum of 45 minutes.<br>**Family/Couples Crisis Intervention and/or Therapy:**<br>A unit of service is defined as a family/couples counseling session lasting a minimum of 90 minutes.<br>**Group Therapy:**<br>A unit of service is defined as one (1) eligible PLWH attending 90 minutes of group therapy. The minimum time allowable for a single group session is 90 minutes and maximum time allowable for a single group session is 120 minutes. No more than one unit may be billed per session for an individual or group session.<br>A minimum of three (3) participants must attend a group session in order for the group session to eligible for reimbursement.<br>**Consultation:**<br>One unit of service is defined as 15 minutes of communication with a medical or other appropriate provider to ensure case coordination. |
| Financial Eligibility: | Income at or below 500% Federal Poverty Guidelines. |
| Eligibility for Services: | For individual therapy session, person living with HIV or the affected significant other of a person living with HIV, resident of Houston HSDA.<br>Person living with HIV must have a current DSM diagnosis eligible for reimbursement under the State Medicaid Plan.<br>PLWH must not be eligible for services from other programs or providers (i.e. MHMRA of Harris County) or any other reimbursement source (i.e. Medicaid, Medicare, Private Insurance) unless the PLWH is in crisis and cannot be provided immediate services from the other programs/providers. In this case, PLWH may be provided services, if the PLWH applies for the other programs /providers, until the other programs/providers can take over services.<br>Medicaid/Medicare, Third Party Payer and Private Pay status of PLWH receiving services under this grant must be verified by the provider prior to requesting reimbursement under this grant. For support group sessions, PLWH must be either a person living with HIV or the significant other of person living with HIV.<br>Affected significant other is eligible for services only related to the stress of caring for a person living with HIV. |
| Agency Requirements **(TRG Only)**: | Agency must provide assurance that the mental health practitioner shall be supervised by a licensed therapist qualified by the State to provide clinical supervision. This supervision should be documented through supervision notes.<br>Keep attendance records for group sessions.<br>Must provide 24-hour access to a licensed counselor for current PLWH with |

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| | emotional emergencies.<br>PLWH eligible for Medicaid or 3rd party payer reimbursement may not be billed to grant funds. Medicare Co-payments may be billed to the contract as ½ unit of service.<br>Documentation of at least one therapist certified by Medicaid/Medicare on the staff of the agency must be provided in the proposal. All funded agencies must maintain the capability to serve and seek reimbursement from Medicaid/Medicare throughout the term of their contract. Potential PLWH who are Medicaid/Medicare eligible may not be denied services by a funded agency based on their reimbursement status (Medicaid/Medicare eligible PLWH may not be referred elsewhere in order that non-Medicaid/Medicare eligible PLWH may be added to this grant). Failure to serve Medicaid/ Medicare eligible PLWH based on their reimbursement status will be grounds for the immediate termination of the provider's contract.<br>Must comply with the State Services Standards of Care.<br>Must provide a plan for establishing criteria for prioritizing participation in group sessions and for termination from group participation.<br>Providers and system must be Medicaid/Medicare certified to ensure that Ryan White funds are the payer of last resort. |
| Staff Requirements: | It is required that counselors have the following qualifications:<br>Licensed Mental Health Practitioner by the State of Texas (LCSW, LMSW, LPC PhD, Psychologist, or LMFT).<br>At least two years' experience working with HIV disease or two years' work experience with chronic care of a catastrophic illness.<br>Counselors providing family sessions must have at least two years' experience in family therapy.<br>Counselors must be covered by professional liability insurance with limits of at least $300,000 per occurrence. |
| Special Requirements **(TRG Only)**: | All mental health interventions must be based on proven clinical methods and in accordance with legal and ethical standards. The importance of maintaining confidentiality is of critical importance and cannot be overstated unless otherwise indicated based on Federal, state and local laws and guidelines (i.e. abuse, self or other harm). All programs must comply with the Health Insurance Portability and Accountability Act (HIPAA) standards for privacy practices of protected health information (PHI) information.<br>Mental health services can be delivered via telehealth and must follow applicable federal and State of Texas privacy laws.<br>Mental health services that are provided via ~~telehealth~~ telemedicine must be in accordance with State of Texas mental health provider practice requirements, see Texas Occupations Code, Title 3 Health Professions and chapter 111 for Telehealth & Telemedicine. |

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| | When psychiatry is provided as a mental health service via telemedicine then the provider must follow guidelines for telemedicine as noted in Texas Medical Board (TMB) guidelines in accordance with rules adopted under OCC §111.006.<br>Medicare and private insurance co-payments are eligible for reimbursement under this grant (in this situation the agency will be reimbursed the PLWH's co-payment only, not the cost of the session which must be billed to Medicare and/or the Third-party payer). Extensions will be addressed on an individual basis when meeting the criteria of counseling directly related to HIV illness. Under no circumstances will the agency be reimbursed more than two (2) units of individual therapy per PLWH in any single 24-hour period.<br>~~Agency should develop services that focus on the most current Special Populations identified in the *Houston Area Comprehensive Plan for HIV Prevention and Care Services* including Adolescents, Homeless, Incarcerated & Recently Released (IRR), Injection Drug Users (IDU), Men who Have Sex with Men (MSM), and Transgender populations. Additionally, services should focus on increasing access for individuals living in rural counties.~~<br>Must comply with the Houston EMA/HSDA Standards of Care.<br>The agency must comply with **the DSHS Mental Health Services Standards of Care**. The agency must have policies and procedures in place that comply with the standards ***prior*** to delivery of the service. |

# *FY 2026 RWPC "How to Best Meet the Need" Decision Process*

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| Step in Process: **Council** | | Date: **06/12/2025** |
| Recommendations: | Approved: Y:_____ No: ______<br>Approved With Changes:______ | If approved with changes list changes below: |
| 1. | | |
| 2. | | |
| 3. | | |
| Step in Process: **Steering Committee** | | Date: **06/05/2025** |
| Recommendations: | Approved: Y:_____ No: ______<br>Approved With Changes:______ | If approved with changes list changes below: |
| 1. | | |
| 2. | | |
| 3. | | |
| Step in Process: **Quality Improvement Committee** | | Date: **05/13/2025** |
| Recommendations: | Approved: Y:_____ No: ______<br>Approved With Changes:______ | If approved with changes list changes below: |
| 1. | | |
| 2. | | |
| 3. | | |
| Step in Process: **HTBMTN Workgroup #2** | | Date: **04/15/2025** |
| Recommendations: | Financial Eligibility: | |
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| Local Service Category: | **Mental Health Services Targeting Special Populations** |
| Amount Available**:** | **To be determined** |
| Unit Cost | |
| Budget Requirements or Restrictions **(TRG Only)**: | Maximum of 10% of budget for Administrative Cost. |
| DSHS Service Category Definition: | Mental Health Services include psychological and psychiatric treatment and counseling services offered to individuals with a diagnosed mental illness, conducted in a family/couples, group or individual setting, based on a detailed treatment plan, and provided by a mental health professional licensed or authorized within the State to provide such services, typically including psychiatrists, psychologists, and licensed clinical social workers.<br>Mental health counseling services includes outpatient mental health therapy and counseling (individual and family/couple) provided solely by Mental Health Practitioners licensed in the State of Texas.<br>Mental health services include:<br>• Mental Health Assessment<br>• Treatment Planning<br>• Treatment Provision<br>• Individual psychotherapy<br>• Family psychotherapy<br>• Conjoint psychotherapy<br>• Group psychotherapy<br>• Psychiatric medication assessment, prescription and monitoring<br>• Psychotropic medication management<br>• Drop-In Psychotherapy Groups<br>• Emergency/Crisis Intervention<br>General mental health therapy, counseling and short-term (based on the mental health professional's judgment) bereavement support is available for family members or significant others of people living with HIV. |
| Local Service Category Definition: | **Individual Therapy/counseling** is defined as 1:1 or family-based crisis intervention and/or mental health therapy provided by a licensed mental health practitioner to an eligible person living with HIV.<br>**Family/Couples Therapy/Counseling** is defined as crisis intervention and/or mental health therapy provided by a licensed mental health practitioner to a family or couple (opposite-sex, same-sex, transgendered or non-gender conforming) that includes an eligible person living with HIV.<br>**Support Groups** are defined as professionally led (licensed therapists or counselor) groups that comprise people living with HIV, family members, or significant others for the purpose of providing emotional support directly related to the stress of caring for people living with HIV. |
| Target Population (age, gender, geographic, race, ethnicity, etc.): | People living with HIV and affected family/partners living within the Houston HIV Service Delivery Area (HSDA). PLWH should also be a member of the following special populations: Transgender persons (emphasizing those who are LatinX/Black and/or under the age of 25), individuals who exchange sex for money, and individuals born outside the |

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| | US. |
| Services to be Provided: | Agencies are encouraged to have available to PLWH all modes of counseling services, i.e., crisis, individual, family, and group. Sessions may be conducted in-home. Agency must provide professional support group sessions led by a licensed counselor. |
| Service Unit Definition(s) **(TRG Only)**: | **Individual Crisis Intervention and/or Therapy:**<br>A unit of service is defined as an individual counseling session lasting a minimum of 45 minutes.<br><br>**Family/Couples Crisis Intervention and/or Therapy:**<br>A unit of service is defined as a family/couples counseling session lasting a minimum of 90 minutes.<br><br>**Group Therapy:**<br>A unit of service is defined as one (1) eligible PLWH attending 90 minutes of group therapy. The minimum time allowable for a single group session is 90 minutes and maximum time allowable for a single group session is 120 minutes. No more than one unit may be billed per session for an individual or group session.<br><br>A minimum of three (3) participants must attend a group session in order for the group session to be eligible for reimbursement.<br><br>**Consultation:**<br>One unit of service is defined as 15 minutes of communication with a medical or other appropriate provider to ensure case coordination. |
| Financial Eligibility: | Income at or below 500% Federal Poverty Guidelines. |
| Eligibility for Services: | For individual therapy session, person living with HIV or the affected significant other of a person living with HIV, resident of Houston HSDA.<br><br>The PLWH should be a member of the following special populations: Transgender persons (emphasizing those who are LatinX/Black and/or under the age of 25), individuals who exchange sex for money, and individuals born outside the US.<br><br>Person living with HIV must have a current DSM diagnosis eligible for reimbursement under the State Medicaid Plan.<br><br>PLWH must not be eligible for services from other programs or providers (i.e. MHMRA of Harris County) or any other reimbursement source (i.e. Medicaid, Medicare, Private Insurance) unless the PLWH is in crisis and cannot be provided immediate services from the other programs/providers. In this case, PLWH may be provided services, if the PLWH applies for the other programs /providers, until the other programs/providers can take over services.<br><br>Medicaid/Medicare, Third Party Payer and Private Pay status of PLWH receiving services under this grant must be verified by the provider prior to requesting reimbursement under this grant. For support group sessions, |

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| | PLWH must be either a person living with HIV or the significant other of person living with HIV.<br>Affected significant others are eligible for services only related to the stress of caring for a person living with HIV. |
| Agency Requirements **(TRG Only)**: | Agency must provide assurance that the mental health practitioner shall be supervised by a licensed therapist qualified by the State to provide clinical supervision. This supervision should be documented through supervision notes.<br>Keep attendance records for group sessions.<br>Must provide 24-hour access to a licensed counselor for current PLWH with emotional emergencies.<br>PLWH eligible for Medicaid or 3rd party payer reimbursement may not be billed to grant funds. Medicare Co-payments may be billed to the contract as ½ unit of service.<br>Documentation of at least one therapist certified by Medicaid/Medicare on the staff of the agency must be provided in the proposal. All funded agencies must maintain the capability to serve and seek reimbursement from Medicaid/Medicare throughout the term of their contract. Potential PLWH who are Medicaid/ Medicare eligible may not be denied services by a funded agency based on their reimbursement status (Medicaid/Medicare eligible PLWH may not be referred elsewhere in order that non-Medicaid/Medicare eligible PLWH may be added to this grant). Failure to serve Medicaid/Medicare eligible PLWH based on their reimbursement status will be grounds for the immediate termination of the provider's contract.<br>Must comply with the State Services Standards of Care.<br>Must provide a plan for establishing criteria for prioritizing participation in group sessions and for termination from group participation.<br>Providers and system must be Medicaid/Medicare certified to ensure that Ryan White funds are the payer of last resort. |
| Staff Requirements: | It is required that counselors have the following qualifications:<br>Licensed Mental Health Practitioner by the State of Texas (LCSW, LMSW, LPC, PhD, Psychologist, or LMFT).<br>At least two years' experience working with HIV disease or two years' work experience with chronic care of a catastrophic illness.<br>Counselors providing family sessions must have at least two years' experience in family therapy.<br>Counselors must be covered by professional liability insurance with limits of at least $300,000 per occurrence. |

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| Special Requirements **(TRG Only)**: | The agency must develop collaborative relationships with community partners that serve each of the identified special populations. These relationships should be documented via Memoranda of Understanding. MOUs will be submitted to TRG for review each year. Referrals should be tracked to evidence the success of these MOUs. Referrals will be reviewed by TRG on an annual basis.<br>Staff should be adequately trained and/or experienced with each of the identified special populations. Training and/or experience should be documented. This documentation will be reviewed by TRG on an annual basis.<br>Services are strongly encouraged to be community based where counseling can be provided in a safe and secure location. Services should be provided on days and at times that are conducive for participation of the identified special populations.<br>All mental health interventions must be based on proven clinical methods and in accordance with legal and ethical standards. The importance of maintaining confidentiality is of critical importance and cannot be overstated unless otherwise indicated based on Federal, state and local laws and guidelines (i.e. abuse, self or other harm). All programs must comply with the Health Insurance Portability and Accountability Act (HIPAA) standards for privacy practices of protected health information (PHI) information.<br>The State of Texas considers mental health services such as assessments or psychotherapy that providers deliver via electronic means to be telemedicine rather than telehealth. Agencies must provide these services in accordance with the State of Texas mental health provider practice requirements: Texas Occupations Code, Title 3 Health Professions, chapter 111.<br>When a provider delivers psychiatry via electronic means, the State of Texas considers this telemedicine and the provider must follow guidelines for telemedicine as noted in Texas Medical Board (TMB) guidelines for providing telemedicine: Texas Administrative Code, Texas Medical Board, Rules, Title 22, Part 9, Chapter 174.<br>Medicare and private insurance co-payments are eligible for reimbursement under this grant (in this situation the agency will be reimbursed by the PLWH's co-payment only, not the cost of the session which must be billed to Medicare and/or the Third-party payer). Extensions will be addressed on an individual basis when meeting the criteria of counseling directly related to HIV illness. Under no circumstances will the agency be reimbursed more than two (2) units of individual therapy per PLWH in any single 24-hour period.<br>Agency should develop services that focus on the most current Special |

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| | Populations identified in the *Houston Area Comprehensive Plan for HIV Prevention and Care Services* including Adolescents, Homeless, Incarcerated & Recently Released (IRR), Injection Drug Users (IDU), Men who Have Sex with Men (MSM), and Transgender populations. Additionally, services should focus on increasing access for individuals living in rural counties.<br>Must comply with the Houston EMA/HSDA Standards of Care.<br>The agency must comply with **the DSHS Mental Health Services Standards of Care**. The agency must have policies and procedures in place that comply with the standards ***prior*** to delivery of the service. |

## *FY 2026 RWPC "How to Best Meet the Need" Decision Process*

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| Step in Process: **Council** | | Date: **06/12/2025** |
| Recommendations: | Approved: Y:_____ No: ______<br>Approved With Changes:______ | If approved with changes list changes below: |
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| Step in Process: **Steering Committee** | | Date: **06/05/2025** |
| Recommendations: | Approved: Y:_____ No: ______<br>Approved With Changes:______ | If approved with changes list changes below: |
| 1. | | |
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| Step in Process: **Quality Improvement Committee** | | Date: **05/13/2025** |
| Recommendations: | Approved: Y:_____ No: ______<br>Approved With Changes:______ | If approved with changes list changes below: |
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| Step in Process: **HTBMTN Workgroup #2** | Date: **04/15/2025** |
| Recommendations: | Financial Eligibility: |
| 1. | |
| 2. | |
| 3. | |

## Modified Monitoring Process

Effective March 13, 2020 TRG enacted emergency response procedures due to COVID-19 pandemic. All monitoring was deferred/suspended in 2020 per DSHS and HRSA guidance.

In 2020, DSHS launched a burden reduction plan to reduce administrative burden by 50% for AA's and Subrecipients.

- This model requires subrecipient monitoring every other year (even years only).
- Per DSHS guidance, TRG is not required to complete monitoring in odd years
- In 2020, subrecipients that didn't have the ability to complete a remote review, were exempted from the 2020 Standards of Care chart review monitoring due to the COVID-19 State of Emergency.

## 2022 Monitoring

This year all subrecipients will be monitored, remotely if possible and in-person if necessary.

The monitoring period will cover calendar year 2021

Special chart review process is being evaluated for the RW Planning Council process during the "odd" years DSHS is not requiring monitoring (requires DSHS approval)

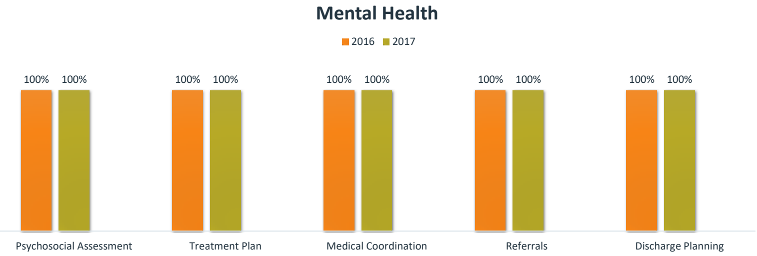
# Mental Health (MH)

NOT REVIEWED IN 2020 DUE TO NO REMOTE ACCESS

## Description of Service

Mental Health Services are treatment and counseling services offered to individuals with a diagnosed mental illness, conducted in a group or individual setting, and provided by a mental health professional licensed or authorized within the State to render such services.

## Chart Review Highlights- 2018



Indicators reviewed in 2017 that were met at <50% were not reviewed in 2018.  Only one indicator was reviewed in 2018, which was a new indicator

Quality of Life Research
https://doi.org/10.1007/s11136-023-03342-z

# The associations between HIV stigma and mental health symptoms, life satisfaction, and quality of life among Black sexual minority men with HIV

Chenglin Hong[1] · Ayako Miyashita Ochoa[1] · Bianca D. M. Wilson[2] · Elizabeth S. C. Wu[1] · Damone Thomas[3] · Ian W. Holloway[1]

Accepted: 3 January 2023

## Abstract

**Purpose** With the advancement of antiretroviral therapy (ART), HIV/AIDS has become a manageable illness, similar to other chronic conditions. This study examined the associations between HIV stigma and patient-reported outcomes including mental health symptoms, life satisfaction, and quality of life among Black sexual minority men with HIV.

**Methods** We analyzed baseline data from a randomized comparison trial of a mobile app intervention aimed to address the social work and legal needs of Black sexual minority men with HIV in Los Angeles County. We used validated scales including the Berger HIV stigma scale, the Patient Health Questionnaire-9 & the General Anxiety Disorder-7, the Satisfaction with Life Scale, and the Ladder Scale to assess HIV stigma, depressive symptoms, anxiety, life satisfaction, and quality of life, and we conducted multivariable linear regression to examine their associations.

**Results** Participants experienced HIV stigma especially about disclosure concerns (e.g., 81.9% participants indicated "*I am very careful who I tell that I have HIV*") and public attitudes (52.3% believed "*Most people with HIV are rejected when others find out*"). In the multivariable models, higher overall stigma scores were associated with higher likelihood of experiencing depression (adjusted $b = 0.235$, $p < 0.001$) and anxiety (adjusted $b = 0.188$, $p = 0.002$), and lower life satisfaction (adjusted $b = -0.236$, $p < 0.001$) and quality of life (adjusted $b = -0.053$, $p = 0.013$), adjusting for clinical characteristics including ART initiation, viral load suppression, and medication adherence. In addition, being attacked or harassed in the past year were significantly associated with lower life satisfaction and quality of life (adjusted $b = -3.028$, $p = 0.046$; adjusted $b = -1.438$, $p = 0.002$).

**Conclusion** Our findings highlight the need for focused HIV stigma reduction interventions to promote the overall well-being of Black sexual minority men with HIV. Strategies to promote the patient-reported outcomes may benefit from trauma-informed approaches.

**Keywords** HIV stigma · Depression · Anxiety · Life satisfaction · Quality of life · Black sexual minority men

## Introduction

With the advancement of antiretroviral therapy (ART), HIV/AIDS has become a manageable illness, similar to other chronic conditions. People living with HIV (PLWH) who initiate ART and sustain virologic suppression now have a similar life expectancy as those in the general population [1, 2]. In the past decade, significant progress has been made toward the 95–95-95 target of ending the HIV/AIDS epidemic in 2030 [3]. This refers to 95% of PLWH who knowing their HIV status, 95% of PLWH receiving ART, and 95% of PLWH receiving ART achieving viral suppression [4]. This Fast-Track approach also includes ambitious

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[2] The Williams Institute, School of Law, University of California Los Angeles, Los Angeles, CA, USA

[3] HEALING With HOPE Corporation, Los Angeles, CA, USA

target for zero discrimination. Now researchers propose a ‘fourth target’—PLWH with viral suppression having good health-related quality of life, which entails attention to two domains—comorbidities and self-perceived quality of life [5]. The newly added target emphasizes the social and psychological well-being of PLWH beyond clinical treatment outcomes. In fact, there has been ongoing research on patient-reported outcomes (PROs) among PLWH in many settings, and it has been gradually recognized as an essential indicator of assessing the overall well-being of PLWH [6–8]. Such PROs include life satisfaction, mental health outcomes, weight and pain management, and self-efficacy [9].

In the past, researchers have examined and identified factors associated with patient-reported outcomes among PLWH, which include demographic characteristics and behavioral health factors [7, 10, 11]. Among these, one factor that plays a persistent role is HIV stigma [12, 13], which refers to prejudice and discrimination directed at people perceived to have HIV/AIDS and individuals, groups, and communities associated with the disease [14]. Herek (2002) noted that HIV stigma is a construct that explains both the negative attitudes toward people with HIV, often manifested by discrimination, and internalized negative beliefs, views, and feelings experienced by those living with HIV [15]. Turan et al. also emphasized that HIV stigma is a multi-dimensional phenomenon consisting of internalized, perceived, anticipated, and experienced stigma [16]. Indeed, prior studies have demonstrated that HIV stigma is a considerable barrier to accessing HIV treatment and prevention services and a major factor for the overall health-related quality of life among PLWH [17, 18]. For example, HIV stigma has been associated with never having received an HIV test, delayed ART initiation, and lower ART adherence and retention in HIV care [19, 20]. Moreover, stigmatization in different forms could also materialize into discriminative actions and pose obstacles that eliminate or exclude PLWH from accessing equal opportunities such as employment, education, and legal services [18]. A comprehensive systematic review and meta-analysis of the literature in the past 40 years suggested that HIV/AIDS stigma was negatively associated with well-being among PLWH and these associations were stronger among older PLWH [21]. In recent years, standardized measurement tools were also developed to assess stigma as a domain of quality of life among people living with HIV [22, 23]. Another recently published systematic review revealed despite the growing numbers of interventions on reducing stigma, there is a lack of well-designed interventions that documented stigma reduction among PLWH and few studies measured such effects on improving patient outcomes [18].

In the United States, Black sexual minority men living with HIV are disproportionately impacted by HIV and have poor treatment outcomes along the HIV care continuum compared to their White and Latino counterparts [24]. For instance, compared to White sexual minority men, Black sexual minority men living with HIV have 8.2 times higher HIV incidence, and 6.5 times greater HIV mortality [25]. Studies also suggest that Black sexual minority men with HIV have lower retention in HIV care [26] and are less likely to be virally suppressed than their White counterparts [27, 28]. Individual and structural barriers, including HIV stigma, may increase morbidity, leading to worse patient outcomes among this population at the intersection of multiple vulnerabilities. Furthermore, the effects of HIV stigma may be pronounced among Black sexual minority men with HIV who also experience other forms of stigmatization and marginalization based on other identities, including sexual orientation and race, compared to the general population of PLWH.

### The current study

To better understand the mechanisms by which HIV stigma influences the social and psychological well-being of Black sexual minority men living with HIV and provide insights into the development of stigma reduction interventions, this study aims to document HIV stigma using a validated instrument, and to examine the associations between HIV stigma and patient-reported outcomes (PROs) in a sample ($n = 122$) of Black sexual minority men living with HIV in Los Angeles County, California. Specifically, we hypothesized that higher levels of HIV stigma would be associated with higher levels depression and anxiety, lower life satisfaction, and lower quality of life.

## Materials and methods

### Study procedures

We analyzed baseline data from a randomized comparison trial of a community-developed, web-based mobile app intervention that aimed to address the social work and legal needs of Black sexual minority men living with HIV, described elsewhere[29]. Briefly, Black sexual minority men living with HIV were recruited via online social media and community outreach events. To be eligible for the study, participants were required to: (1) be 18 years old or above, (2) self-identify male, (3) identify as Black/African American, (4) identify as gay, bisexual, or another sexual minority, and (5) and be living in Los Angeles County. Participants were also required to have a smartphone and be able to provide informed consent. Study procedures were reviewed and approved by the Institutional Review Board at the University of California Los Angeles. All respondents provided informed consent and were offered monetary compensation of up to USD 130 for their participation in the research.

## Measures

*Sociodemographic and clinical characteristics.* Study participants were asked to report their age, birthplace, education and income level, number of children, and insurance status. In addition, participants were asked about their most recent CD4 and viral load, whether they were currently taking antiretroviral therapy (ART), and if so, how long they had received ART. Participants were also asked to self-report their ability to take all HIV medications as prescribed (options from very poor to excellent). See Table 1 for a complete list of demographic characteristics.

HIV *stigma.* HIV stigma was assessed using the adapted Berger HIV stigma scale [30]. This 10-item scale assessed four stigma subscales: (1) personalized stigma, (2) disclosure concerns, (3) negative self-image, and (4) public attitudes. All questions were rated on a five-point scale from "strongly disagree (0)" to "strongly agree (4)", with a total possible score ranging from 0 to 40. A full description of the 10 items and distributions are presented in Table 2. The abbreviated scale was validated and showed good internal consistency in previous studies among PLWH [31, 32]. In the current sample internal consistency on the adapted Berger HIV stigma scale was also high (Cronbach's alpha = 0.87).

## Patient-reported outcomes

*Depression.* We used the Patient Health Questionnaire-9 (PHQ-9) to measure depression [33]. This 9-item measure assessed how often the participant had experienced depressive symptoms over in the past 2 weeks, including "*feeling down, depressed, or hopeless*" and "*Feeling bad about yourself—or that you are a failure or have let yourself or your family down*?". Response options included "not at all" (0), "several days" (1), "more than half the days" (2), and "nearly every day" (3). A total score was summed and presented from 0 to 27, and scores of 5, 10, 15, and 20 represent cut-off points for mild, moderate, moderately severe, and severe depression. To screen for depression, a PHQ-9 of 10 or greater is recommended for referral for further evaluation [33]. The Cronbach's alpha for PHQ-9 among the study sample was 0.86.

*Anxiety*. The General Anxiety Disorder-7 (GAD-7) was used to measure anxiety among the participants[30]. The 7-item survey asked the participants questions about how often they were bothered by a list of anxiety-related symptoms over the past 2 weeks (e.g., *feeling nervous, anxious, or on edge*). A score of 10 or higher was considered

**Table 1** Characteristics of Black sexual minority men with HIV in Los Angeles County, California ($n = 122$)

| | *n* (%) |
|---|---|
| Social behavioral characteristics | |
| Age (range: 18 – 74; mean = 37.2; SD = 12.7) | |
| 18–24 | 19 (15.6%) |
| 25–34 | 43 (35.2%) |
| 35–44 | 24 (19.7%) |
| 45 and above | 36 (29.5%) |
| Born in Los Angeles | 53 (43.4%) |
| Born in the U.S | 107 (87.7%) |
| Employment status | |
| Employed | 44 (36.1%) |
| Unemployed | 29 (23.8%) |
| Retired | 6 (4.9%) |
| Disabled | 40 (32.8%) |
| Decline to answer | 3 (2.5%) |
| Income level | |
| < $12,000 | 46 (37.7%) |
| > = $12,000 | 69 (56.6%) |
| Decline to answer | 7 (5.7%) |
| Education | |
| College and above | 18 (14.8%) |
| Some college | 57 (46.7%) |
| High school and below | 47 (38.5%) |
| Have at least one child | 14 (11.5%) |
| Always have insurance in the past 5 years | 91 (74.6%) |
| Did not get medical care when you needed it in the past year | 15 (12.3%) |
| Did not get medication when you needed it in the past year | 21 (17.2%) |
| Had been attacked or harassed in the past year | 45 (36.9%) |
| Had been attacked with violence in the past year | 28 (23.0%) |
| Had been a victim of any other crime in the past year | 25 (20.5%) |
| Had been incarcerated in the past 5 years | 31 (25.4%) |
| Clinical characteristics | |
| Receiving ART | 115 (94.3%) |
| Started ART within 5 years | 48 (41.7%) [1] |
| Viral load less than 200 copies/ml | 71 (61.7%) [1] |
| Self-report very good medication adherence | 82 (71.3%) [1] |
| Patient-reported outcomes | |
| Depression (*PHQ9* > *9*) | 46 (37.7%) |
| Anxiety (*GAD7* > *9*) | 45 (36.8%) |
| Satisfaction with Life (*SWLS* > *25*) | 35 (28.7%) |
| Quality of life (*Cantril's ladder scale*) | |
| Thriving | 61 (50.0%) |
| Struggling | 45 (36.9%) |
| Suffering | 16 (13.1%) |

*SD:* standard deviation *ART*: antiretroviral therapy *PHQ9:* Patient Health Questionnaire-9 *GAD7:* General Anxiety Disorder-7 *SWLS*: Satisfaction with Life Scale

[a] *Percentage among those who initiated ART*

**Table 2** HIV stigma score among Black sexual minority men with HIV in Los Angeles ($n=122$)

| | Mean (SD) | Strongly agree or agree *n* (%) |
|---|---|---|
| *Personalized stigma (range 0 – 12)* | 5.148 (4.159) | |
| I have been hurt by how people reacted to learning I have HIV | 1.943 (1.607) | 56 (45.9) |
| I have stopped socializing with some people because of their reactions to my having HIV | 1.828 (1.650) | 51 (41.8) |
| I have lost friends by telling them I have HIV | 1.377 (1.496) | 35 (28.7) |
| *Disclosure concerns (range 0 – 8)* | 5.779 (2.262) | |
| I am very careful who I tell that I have HIV | 3.352 (1.149) | 100 (81.9) |
| I worry that people who know I have HIV will tell others | 2.426 (1.526) | 69 (56.5) |
| *Negative self-image (range 0 – 12)* | 2.893 (3.468) | |
| I feel that I am not as good a person as others because I have HIV | 0.951 (1.316) | 21 (17.2) |
| Having HIV makes me feel unclean | 1.213 (1.506) | 32 (26.3) |
| Having HIV makes me feel that I'm a bad person | 0.730 (1.172) | 15 (12.3) |
| *Public Attitude (range 0 – 8)* | 4.574 (2.479) | |
| Most people think that a person with HIV is disgusting | 2.148 (1.441) | 58 (47.5) |
| Most people with HIV are rejected when others find out | 2.426 (1.354) | 65 (52.3) |
| *Total score (range 0 – 40)* | 18.393 (9.760) | – |

experiencing anxiety [34]. The Cronbach's alpha for GAD-7 among our study participants were 0.89.

*Life Satisfaction*. The Satisfaction With Life Scale (SWLS) was used to evaluate participants' global life satisfaction [35]. This 5-item measure assessed life satisfaction using questions that included, "*In most ways my life is close to my ideal*". Participants answered using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The possible range of SWLS scores was 5—35. Based on prior literature [35], a SWLS score greater than 25 was used to indicate life satisfaction. The Cronbach's alpha of SWLS in the current sample was 0.83.

*Quality of Life*. Quality of life was measured using an abbreviated one-item Cantril Ladder Scale [36]. Specifically, participants were asked, "*Suppose the top of the ladder represents the best possible life for you and the bottom of the ladder the worst possible life. Where on the ladder do you feel you stand at the present time?*". Consistent with prior work, the 0–10 Likert scale was divided into three levels of well-being: *Thriving* (7–10), *Struggling* (5–6), and *Suffering* ($<5$) [37]. Thriving indicates that well-being is strong, consistent, and progressing, and has been previously associated with fewer health problems and more happiness and enjoyment [36].

## Study covariates

We consider including study covariates given the evidence in the literature or the theoretical plausibility of their associations with the study exposures and outcomes. Social support has been previously associated with both HIV stigma and mental health outcomes among people with HIV [38, 39] as have histories of victimization and incarceration [40, 41]. These variables were therefore included in the adjusted model.

*Social support*. Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS) [42]. The MSPSS measures three different sources of support: (1) family, (2) friends, and (3) significant others, with questions like "*There is a special person who is around when I am in need.*" and "*My family is willing to help me to make decisions*". Each item was measured on a 7-point Likert scale and all items were summed to create a total score where higher values indicated greater social support (range: 12–84). The Cronbach's alpha coefficient for the MSSPS in this sample was 0.92.

*Experiences of victimization and incarceration*. We assessed victimization by asking participants a set of questions including "*Were you attacked or harassed*", "*Were you attacked with violence*", and "*have you been a victim of another crime*" in the past year. We also asked if participants whether they had ever been incarcerated in the past 5 years. All four of these variables were coded 1 = *yes* and 0 = *no, and each variable represented a history of victimization or incarceration.*

## Statistical analysis

We used descriptive statistics to summarize the characteristics of the study participants. Bivariate correlation coefficients were calculated between HIV stigma, PROs, and other covariates. To assess the association between HIV stigma and each PRO, we conducted multivariable linear regression controlling for sociodemographic and clinical characteristics and study covariates. All PROs were used as continuous variables. Results are reported as beta coefficient (*b*) with corresponding standard error (SE), and a *p*-value less than 0.05 was considered statistically significant.

## Results

### Characteristics

Among all participants ($n = 122$), the mean age was 37.2 (SD = 12.7, range: 18–74), and 43.4% were born in Los Angeles. About one-third (36.1%) were currently employed, and 37.7% had an annual income of $12,000 or less. Over sixty percent (61.5%) had at least some college education. Nearly all (94.3%) were receiving ART, and over half of those participants (58.3%) had been on ART for more than 5 years. Less than two-thirds (61.7%) reported having a viral load of fewer than 200 copies/ml, and 71.3% indicated being excellent or very good at taking HIV medications. One in three (36.9%) reported being attacked or harassed in the past year, and over a quarter (25.4%) reported that they had been incarcerated in the past 5 years (Table 1).

### HIV stigma and associated factors

Participants scored high on HIV stigma measures (Table 2). Specifically, participants indicated high rates of *Disclosure Concerns*—a majority (81.9%) noted that they were very careful about to whom they tell their HIV status, and over half (56.5%) indicated that they worried that people who know they have HIV would tell others. Regarding *Public Attitude*, over half (52.3%) (strongly) agreed that most people with HIV are rejected when others find out. Nearly half (47.5%) noted that most people think that a person with HIV is disgusting; 45.9% indicated they had been hurt by how people reacted to learning that they had HIV; and 41.8% reported stopping socializing with some people because of their reactions to the participant's HIV disclosure. The correlation coefficients of HIV stigma and all other study key variables are presented in Table 3.

### Patient-Reported outcomes and associated factors

As presented in Table 1, more than one-third (37.7%) of participants screened positive for depression based on PHQ-9 score, and about the same percentage screened positive for anxiety (36.8%). Based on the SWLS, less than one-third (28.7%) of the participants reported being satisfied

**Table 3** Descriptive statistics and correlation matrix of main measures

| | | 1 | 1a | 1b | 1c | 1d | 2 | 3 | 4 | 5 | 6 | Skewness | Kurtosis | Mean (SD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | HIV stigma | – | | | | | | | | | | 0.31 | −0.63 | 1.84 (0.98) |
| 1a | Personalized stigma | 0.85** | – | | | | | | | | | 0.16 | −1.27 | 5.15 (4.16) |
| 1b | Disclosure concerns | 0.69** | 0.46** | – | | | | | | | | −0.92 | 0.08 | 5.78 (2.26) |
| 1c | Negative self-image | 0.78** | 0.48** | 0.36** | - | | | | | | | 0.93 | −0.26 | 2.89 (3.47) |
| 1d | Public Attitude | 0.80** | 0.57** | 0.52** | 0.53** | - | | | | | | −0.29 | −0.92 | 4.57 (2.48) |
| 2 | MSSPS | −0.02* | −0.14* | −0.21* | −0.18 | −0.21* | – | | | | | | | |
| 3 | PHQ9 | 0.44** | 0.32** | 0.22* | 0.41** | 0.41** | −0.25** | – | | | | 0.74 | 0.31 | 8.07 (5.90) |
| 4 | GAD7 | 0.32** | 0.25 ** | 0.20 * | 0.26** | 0.32** | 0.74** | -0.21* | – | | | 0.68 | −0.26 | 8.31 (6.43) |
| 5 | SWLS | −0.36** | −0.25** | −0.20* | −0.33** | −0.37** | −0.48** | −0.36** | 0.20* | – | | −0.08 | −0.83 | 20.5 (7.63) |
| 6 | Ladder Scale | −0.29** | −0.26 ** | −0.12 | −0.23 * | −0.29** | −0.47** | −0.43** | −0.58** | 0.33** | – | −0.46 | 0.47 | 6.46 (2.23) |

*$^{*}p < 0.05$; $^{**}p < 0.01$*

*MSPSS*: Multidimensional Scale of Perceived Social Support

*PHQ9*: Patient Health Questionnaire-9

*GAD7*: General Anxiety Disorder-7

*SWLS*: Satisfaction with Life Scale

**Table 4** Associations between HIV stigma and patient-reported quality of life measures among Black sexual minority men with HIV ($n=122$)

| | PHQ-9 | | GAD-7 | | SWLS | | Ladder scale | |
|---|---|---|---|---|---|---|---|---|
| | *b (SE)* | *p* | *b (SE)* | *p* | *b (SE)* | *p* | *b (SE)* | *p* |
| HIV stigma | **0.235 (0.054)** | ***< 0.001*** | **0.188 (0.061)** | ***0.002*** | **−0.236 (0.069)** | ***< 0.001*** | **−0.053 (0.021)** | ***0.013*** |
| Social support | −0.061 (0.035) | *0.140* | −0.067 (0.040) | *0.122* | 0.131 (0.045) | *0.069* | 0.011 (0.014) | *0.658* |
| Age | | | | | | | | |
| 18–24 | – | – | – | – | – | – | – | – |
| 25–34 | 1.419 (1.574) | *0.230* | 1.633 (1.760) | *0.301* | 4.012 (1.998) | *0.094* | 0.368 (0.626) | *0.918* |
| 35–44 | 2.181 (1.757) | *0.144* | 2.464 (1.964) | *0.185* | 1.369 (2.229) | *0.702* | −0.045 (0.699) | *0.666* |
| 45 and above | 1.625 (1.844) | *0.196* | -0.070 (2.06) | *0.889* | 0.600 (2.339) | *0.843* | −0.158 (0.733) | *0.357* |
| Employment status | | | | | | | | |
| Employed | – | – | – | – | – | – | – | – |
| Unemployed | −0.869 (1.371) | *0.801* | −1.548 (1.532) | *0.405* | −1.859 (1.739) | *0.148* | −0.320 (0.545) | *0.228* |
| Retired | 2.613 (2.674) | *0.463* | 3.686 (2.987) | *0.265* | 3.854 (3.391) | *0.164* | 1.232 (1.063) | *0.113* |
| Disabled | 0.972 (1.381) | *0.473* | 2.036 (1.542) | *0.189* | −0.660 (1.750) | *0.697* | 0.033 (0.549) | *0.950* |
| Decline to answer | 0.611 (3.398) | *0.756* | 1.520 (3.797) | *0.652* | 1.796 (4.310) | *0.776* | 0.504 (1.352) | *0.862* |
| Income level | | | | | | | | |
| < $12,000 | – | – | – | – | – | – | – | – |
| > = $12,000 | −1.216 (1.160) | *0.270* | 0.251 (1.296) | *0.862* | 0.781 (1.471) | *0.556* | 0.140 (0.461) | *0.693* |
| Decline to answer | −0.807 (2.353) | *0.742* | −0.183 (2.629) | *0.951* | -3.967 (2.984) | *0.175* | 0.471 (0.936) | *0.621* |
| Education | | | | | | | | |
| College and above | – | – | – | – | – | – | – | – |
| Some college | 3.058 (1.542) | *0.069* | 1.000 (1.722) | *0.862* | −3.602 (1.955) | *0.054* | −0.532 (0.613) | *0.305* |
| High school and below | 2.284 (1.651) | *0.768* | −0.511 (1.845) | *0.951* | 0.061 (2.094) | *0.957* | −0.265 (0.656) | *0.582* |
| Had been attacked or harassed* | 2.276 (1.188) | *0.068* | 1.054 (1.346) | ***0.435*** | **−3.028 (1.503)** | ***0.046*** | **−1.438 (0.459)** | ***0.002*** |
| Had been attacked with violence* | 0.222 (1.526) | *0.768* | −0.596 (1.704) | *0.605* | −0.346 (1.935) | *0.777* | −0.975 (0.606) | *0.363* |
| Had been a victim of any other crime* | 2.156 (1.583) | *0.310* | 2.882 (1.769) | *0.147* | −2.098 (2.008) | *0.492* | −0.745 (0.630) | *0.508* |
| Had been incarcerated** | 0.801 (1.202) | *0.339* | 0.566 (1.343) | *−593* | 1.643 (1.525) | *0.442* | −0.073 (0.478) | *0.525* |
| Receiving ART | −2.819 (2.287) | *0.263* | **−5.251 (2.555)** | ***0.048*** | **4.960 (2.901)** | ***0.001*** | **1.965 (0.910)** | ***0.042*** |
| Virally suppressed | −0.239 (1.156) | *0.818* | −0.696 (1.291) | *0.586* | 0.590 (1.466) | *0.666* | −0.450 (0.459) | *0.327* |
| Good adherence | 0.214 (1.215) | *0.718* | 1.237 (1.358) | *0.329* | 0.918 (1.541) | *0.684* | 0.552 (0.483) | *0.379* |

Bold values are statistically significant p values of less than or equal to 0.05 b: beta coefficient SE: standard error PHQ9: Patient Health Questionnaire-9 GAD7: General Anxiety Disorder-7 SWLS: Satisfaction with Life Scale

*in the past year; **in the past 5 years

or extremely satisfied with life. Meanwhile, half (50%) indicated *thriving* in terms of quality of life.

The associations between HIV stigma with PROs are presented in Table 4. In multivariable models, participants who experienced higher HIV stigma were more likely to experiencing depression and anxiety ($b=0.235$, $p<0.001$; $b=0.188$, $p=0.002$). Conversely, higher HIV stigma was also associated with lower life satisfaction and quality of life ($b=-0.236$, $p<0.001$; $b=-0.053$, $p=0.013$). Notably, in adjusted models, currently receiving ART was associated with higher GAD-7 score ($b=-5.251$, $p=0.048$), higher life satisfaction and quality of life ($b=4.960$, $p=0.001$; $b=1.965$, $p=0.042$). In addition, being attacked or harassed in the past year were significantly associated with lower life satisfaction and quality of life ($b=-3.028$, $p=0.046$; $b=-1.438$, $p=0.002$). We tested multicollinearity by computing the variance inflation factors for the multivariable model with a cutoff point of 10 and we did not any violations.

## Discussion

This study examined the associations between HIV stigma with patient-reported outcomes among a sample of Black sexual minority men living with HIV. Findings revealed high levels of HIV stigma in this sample of Black sexual minority men living with HIV, which are comparable to those found in other studies examining stigma in the lives of PLWH [20, 43]. We also found that higher levels of HIV stigma were associated with higher likelihood of experiencing depression and anxiety, and lower life satisfaction and quality of life among Black sexual minority men living with HIV.

Participants expressed high levels of concern about HIV disclosure and public attitudes about HIV, similar to a study conducted Quinn et al. among young Black men who have sex with men [44]. Unlike experienced or enacted stigma (e.g., *I have been hurt by how people reacted to learning I have HIV*), both disclosure concerns and public attitudes are *perceived* or *anticipated* stigma, which refer to the degree to which individuals expect that they will experience prejudice, judgment, and discrimination from the community [17]. Another study in San Francisco also noted that compared to their White counterparts, African Americans living with HIV (97% of which were identified as men) were more likely to have higher disclosure and public attitude concerns. They also found that these stigmas were associated with poorer physical and mental health status [43].

The relationship between HIV disclosure stigma and HIV viral suppression is likely complicated and requires more study. For example, a study in South Texas among a primarily Hispanic sample, found that HIV disclosure stigma was positively significantly associated with viral suppression [45]. Future research should examine the effects of different types of HIV stigma on patient-reported outcomes among people with HIV from diverse racial/ethnic backgrounds and the mechanisms driving these associations. In this analysis, higher levels of HIV stigma were associated with adverse mental health outcomes, lower life satisfaction, and poor quality of life after controlling for clinical characteristics including ART initiation, viral load suppression, and medication adherence. These results suggest that HIV stigma may affect patient-reported outcomes independent of treatment outcomes and highlights the need for tailored stigma reduction interventions among Black sexual minority men with HIV. Given the high levels of HIV stigma experienced among Black sexual minority males living with HIV as well as its negative impact on PROs including mental health outcomes, life satisfaction and quality of life, there is an urgent need to design, test, implement, and evaluate tailored stigma reduction interventions among this population. Such interventions must consider the intersectional stigma and discrimination that Black sexual minority males living with may encounter and integrate culturally specific components.

Black sexual minority men living with HIV in this study experienced high rates of mental health challenges. About one in three screened positive for depression and about the same proportion were screened for anxiety, similar to findings from two prior studies [46, 47]. Recent literature suggests that psychological distress such as depression and anxiety are associated with worse HIV treatment outcomes, such as lower medication adherence and likelihood of initiating ART [48, 49]. Therefore, it is critical to provide mental health screening and treatment services for Black sexual minority men with HIV in order to improve their overall mental well-being and minimize adverse HIV treatment outcomes [50]. Our results also suggest that only about a quarter of participants were satisfied with their current life, and half were struggling or suffering in terms of quality of life. These results signal the need to provide comprehensive support along HIV care continuum to address the physical, mental, and social needs of PLWH. Focusing on life satisfaction and quality of life reflect holistic HIV treatment and can be determined by multiple factors, from individual to societal. A longitudinal study conducted in five African countries also noted that increased HIV stigma was related to decreased life satisfaction over time [51]. While romantic partnership [52, 53], higher education and income level [10, 52], sleep quality [11], and social capitol [54] have all been correlated with higher quality of life, these factors have not been well studied among Black sexual minority men with HIV. Notably, more than half of study participants received ART for more than 5 years. Future interventions must address these correlates of life satisfaction and quality of life.

The strengths of the current analysis include the unique characteristics of the study participants and the diversity of the patient-reported outcomes (PROs). However, our study has several important limitations. The small sample size may limit the statistical power. PROs were all self-reported and are subject to recall bias. However, researchers also argue that PROs have the advantage of providing a subjective view of patient's health [9]. Another limitation is that almost all participants in this study were receiving ART. Therefore, the results are not generalizable to Black sexual minority men living with HIV who have not initiated ART. Further studies may consider focusing more on those who do not receive ART as they may experience adverse health outcomes due to the natural progression of HIV/AIDS. In addition, the current study did not assess the intersectional effects such as the syndemics among this population. Future studies should consider applying intersectionality in HIV research among Black sexual minority men living with HIV. Finally, the cross-sectional nature of the study prevents causal inference.

Future longitudinal research is needed to examine the unique effect of HIV stigma on PROs among PLWH over time.

## Conclusions

HIV stigma is a painful reality in the lives of PLWH, and here, among Black sexual minority men living with HIV, it was statistically significantly associated with adverse patient-reported outcomes. Further research should focus on understanding the mechanisms by which HIV stigma impacts health outcomes among this population and to inform tailored stigma reduction interventions that take a holistic view of the health of Black sexual minority men living with HIV. Tackling stigma and reducing its effects are levers to improving patient outcomes, which is imperative to achieve the UNAIDS 4th 90% target among Black sexual minority men living with HIV.

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**Author contributions** CH conceptualized the research questions, conducted the literature review, analyzed the data, and written up the manuscript. IWH and AOM are the principal investigators of the project. All other authors provided feedback on data analysis, analysis interpretation, and manuscript revisions. All authors provided intellectual content to the paper and reviewed and approved the final manuscript.

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**Data availability** The data supporting this study's findings are available from the senior author upon reasonable request.

## Declarations

**Conflict of interest** All authors declared no conflict of interest.

**Ethical approval** Study procedures were reviewed and approved by the Institute of Review Board at the University of California Los Angeles.

**Informed consent** All participants agreed to participate after reviewing the study’s informational letter and provided informed consent.

**Consent for publication** Not applicable.

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**RESEARCH** **Open Access**

# Assessment and determinants of depression and anxiety on a global sample of sexual and gender diverse people at high risk of HIV: a public health approach

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## Abstract

**Background** Sexual and gender diverse people face intersecting factors affecting their well-being and livelihood. These include homophobic reactions, stigma or discrimination at the workplace and in healthcare facilities, economic vulnerability, lack of social support, and HIV. This study aimed to examine the association between such factors and symptoms of anxiety and depression among sexual and gender diverse people.

**Methods** This study is based on a sample of 108,389 gay, bisexual, queer and questioning men, and transfeminine people from 161 countries collected through a cross-sectional internet survey. We developed a multinomial logistic regression for each group to study the associations of the above factors at different severity scores for anxiety and depression symptoms.

**Results** Almost a third (30.3%) of the participants reported experiencing moderate to severe symptoms of anxiety and depression. Higher severity scores were found for transfeminine people (39%), and queer or questioning people (34.8%). Severe symptoms of anxiety and depression were strongly correlated with economic hardship for all groups. Compared to those who are HIV-negative, those living with HIV were more likely to report severe symptoms of anxiety and depression, and the highest score was among those who do not know their HIV status. Transfeminine people were the most exposed group, with more than 80% higher risk for those living with HIV suffering from anxiety and depression. Finally, homophobic reactions were strongly associated with anxiety and depression. The relative risk of severe anxiety and depression was 3.47 times higher for transfeminine people facing transphobic reactions than those with no symptoms. Moreover, anxiety and depression correlate with stigma or discrimination in the workplace and healthcare facilities.

**Conclusions** The strong association between the severity of anxiety and depression, and socioeconomic inequality and HIV status highlights the need for concrete actions to meet the United Nations' pledge to end inequalities faced by communities and people affected by HIV. Moreover, the association between stigma or discrimination and anxiety and depression among sexual and gender diverse people is alarming. There is a need for bold structural public

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health interventions, particularly for transfeminine, queer and questioning people who represent three communities under the radar of national HIV programmes.

**Keywords** LGBT, Gay, Bisexual, Transgender, Queer, Depression, Anxiety, HIV, Homophobia, Stigma and discrimination, PHQ-4

## Background

Stigma and discrimination based on sex, gender identity and sexual orientation significantly impact all aspects of the lives of sexual and gender diverse people [1], including people who identify as lesbian, gay, bisexual, transgender, queer or questioning, and other sexual, sex- and gender-diverse (LGBT) people and people with intersex traits [2–5]. Under International Human Rights Law, discrimination on the basis of sexual orientation is a human rights violation [6]. The first-ever United Nations resolution on sexual orientation and gender identity was published in November 2011. It requested a report by the Office of the High Commissioner for Human Rights, which stated: "Homophobic and transphobic violence has been recorded in all regions. Such violence may be physical (including murder, beatings, kidnappings, rape, and sexual assault) or psychological (including threats, coercion and arbitrary deprivations of liberty). These attacks constitute a form of gender-based violence driven by a desire to punish those seen as defying gender norms" [7]. In this study, we adopted t [8]he definition of stigma from Link and Phelan, who conceptualise stigma as the co-occurrence of labelling, stereotyping, separation ("us" from "them"), status loss and discrimination [9] in which power is exercised [10]. Discrimination happens at an individual level, where one faces unequal treatment [11, 12] and at the structural level, where societies constrain a person's opportunities, resources and well-being [4]. Homophobic reactions entail emotional, intellectual and behavioural reactions [13] towards sexual and gender diverse people. In this study, we consider homophobia as a particular case of stigma or discrimination based on sexual orientation and gender identity [14]. Discrimination based on sexual orientation intersects with other forms of discrimination towards various groups, including those related to race [15, 16], gender identity [17], age [18], HIV status [19], disability, and socioeconomic status [20, 21].

Evidence suggests that stigma and discrimination impede the health and well-being of sexual and gender diverse people [22]. According to the Joint United Nations Programme on HIV/AIDS (UNAIDS) National Commitments and Policy Instrument (NCPI), 70 countries have discriminatory and punitive laws that criminalise people who engage in same-sex sexual relations, and 20 countries criminalise or prosecute transgender people [23]. Consequently, they are less likely to access health services due to stigma and discrimination [24] and bear a disproportionate burden of adverse physical and mental health outcomes [25]. Evidence suggests that factors, such as stigma, discrimination and violence based on sexual orientation and gender identity, and the criminalisation of same-sex sexual behaviour, lead to elevated rates of emotional distress and adverse mental health conditions [18], hindering the availability, access and uptake of prevention, testing, treatment and care for HIV, sexually transmitted infections (STIs), and mental health services [19]. The criminalisation of same-sex sexual behaviour in Africa was found to be correlated with lower rates of HIV testing and higher HIV prevalence among gay men and other men who have sex with men [26]. A study of transgender women in Argentina showed that those who had experienced discrimination in healthcare settings were three times more likely to avoid healthcare settings than those who had not [27].

Sexual and gender diverse people face overlapping forms of vulnerabilities related to mental health conditions [28]. They are at higher risk of anxiety, depression, suicidal ideation, substance misuse, and deliberate self-harm than heterosexual people [29]. Mental health conditions further increase the risk of HIV infection, and people living with and affected by HIV have an increased risk of these conditions, which are, in turn, associated with lower retention in HIV care, increased risk behaviours and lower engagement with HIV prevention [6]. Evidence suggests that sexual and gender diverse adolescents and young people -experience higher rates of depression and anxiety and are disproportionately at risk of self-harm and suicide than other adolescents and young people [30]. The prevalence of depression across surveys of people living with HIV in sub-Saharan Africa is estimated at 24%, compared with less than 3% for the general population [31, 32].

Efforts to improve data collection in sexual and gender diverse people are important for monitoring healthcare outcomes and designing healthcare services and programmes. While sex disparities are well documented in public health through nationally notifiable surveillance data, population studies and sentinel surveillance, they stratify by binary sex and only include male or female sex as assigned at birth, which leads to an incomplete understanding of the burden of disease in sexual and gender diverse communities and limits the effectiveness of health and HIV prevention and care programmes [33]. Moreover, the quantitative evidence of the factors driving mental health disparities in sexual and gender diverse people is particularly deficient in low- and middle-income countries.

This study aims to examine the association between the severity of the symptoms of anxiety and depression and factors affecting the well-being and livelihood of sexual and gender diverse people. Using quantitative methods and the data from a global LGBT survey, the study assesses this relationship for specific factors such as homophobic reactions, stigma or discrimination at the workplace and in healthcare facilities, economic vulnerability, lack of social support, and HIV status among people who self-identify as gay men, bisexual men, transfeminine, and queer or questioning men. The study explores two questions: is there a link between the mental health distress measured by the severity of anxiety and depression symptoms in sexual and gender diverse people and the above socioecological factors? If there is a link, does it differ between selected LGBT communities?

## Methods

The analysis presented here draws on the results of the LGBT + Happiness Survey, which collected data from sexual and gender diverse people aged 18 years and older without geographical restrictions. The survey aimed to generate data for sexual and gender diverse people across countries, providing a snapshot of the population's characteristics of interest and outcomes. It captured information on demographics, economic situation, factors influencing happiness, well-being, health, HIV, stigma or discrimination. The survey also considered challenges faced by sexual and gender diverse populations across countries, such as symptoms of depression and anxiety, and experiences of or apprehension about HIV-related discrimination, including in healthcare or the workplace. The survey design was developed collaboratively by UNAIDS, the LGBT + Foundation, the University of Aix-Marseille, the Medical School of the University of Minnesota, and representatives of the LGBT community.

Consenting sexual and gender diverse participants were recruited between May 2019 and January 2020 through social networks, LGBT activists, more than 300 global, regional, and national LGBT community-based organisations, and development partners. Participation was through an anonymous, self-administered, and encrypted Internet-based questionnaire in 32 languages. Questions could be answered using a computer, mobile phone, tablet, or another Internet-linked device. Community-based organisations provided access to the Internet in several African and Caribbean countries where access to the Internet was limited. The survey purposefully did not use cookies, geographic or other identifiers, thus ensuring anonymous and safe participation. This was important for participants who fall within socially marginalised or stigmatised groups in their country and for people who wish to exercise their right to privacy.

Participants were provided with five options for sexual orientation: attracted to men or who identify as gay; attracted to women or who identify as lesbian; attracted to both women and men or who identify as bisexual; those who identify straight or heterosexual; those who do not know or identify as questioning. Regarding gender identity, options were man, woman, transmasculine, transfeminine, or non-binary. Options for sex at birth were male, female, or person with intersex traits.

More than 115,000 participants from more than 200 countries and territories responded to the survey over the May to December 2019 study period. The attrition rate was 2.2% following a review of completed questionnaires—for example, removing participants under the age of 18. The study's final sample was 197 countries with 112,053 sexual and gender diverse participants, including those who identify themselves as lesbian, gay, bisexual, transgender, queer or questioning, other sexuality, sex- and gender-diverse (LGBT) people, and people with intersex traits. A small proportion of the sample (2%) indicated they were living with intersex traits. The detailed research protocol and the questionnaire (English version) are available in the Supplementary material.

### Participants

Sexuality and gender are fluid concepts and include internalised and externalised aspects of gender expression and sexual orientation. The present analysis considers a subsample of sexual and gender diverse people at higher risk of HIV, including people whose biological sex, sexuality, gender identity or gender expression depart from majority norms. This includes those who identify as (i) gay cisgender men; (ii) bisexual cisgender men; (iii) transfeminine people; and (iv) queer/questioning cisgender men. All categories include people with intersex traits. These categories were built from three standardised questions on sex at birth, self-identification of gender identity and self-identification of attraction (without discriminating between sexual, emotional, or physical attraction). The questions were neither mandatory nor prescriptive, i.e., the survey did not provide a definition for each response, acknowledging that participants are best placed to inform how they identify themselves based on their culture, background and self-perception. In addition, the questions were translated and proof-reviewed in more than 32 languages by members from different sexual and gender diverse communities. Appropriate and respectful language was used for each question and answer. The questionnaire was tested and piloted in a dozen countries to ensure the questions, answers, and vocabulary followed the local interpretations and cultural specificities. The questionnaire is available with this link, and translated versions available upon request.

There were 108,329 participants aged 18 and above in this subsample. The sociodemographic characteristics of the participants are presented in Table 1 and Supplementary Material S1 presents their repartition per country and per gender and sexual identity.

### Description of variables

#### *Dependent variable*

We explored the predictors of symptoms of anxiety and depression among sexual and gender diverse people. Depression and anxiety are the most common mental disorders and frequently occur together. We used the Patient Health Questionnaire (PHQ-4), a cross-cultural validated [31, 34–41] four-item questionnaire set up to detect symptoms of depression and anxiety manifestations among our subsample's sexual and gender diverse groups [42, 43]. It comprises two items on depression: feeling down, depressed, or hopeless; having little interest or pleasure in doing things, and two items on anxiety: feeling nervous, anxious or on edge; not being able to stop or control worrying. Possible answers follow a 4-item Likert scale ranging from 0 (not at all), 1 (several days), 2 (more than half the days) and 3 (nearly every day). The possible scores ranged from 0 to 12. The index was categorised into none (0–2), mild (3–5), moderate (6–8) and severe (9–12). We tested the robustness of the index using the Cronbach alpha coefficient. The value of the scale reliability coefficient was 0.86, which validates the internal consistency of our index.

#### *Independent variables*

A set of socioeconomic control variables were first included for each of the sexual and gender identities included in this study, such as age, education (no education/primary school, secondary school, higher education); Economic vulnerability (struggling on present income, neither struggling nor comfortable, living comfortably on present income) and the recency of HIV test as a proxy of possible risk exposure to HIV [44]. Respondents had to choose between the following options: within the last 6 or 12 months, more than 12 months or never.

Thus, two dichotomous variables related to discrimination and stigmatisation of sexual and gender diverse people: the experience of homophobic or transphobic reactions, considered whether the respondent had ever been intimidated/stared at, and/or verbally insulted, and/or physically assaulted during the last 12 months or more, or not. Stigma and discrimination at the workplace considered whether, in the last 12 months, the respondent had their application refused, was harassed or ridiculed at the workplace, was not promoted, was told not to show them being a member of the sexual and gender diverse people, or was denied certain work-related benefits, because of who they are. Stigma and discrimination in healthcare considered whether, in the last 12 months, the respondent experienced verbal or physical abuse, was given a condition (requirement) to change their sexual behaviour or gender identity, or was refused services.

Finally, models included two sources of perceived social support [45]: family and friend support. These variables were assessed with the following questions: "My family accepts me as I am" and "There is someone I can count on if things go wrong". Possible answers followed a 4-item Likert. The variables were dichotomised between those who agree or strongly agree and those who disagree or strongly disagree.

### Statistical model

The intuitive model to address the research question would be the ordered logistic model. However, such model is conditional on the proportional odds assumption (or parallel regression assumption). This key assumption says that the slope of the logistic function is the same for all category cut-offs of the outcome variable [46]. In the present case, the Brant test [47] concluded that the parallel regression assumption was not met, i.e., the slopes of the four stages of the Patient Health Questionnaire are not parallel. In other words, the differences between each stage were not identical. The test results are presented in Supplementary Material S2. Therefore, we developed a multinomial logistic model to adequately reflect the variable characteristics [48]. This technical choice further enabled us to capture the evolution of the independent variables at different severity scores for depression and anxiety symptoms. The base category was no symptoms of anxiety or depression (score 0). The multinomial logistic regression model detects determinants that increase or decrease the relative risk for a participant to suffer from symptoms of anxiety or depression. Considering the possible biases inherent to convenience-based online sampling methods where participants tend to be younger and more educated [49, 50], we included variables age, education and geographical/continental as covariates in the regressions.

We applied a conservative approach to the sample size, using the criteria of total completion, i.e., the regression models only considered participants who informed all variables in the models. We did not impute missing variables. In addition, we successfully tested whether the participants who did not inform their HIV status could

**Table 1** Sociodemographic characteristics of the participants

| | **Gay cisgender men or with intersex traits** | | **Bisexual cisgender men or with intersex traits** | | **Transfeminine people** | | **Queer or questioning cisgender men or with intersex traits** | |
|---|---|---|---|---|---|---|---|---|
| | **(*N* = 74 730)** | | **(*N* = 14 872)** | | **(*N* = 4 461)** | | **(*N* = 14 326)** | |
| | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** |
| **Individual characteristics** | | | | | | | | |
| **Symptoms of anxiety and depression** | | | | | | | | |
| **None** | 30.8% | 22,999 | 30.6% | 4,552 | 20.1% | 898 | 26.4% | 3,787 |
| **Mild** | 39.3% | 29,423 | 40.0% | 5,949 | 39.5% | 1,762 | 37.7% | 5,394 |
| **Moderate** | 16.8% | 12,578 | 17.3% | 2,569 | 21.0% | 940 | 19.7% | 2,826 |
| **Severe** | 12.4% | 9,274 | 11.5% | 1,705 | 17.9% | 798 | 15.1% | 2,160 |
| **Missing** | 0.6% | 456 | 0.7% | 97 | 1.4% | 63 | 1.1% | 159 |
| **Age groups** | (chi2(2) = 3.8exp03, *p* = 0.000) | | | | | | | |
| **Young adults (18–24)** | 27.37% | 20,450 | 35.59% | 5293 | 37.46% | 1,671 | 35.31% | 5,059.00 |
| **Adults (25–34)** | 37.68% | 28,161 | 38.01% | 5653 | 38.31% | 1,709 | 39.17% | 5,612.00 |
| **Older adults (35 +)** | 34.83% | 26,029 | 26.22% | 3900 | 23.74% | 1,059 | 25.18% | 3,607.00 |
| **Missing** | 0.12% | 90 | 0.17% | 26 | 0.49% | 22 | 0.34% | 48 |
| **Education** | (chi2(2) = 458.80, *p* = 0.000) | | | | | | | |
| **From none to primary education** | 2.6% | 1926 | 3.6% | 541 | 7.4% | 330 | 6.4% | 909 |
| **Secondary education** | 24.2% | 18,053 | 30.3% | 4,508 | 37.7% | 1,680 | 31.1% | 4,460 |
| **Post-secondary or University degree** | 72.9% | 54,504 | 65.6% | 9,754 | 52.6% | 2,345 | 61.2% | 8,773 |
| **Missing** | 0.3% | 247 | 0.46% | 69 | 2.4% | 106 | 1.2% | 184 |
| **Social and economic inequalities** | | | | | | | | |
| **Subjective socioeconomic status** | (chi2(2) = 266.74, *p* = 0.000) | | | | | | | |
| **Lower tercile** | 24.7% | 18,467 | 27.4% | 4,067 | 36.0% | 1,606 | 31.4% | 4,504 |
| **Middle tercile** | 38.8% | 28,991 | 38.1% | 5,667 | 35.8% | 1,597 | 34.5% | 4,947 |
| **Higher tercile** | 35.8% | 26,784 | 33.6 | 4,990 | 25.0% | 1,116 | 32.3% | 4,623 |
| **Missing** | 0.65% | 488 | 1.0% | 148 | 1.8% | 142 | 1.8% | 252 |
| **HIV** | | | | | | | | |
| **HIV status** | (chi2(3) = 2.0exp + 03, *p* = 0.000) | | | | | | | |
| **Negative** | 54.6% | 40,769 | 50.3% | 7,480 | 45.3% | 2,020 | 42.3% | 6,063 |
| **Positive** | 10.9% | 8,161 | 5.7% | 853 | 8.1% | 363 | 8.4% | 1,202 |
| **I don't know** | 17.0% | 12,771 | 22.8% | 3,391 | 22.4% | 1,001 | 22.0% | 3,149 |
| **I don't want to answer** | 3.2% | 2,400 | 4.0% | 593 | 5.5% | 246 | 5.7% | 814 |
| **Missing** | 14.2% | 10,629 | 17.1% | 2,555 | 18.6% | 831 | 21.6% | 3,098 |
| **Stigma and discrimination** | | | | | | | | |
| **Homophobic reactions** | (chi2(1) = 6.7843, *p* = 0.009) | | | | | | | |
| **No** | 28.5% | 21,303 | 37.7% | 5,605 | 23.6% | 1,046 | 31.6% | 4,509 |
| **Yes** | 71.4% | 53,367 | 62.3% | 9,247 | 76.3% | 3,373 | 68.4% | 9,757 |
| **Missing** | 0.08% | 60 | 0.13% | 20 | 0.94% | 42 | 0.42% | 60 |
| **Homophobia at the workplace** | (chi2(1) = 0.7730, *p* = 0.379) | | | | | | | |
| **No** | 82.8% | 61,910 | 82.3% | 12,241 | 65.1% | 2,906 | 76.9% | 11,023 |
| **Yes** | 13.1% | 9,823 | 11.4% | 1,695 | 24.1% | 1,079 | 18.6% | 2,670 |
| **Missing** | 4% | 2,997 | 6.3% | 936 | 10.7% | 476 | 4% | 633 |
| **S&D in healthcare** | (chi2(1) = 44.7508, *p* = 0.000) | | | | | | | |
| **No** | 94.6% | 70,668 | 93% | 13,830 | 84.6% | 3,776 | 89.2% | 12,773 |
| **Yes** | 5.4% | 4,062 | 7% | 1,042 | 15.3% | 685 | 10.8% | 1,553 |
| **Missing** | - | - | - | - | - | - | - | - |
| **Perceived social support** | | | | | | | | |
| **Family** | (chi2(4) = 292.79, *p* = 0.000) | | | | | | | |

**Table 1** (continued)

| | **Gay cisgender men or with intersex traits** | | **Bisexual cisgender men or with intersex traits** | | **Transfeminine people** | | **Queer or questioning cisgender men or with intersex traits** | |
|---|---|---|---|---|---|---|---|---|
| | **(*N* = 74 730)** | | **(*N* = 14 872)** | | **(*N* = 4 461)** | | **(*N* = 14 326)** | |
| | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** |
| **Strongly disagree** | 10.1% | 7,605 | 11.8% | 1,755 | 18.5% | 826 | 12.4% | 1,774 |
| **Disagree** | 16.1% | 12,089 | 16.4% | 2,445 | 19.0% | 847 | 15.0% | 2,158 |
| **Don't know** | 18.6% | 13,877 | 25.8% | 3,840 | 21.9% | 978 | 21.7% | 3,111 |
| **Agree** | 30.3% | 22,618 | 27.7% | 4,122 | 23.8% | 1,060 | 27.4% | 3,925 |
| **Strongly agree** | 24.6% | 18,377 | 18.0% | 2,675 | 15.7% | 702 | 22.9% | 3,287 |
| **Missing** | 0.2% | 164 | 0.2% | 35 | 1.0% | 48 | 0.5% | 71 |
| **Friend** | (chi2(4) = 157.05, *p* = 0.000) | | | | | | | |
| **Strongly disagree** | 5.4% | 4,090 | 6.9% | 1,018 | 10.1% | 451 | 7.1% | 1,012 |
| **Disagree** | 10.9% | 8,168 | 11.8% | 1,752 | 14.4% | 643 | 12.7% | 1,824 |
| **Don't know** | 10.1% | 7,529 | 15.3% | 2,268 | 17.6% | 785 | 16.9% | 2,421 |
| **Agree** | 37.4% | 27,958 | 37.1% | 5,516 | 33.0% | 1,473 | 34.4% | 4,933 |
| **Strongly agree** | 35.9% | 26,850 | 28.8% | 4,283 | 23.8% | 1,063 | 28.4% | 4,071 |
| **Missing** | 0.2% | 135 | 0.2% | 35 | 1.0% | 46 | 0.5% | 65 |

create a systematic bias on the dependent variable. See Supplement S3.

We performed the model for the four sexual and gender diverse groups studied. For each model, we assess the validity of the results. The likelihood ratio showed that the independent variables contribute significantly to the predictions of the model. All statistical regressions and tests were performed on Stata 17, and the results were considered significant at $p < 0.05$.

### Ethical approval

The design of the Global LGBT Happiness Survey used in this study was developed collaboratively by UNAIDS, the LGBT Foundation, the University of Aix-Marseille, the Medical School of the University of Minnesota, representatives of the LGBT community and other stakeholders. The Survey was approved by the Research Board of Ethics of Aix-Marseille University (No. 2019–14-03–004) and the Research Ethics Review Committee of the World Health Organization (No. ERC.0003175). All study methods followed the guidelines and principles of the Declaration of Helsinki and the Sex and Gender Equity in Research (SAGER). Participants had to provide their informed consent prior to accessing the survey. The survey protocol fully complied with the European Union's General Data Protection Regulation (GDPR). Participation was voluntary, and no monetary incentive was given to complete the questionnaire. Participants could skip questions or exit at any stage of the questionnaire. Participants who did not provide a numeric value for age or below 18 were excluded from the study. The survey did not collect any identifier or geolocation data although participants could self-report their country of residence.

### Role of the funding source

The funders of this study had no role in study design, data collection, data analysis, or data interpretation. All authors had full access to the data in the study. EL and BV had final responsibility for the decision to submit for publication.

## Results

### Descriptive statistics

Table 1 presents the sociodemographic characteristics of the sample. Among the 108,389 participants, more than two third (68.9%) identified as gay. Bisexual and queer or questioning participants represent about a seventh of the sample, and transfeminine people account for four per cent of the participants.

The proportion of participants suffering from moderate or severe symptoms of anxiety and depression represents almost a third (30.3%) of the whole sample. We noticed that transgender women are the most affected, with 39% reporting moderate to severe symptoms of anxiety and depression. Participants who identified as queer or questioning are the second most affected group, with 34.8% reporting moderate to severe symptoms of anxiety and depression.

Over a third (37.7%) of the participants are adults aged 25 to 34. The highest proportion among young participants (18- to 24-year-old) are those identifying as transfeminine (37.5%). Most participants hold a post-secondary degree, with gay men having the highest proportion holding a post-secondary degree (72.9%) while transfeminine participants have lower education achievement and the highest proportion (7.4%) having only a primary degree or no formal education. In terms of subjective socioeconomic status, gay men are those with the largest proportion (35.8%) of them in the highest tercile, while transfeminine reported the lowest socioeconomic status, with more than a third (36.0%) of them in the lowest socioeconomic tercile and only a quarter of them in the highest tercile.

The self-reported HIV prevalence among all participants is 9.8%, with the highest HIV prevalence being reported among gay men (10.9%) and the lowest among bisexual men (5.7%). These figures should be considered together with the high proportion of participants unaware of their HIV status (18.7%). Gay men have the lowest rate of unknown HIV status (17.0%). In comparison, more than a fifth of bisexual (22.8%), transfeminine (22.4%) and queer or questioning (22.0%) participants are unaware of their HIV serostatus.

Homophobic, stigmatising, or discriminatory reactions are largely prevalent among all sexual and gender diverse groups, with seven in ten participants reporting having faced such reactions. Bisexual men are the community reporting the lowest percentage (62.3%) of such reactions, while more than three-quarters (76.3%) of transfeminine participants reported facing such reactions.

More than one in seven (14.1%) participants declared facing stigma or discrimination at the workplace. The transfeminine persons reported the highest proportion of stigma or discrimination at the workplace, with a quarter of them (24.1%) facing such stigma or discrimination in the last 12 months. Almost one in five (18.6%) queer or questioning participants declared facing stigma or discrimination at the workplace.

Overall, 6.8% of participants indicated they had suffered from stigma or discrimination at health facilities. Transfeminine persons are the community declaring the highest proportion of stigma or discrimination at a healthcare facility, with 15.3% confronted with it, followed by queer or questioning participants (10.8%).

Gay men reported the highest perceived social support, with more than half (54.9%) having their family supporting them and nearly three quarter (73.9%) benefiting from the support of their friends. Transfeminine reported the lowest level of support from their family (39.5%) and friends (56.8%).

### Statistical models on the severity of anxiety and depressive symptoms

Figures 1, 2, 3 and 4 below present the results of the multinomial regressions for respectively: (i) gay cisgender men or living with intersex traits; (ii) bisexual cisgender men or living with intersex traits people; (iii) transfeminine people; and (iv) queer or questioning cisgender men or living with intersex traits people. The complete regressions tables can be found in Supplement S4.

For gay men, the risk of having severe symptoms of anxiety and depression is 11%% higher (95%CI 1.02—1.23) for those living with HIV. It increases to 27%% (95%CI 1.18—1.38) for those who do not know their HIV status.

Regarding economic vulnerability, the risk of having severe symptoms of anxiety and depression for gay men struggling with present income is 3.18 times that of those living neither comfortably nor struggling on present income. The risk of having severe symptoms is reduced by 48% (95%CI 0.44—0.52) for those living comfortably on their present income. In other terms, economic empowerment is associated with lower symptoms of anxiety and depression, whereas poverty is associated with increased symptoms of anxiety and depression.

Access to social support, whether through family or friend support, decreases the relative risk of having symptoms of anxiety and depression. For each 1-unit increase in family support (ranked from 1 to 5), the risk of having severe symptoms of anxiety and depression decreases by 25.5%. Similarly, for each 1-unit increase in support from friends, the risk of having severe symptoms decreases by 46.2%.

Facing homophobic reactions is strongly associated with increased symptoms of anxiety and depression among gay men. The risk of having severe symptoms is 2.20 times higher (95%CI 2.05—2.38) for gay men who have faced homophobic reactions. Facing homophobia at the workplace increase the risk of suffering of severe symptoms of anxiety and depression as well, with a RRR of 1.87 (95%CI 1.71—2.03).

Figure 2 shows that most results for bisexual men are similar to those of gay men, with one notable exception. The risk of having severe symptoms of anxiety and depression is 42% (95%CI 1.22—1.68) higher for those unaware of their HIV status.

Figure 3 shows that transfeminine people facing economic hardship are 2.87 times (95%CI 2.10—3.93) higher risk of having severe symptoms of anxiety and depression relative to those with no symptoms. The risk of having severe symptoms of anxiety and depression is 67% higher (95%CI 1.08—2.59) for those living with HIV. Transfeminine people who do not know their HIV status have a

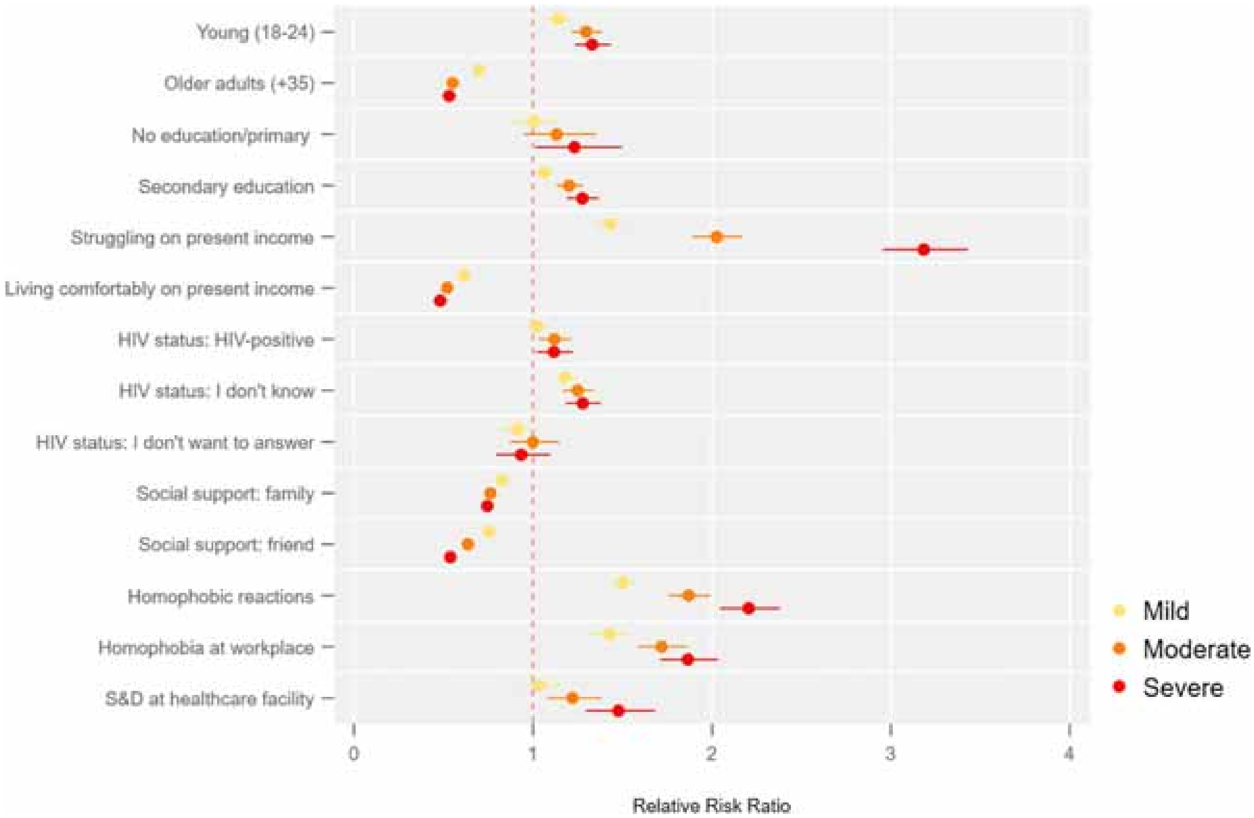

**Fig. 1** Gay cisgender men or living with intersex traits: association between the severity of symptoms of anxiety and depression, and socioeconomic factors

41% higher (95%CI 1.03—1.93) risk of severe symptoms than those with no symptoms.

As the stigmatising and discriminatory reactions faced by transfeminine people increase by one unit, the risk of having severe symptoms of anxiety and depression increases by a factor of 3.47 (95%CI 2.44—4.92) relative to those with no symptoms.

Figure 4 shows that the relative risk of queer or questioning participants having severe symptoms of anxiety and depression is 2.42 times (95%CI 2.04—2.87) that of those living neither comfortably nor struggling on present income.

The risk for queer or questioning people having severe symptoms of anxiety and depression is 31% higher (95%CI 1.11—1.54) for those who do not know their HIV status compared to those who are HIV-negative.

Like transfeminine people, queer or questioning people facing homophobic, stigmatising and discriminatory reactions have a high risk of reporting severe symptoms of anxiety and depression relative to those with no symptoms. Their risk of severe symptoms is multiplied by a factor of 2.72 (95%CI 2.28—3.23) for those who faced homophobic reactions and by 1.91 (95%CI 1.6 – 2.29) for those facing stigma or discrimination at the workplace.

We conducted two post-estimation tests to assess the robustness of our results. First, we have investigated potential multicollinearity issues between the independent variables. The variance inflation factor (VIF) was 1.22, showing that multicollinearity did not threaten our model. We conducted a likelihood ratio test using "mlogtest", a user command [51] for Stata. Results have shown that every independent variable contributes significantly to the model's predictions.

## Discussion

This study explored the role of stigma, discrimination, economic vulnerability, and HIV status in the severity of depression and anxiety symptoms among 108,329 participants, including those living with intersex traits, from 161 countries who identify as transfeminine people, gay, bisexual, and queer or questioning men. Four multinomial logistic regressions enabled us to study the evolution of each predictor on the symptoms of anxiety and depression for each sexual and gender diverse group.

We found that almost a third (30.3%) of the sexual and gender-diverse participants reported suffering from moderate to severe symptoms of anxiety and depression. This proportion rose to almost four in ten (39%) among

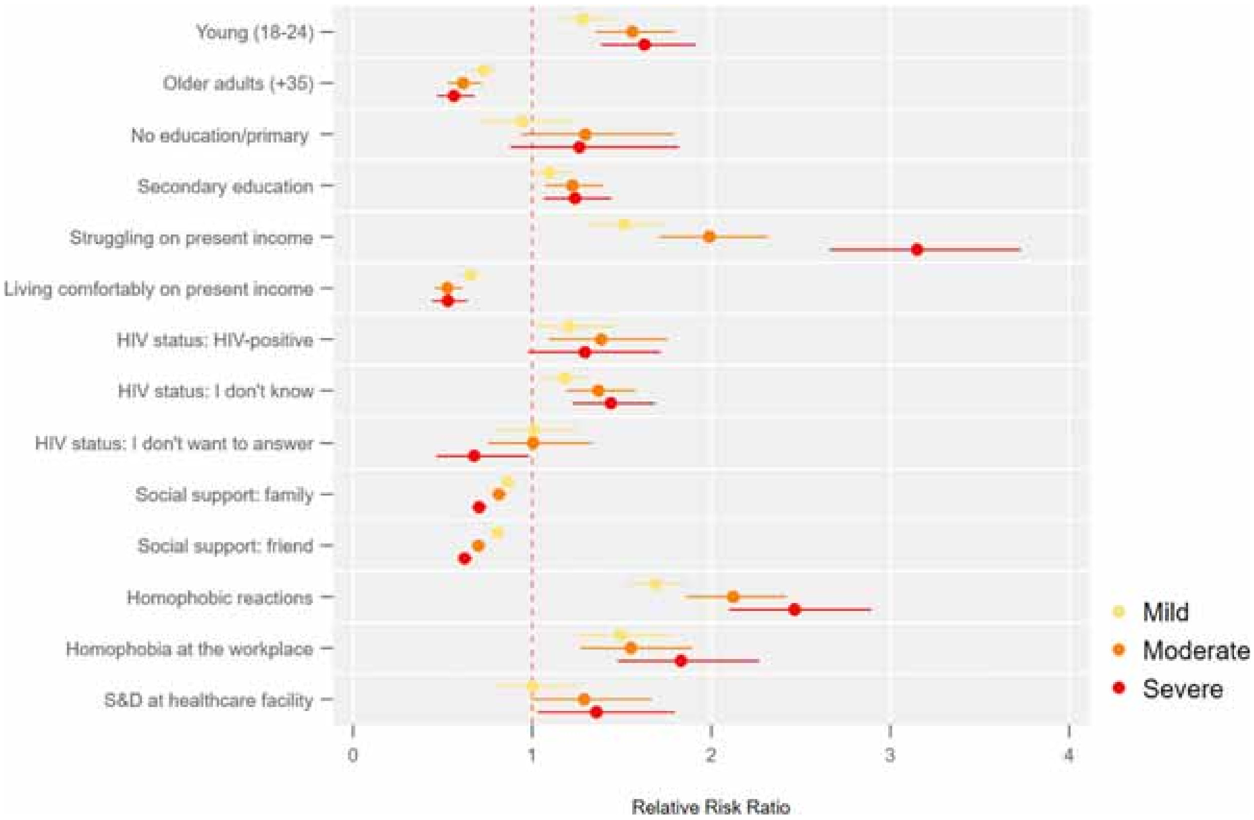

**Fig. 2** Bisexual cisgender men or living with intersex traits: association between the severity of symptoms of anxiety and depression and socioeconomic factors

transfeminine people and more than a third (34.8%) for queer or questioning men. These scores of the severity of anxiety and depression are substantially higher than the ones for the general population, which is around 4% [52].

Overall, we found that for each sexual and gender diverse population group, younger age (except for transfeminine people), low education and income level, seropositivity, homophobic experiences and stigma or discrimination at the workplace and healthcare are associated with a greater risk of suffering from or experiencing severe symptoms of anxiety and depression. In contrast, respondents who have a comfortable income, high levels of family and friends support and who are older tend to have a lesser risk of suffering from severe symptoms of anxiety and depression.

The findings demonstrate the strong association between the severity of depression and anxiety symptoms and economic hardship in all four categories of sexual and gender diverse people. This finding is corroborated by other studies among sexual and gender diverse populations [53, 54] and the general population [55, 56]. This association is particularly acute for gay and bisexual men than for transfeminine people and queer or questioning participants, keeping in mind that participants from the latter two communities are also skewed in the lowest socioeconomic tercile.

The relationship between mental health and HIV risk behaviours has been documented [57], including among sexual and gender-diverse people [58–60]. The study found that the likelihood of reporting severe symptoms of anxiety and depression is significantly higher for those living with HIV [61]. Transfeminine people are the most exposed group, with more than 80% higher likelihood for those living with HIV to suffer from severe symptoms of anxiety and depression. The study further found that gay and bisexual men with severe symptoms of anxiety and depression are statistically more likely to ignore their HIV status. These findings matter as poor mental health is associated with increased HIV risk behaviours such as unprotected anal intercourse, increased number of sex partners, poor HIV continuum of care [62] and negative physical health decisions [63]. It highlights the importance of including mental health support in HIV programmes [61]. This is essential for countries' health systems to reach the sustainable development goal 3 "Ensure healthy lives and promote well-being for all at all ages.

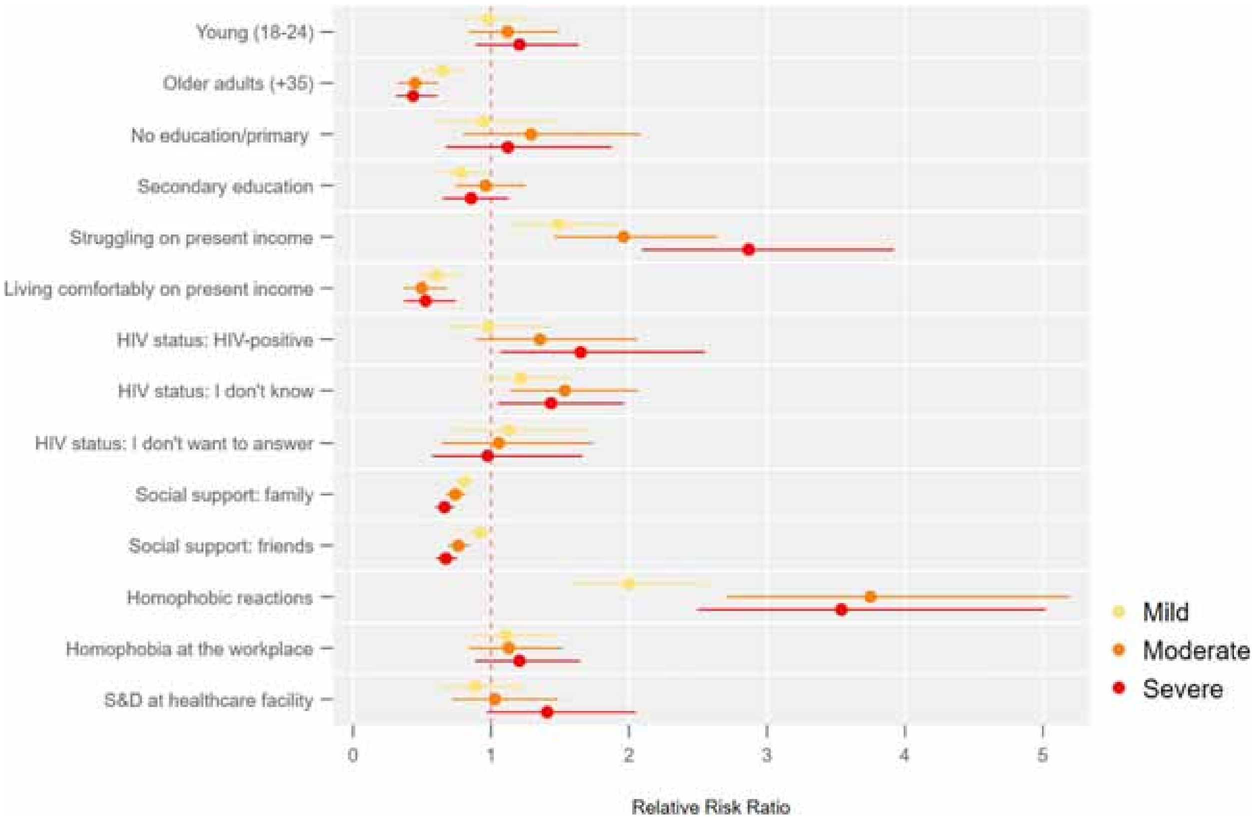

**Fig. 3** Transfeminine people: association between the severity of symptoms of anxiety and depression and socioeconomic factors

The survey demonstrated that the social support provided by family and friends are two essential components associated with no or low symptoms of anxiety and depression. These findings confirm earlier studies [45, 57, 58, 64, 65]. Lower symptoms of anxiety and depression are associated with support from friends among all sexual and gender categories studied. The relation between the two is particularly strong among transfeminine people. Lower symptoms of anxiety and depression among bisexual, queer or questioning men are also strongly associated with support from family. These findings suggest that public health interventions on mental health with sexual and gender diverse people should increasingly consider the importance of social support from family and friends.

The study examined three forms of stigma and discrimination: *i*) homophobic reactions such as being stared at or intimidated, verbally insulted, or physically assaulted because someone knew or presumed one's sexual orientation or gender identity. *ii*) stigma or discrimination at the workplace; and *iii*) stigma at healthcare facilities. We found that the severity of the symptoms of anxiety and depression was strongly associated with stigma or discrimination based on sexual and gender diversity, corroborating findings from other studies [22, 66, 67]. Considering that homophobia is also associated with a reduction in life expectancy of sexual and gender diverse people [68], these findings call for effective measures and legislation to eliminate homophobia, stigma or discrimination at the workplace and in healthcare services as it contributes to better health outcomes and economic growth [14].

The study has several limitations. The first one relates to representativeness. The participants were recruited through online social networks and community-based organisations at global and country-level. It is based on a non-probabilistic, convenience sampling method that is not meant to represent the sexual and gender diverse population of the countries participating in the study. It is generally acknowledged that convenience sampling methods are subject to selection biases compared to probabilistic samples [69, 70]. The degree and direction in which the selection bias of internet convenience sampling may under or overestimate the relationship between sample characteristics and measured outcomes are difficult to predict and control [3, 71]. We identified and included demographic covariates associated with the potential bias described above to reduce but not eliminate the

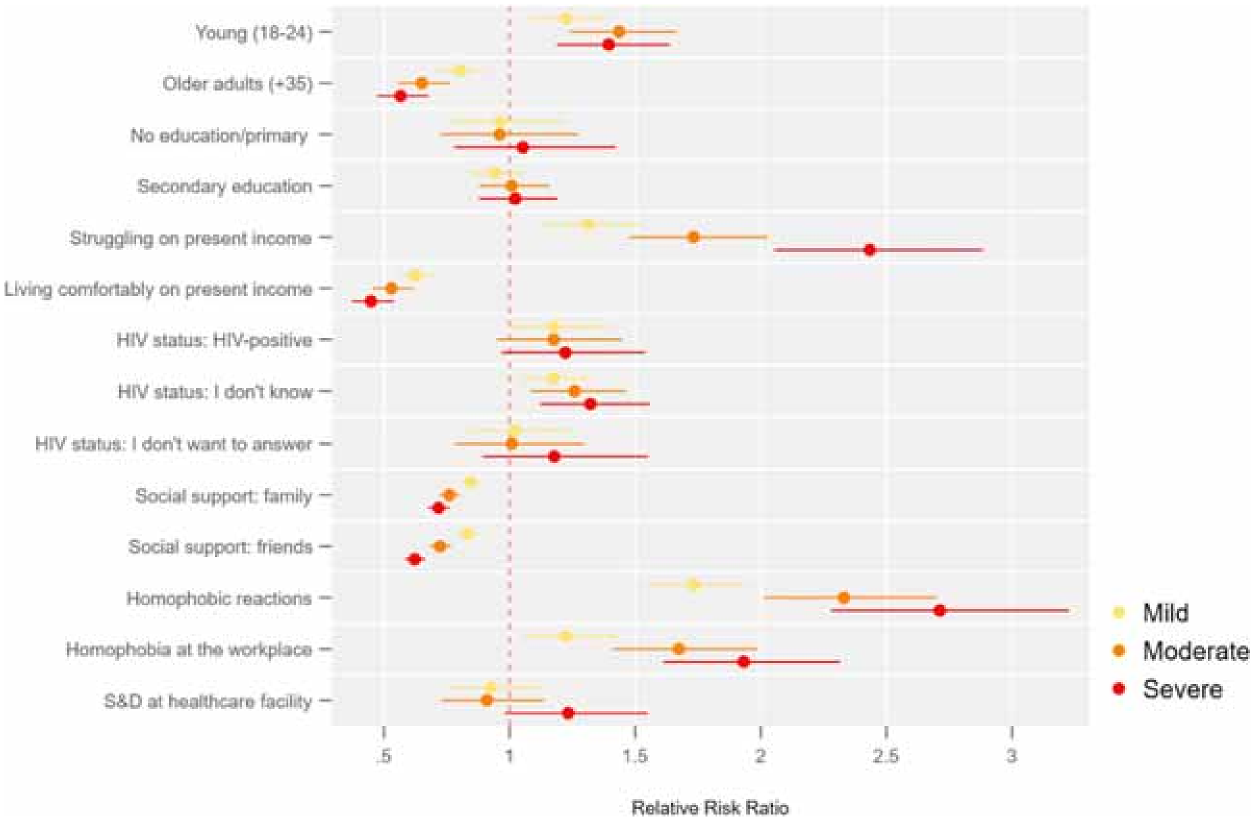

**Fig. 4** Queer or questioning cisgender men or living with intersex traits: association between the severity of symptoms of anxiety and depression and socioeconomic factors

potential bias [72–74]. The survey intended to include the different sexual and gender diverse people. To our knowledge, it is the first time a global survey has tried to reflect this diversity. Nonetheless, the study had to merge population groups into larger categories for the analysis. This is the case, for example, for the queer or questioning category. Following consultations with sexual and gender diverse representatives, this category included participants who identified themselves as gender and sexual diverse people but not as gay and men who have sex with men, bisexual, or transgender people. Additional studies on specific population groups are required to reflect the extraordinary diversity and the cultural differences of the large spectrum of sexual and gender diverse people. To that effect, data are available to researchers upon request. A second limitation relates to the fact that the survey questionnaire was self-administered, making it impossible to assess the accuracy of the information provided by participants. This includes the self-declared HIV status, amongst others. Nevertheless, the participation was voluntary, anonymous and without any incentive. Therefore, we assume participants had little motive to conceal their preference and HIV serostatus. Third, it is worth noting that some instruments used in the study refer to different periods. For example, the last homophobic reaction is measured in months, and the PHQ-4 for symptoms of anxiety and depression refers to the last two weeks. These validated instruments are built based on the expected frequency of the occurrences of the different events they intend to measure. Finally, the statistical model has an underlying limitation. The current model analysed the compounding effect of independent factors on symptoms of anxiety and depression. The size of the effect of each factor reflects its role, considering the existence of the other factors. This is a contribution to the research question; it does not address how these factors intersect and overlap. Future studies could explore the intersectionality of HIV, homophobia, and economic precarity on the levels of anxiety and depression of LGBT communities.

## Conclusions

This study found that severe anxiety symptoms and depression among sexual and gender diverse people were associated with factors such as low education, economic vulnerability, and socioeconomic status. More importantly, the study also identified a strong relationship between HIV-positive status and the severity of symptoms of anxiety and depression. Moreover, the association between severe symptoms of anxiety and depression is the highest among those who ignore their HIV status. These two findings call for urgent and concrete actions to meet the United Nations' Global Targets to End HIV End Inequality. Both findings are particularly acute among transfeminine, queer and questioning people, three communities that are often under the radar of national HIV programmes. The findings also argue for better, more integrated mental health and HIV services. Finally, the association between stigma and discrimination and the severity of symptoms of anxiety and depression among sexual and gender diverse people is alarming and pushes for bold structural public health interventions incorporating community-level interventions alongside health care provision. Decision-makers and practitioners must pursue and intensify their efforts for inclusive public health policies that promote well-being without discrimination.

### Abbreviations

| | |
|---|---|
| CI | Confidence interval |
| COVID-19 | Coronavirus infectious disease 2019 |
| HIV | Human Immunodeficiency Virus |
| LGBT | Lesbian, gay, bisexual and transgender. Short acronym representing all sexual and gender diverse people |
| PHQ-4 | Patient health questionnaire-4 |
| RRR | Relative risk ratio |
| UNAIDS | Joint United Nations Programme on HIV and AIDS |
| WHO | The World Health Organization |

## Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-023-17493-8.

**Additional file 1.** Research protocol.

**Additional file 2: Supplement S1.** Final sample per country and per sexual and gender identity. **S2.** Parallel regression assumption. **Supplement S3.** Tests for the exclusion of participants who did not inform their HIV status from the multinomial regressions. **Supplement S4.** Multinomial logistic regressions per sexual and gender-diverse categories.

### Acknowledgements

The authors thank the 115,000 LGBT individuals who responded to the survey. We thank all the LGBT networks, civil society organisations, community-based organisations, UNAIDS regional and country offices, and partners that promoted the survey. This includes 253 national and transnational civil society organisations, 25 social networking applications and websites, 16 project implementation units of the Global Fund to Fight AIDS, Tuberculosis and Malaria, 38 United Nations Development Programme country offices, 13 country offices of the United States Centers for Disease Control, and 70 UNAIDS regional and country offices. We also thank community activists, and celebrities, including Mr Gay World 2018, Prince Manvendra, and YouTuber Ricardo Perez, for promoting the survey. We thank social networks and 'dating' applications, including Hornet, Blued China, Blued India, DaddyHunt, Gayze, Her, MambaOnline, Scissr, Scruff, Taimi, Tinder, Wapa, and Wapo, who reached potential respondents in particular countries and language groups. Without this help, the survey's success would not have been possible. We are grateful for the support and expertise Laurence Bouvard, Mary Mahy, Keith Sabin, and Antoine Lacombe provided.

All authors contributed to this article in their personal capacity. The views expressed are their own and do not necessarily represent the views of their respective organisations.

### Authors' contribution

EL and SH conceptualised the Global LGBT Happiness Survey. EL, SH and AY collected the data. EL and SH are the exclusive responsible for the data used in this study. EL and BV supervised the data cleaning and encoding. EL conceptualised the study. EL, AY and WP drafted the manuscript. EL and VL conducted the data analysis. EL and BV were primarily responsible for the final content of the manuscript. All authors had full access to all the data in the study. All authors approved the final manuscript.

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### Availability of data and materials

The data supporting the findings will be available from the corresponding author upon request following a 6-month embargo from the publication date. Requests will be examined and considered on a case-by-case basis.

## Declarations

### Ethics approval and consent to participate

All study methods were carried out following the guidelines and principles of the Declaration of Helsinki and the Sex and Gender Equity in Research (SAGER). The Global LGBT Happiness Study research protocol was approved by the Research Board of Ethics of Aix-Marseille University (No. 2019–14-03–004) and by the Research Ethics Review Committee of the World Health Organization (No. ERC.0003175).

Written informed consent was obtained for all study participants prior to accessing the survey. Participants below 18 years old or who did not provide a numerical value for their age were not included in the study. Participation in the survey was voluntary, and no monetary incentive was given to complete the questionnaire. Participants could interrupt the survey at any moment with an exit button on every questionnaire page, and data were immediately and permanently deleted. Participants could skip questions they did not feel comfortable with or did not want to answer. No trackers, identifiers or geolocation data were collected from respondents.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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# Physical and Mental Health Disparities at the Intersection of Sexual and Gender Minority Statuses: Evidence From Population-Level Data

**Lawrence Stacey and Wes Wislar**

**ABSTRACT** Sexual and gender minorities (SGM) experience detriments across many physical and mental health outcomes compared with heterosexual and cisgender people. But little is known about health outcomes for those who are both gender minorities and sexual minorities. Motivated by theories of double disadvantage and leveraging advancements in data collection and measurement, we examine physical and mental health disparities across sexual and gender minority statuses: cisgender heterosexuals, gender minority heterosexuals, cisgender sexual minorities, and people who are both gender and sexual minorities. Using Gallup's National Health and Well-Being Index ($N=93{,}144$) and the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System ($N=543{,}717$), we estimate multivariable logistic regression models to examine how sexual and gender minority statuses are associated with poor/fair self-rated health, functional limitations, and diagnosed depression. Regression models adjusting for sociodemographic characteristics show marked physical and mental health disparities: people who are both gender and sexual minorities report greater odds of poor/fair self-rated health, functional limitations, and depression relative to cisgender heterosexuals and, in some cases, relative to gender minority heterosexuals and cisgender sexual minorities. Our results add to a growing body of research documenting the association between multiple disadvantaged statuses and health and provide novel information on SGM health disparities.

**KEYWORDS** Physical health • Mental health • Double disadvantage • Gender • Sexuality

## Introduction

Evidence across the social sciences—spanning the fields of demography, sociology, public health, and psychology—documents physical and mental health disparities for sexual minority populations across many outcomes relative to heterosexuals (Hsieh and shuster 2021; Liu and Reczek 2021; Meyer 2003). This body of work has proliferated in the past decade, no doubt because of innovations in measurement and data collection and the implementation of such measures to identify sexual and gender minority (SGM)

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populations in state-level and national surveys. Such innovation has pushed the field past its infancy (Gorman et al. 2015). In general, studies have detailed disparities across many physical and mental health outcomes for sexual minorities relative to heterosexual populations (Gorman et al. 2015; Liu and Reczek 2021; Meyer 2003; Stacey et al. 2022). At the same time, burgeoning research has demonstrated that gender minorities bear the burden of worse physical and mental health relative to the cisgender population (Lagos 2018; Stacey et al. 2022). However, population-level data on gender minorities are sparse because of the use of binary sex (male/female) or gender (man/woman) measures in national surveys (Lagos and Compton 2021; Westbrook and Saperstein 2015), reflecting shortcomings of heteronormative and cisnormative thinking (Westbrook and Saperstein 2015; Westbrook et al. 2022).

Although both sexual and gender minorities appear to experience health disadvantages across several measures relative to heterosexual and cisgender individuals, respectively, the extant literature lacks insight into health disparities at the *intersection* of sexual and gender minority statuses. Uncovering how the intersection of these identities relates to health is important, given theoretical evidence about how multiple disadvantaged statuses shape health and well-being (Denise 2014; Gorman et al. 2015) and empirical evidence outlining the compounding health consequences of homophobia, heteronormativity, and transphobia (Gorman et al. 2015; Meyer 2003; Speight 1995). In this study, we provide a comprehensive look at health disparities at the intersection of sexual and gender minority statuses, motivated by the question, How are sexual and gender minority statuses associated with physical and mental health? We pay particular attention to the health of people who are both gender and sexual minorities.

To answer our research question holistically, we conceptualize health using broad measures, ranging from global indicators of health (e.g., self-rated health) to more specific measures (e.g., functional limitations, diagnosed depression). Our outcomes span physical and mental health, providing breadth and depth. This research is also innovative in leveraging recent population-level data (collected between 2018 and 2020) from Gallup's National Health and Well-Being Index (NHWI) and the Centers for Disease Control and Prevention's (CDC) Behavioral Risk Factor Surveillance System (BRFSS). Using two large-scale, population-level data sources makes our work exceptionally suited for documenting health disparities, provides robust findings, and better enables practical application in addressing such disparities among SGM populations (Gates 2013, 2017).

## Background

### Health Disparities for Sexual and Gender Minority Populations

This study builds on extant literature demonstrating relatively worse health outcomes for SGM populations. Compared with cisgender and heterosexual populations, SGM populations report marked differences in health outcomes and health behaviors across numerous dimensions (Hsieh and shuster 2021). For example, relative to heterosexuals, sexual minorities experience worse self-rated health (Fredriksen-Goldsen et al. 2017; Gorman et al. 2015) and more functional limitations hampering daily life (Cohchran et al. 2017). Lesbian, gay, and bisexual populations experience adverse mental health outcomes relative to heterosexuals, reporting greater rates of mental distress and depression (Gonzales and Henning-Smith 2017). Eleven percent of lesbian, gay, and bisexual people report a suicide attempt, compared with only 4% of heterosexual people (Hottes et al. 2016).

The literature also speaks to the relative health disadvantages of gender minorities relative to cisgender individuals. Notably, gender minorities experience disadvantages in global overall assessments of health and more specific outcomes. One study, based on the first multistate sample of the BRFSS in 2014 when the first Sexual Orientation and Gender Identity (SOGI) Module was implemented, showed that the population of transgender and gender-nonconforming individuals experienced elevated odds of poor physical and mental health relative to cisgender populations (Meyer et al. 2017; see also Stacey et al. 2022). More specifically, relative to cisgender populations, gender minorities reported worse self-rated health (Lagos 2018), greater functional limitations (Cicero et al. 2021), and elevated rates of depression (Hyde et al. 2014). Results from the 2015 U.S. Transgender Discrimination Survey demonstrated that a whopping 41% of gender minorities reported attempting suicide, compared with only 1.6% of the general population (Grant et al. 2011). Hughes et al. (2022) used private health insurance data to examine all-cause mortality of U.S. individuals from 2011 to 2019 and found that transgender people were nearly twice as likely to die over the period than their cisgender counterparts—an extreme example of disadvantage among gender minorities. In sum, gender minorities tend to experience worse physical and mental health relative to cisgender populations (Lagos 2018; Stacey et al. 2022).

Self-rated health, functional limitations, and mental health disparities for SGM populations are well-documented in the social sciences. But what about health disparities for those people who are *both* gender and sexual minorities? What might health disparities at these intersections (i.e., cisgender heterosexual, gender minority heterosexual, cisgender sexual minority, both gender minority and sexual minority) reveal about population-level health patterns that have been obscured by analyzing health disparities for sexual minorities relative to heterosexuals or for gender minorities relative to cisgender populations? Shortcomings in population-level surveys' use of binary sex or gender measures (but not both) and small sample sizes in national surveys when SGM populations are identifiable have precluded an in-depth look at physical and mental health disparities at the *intersection* of sexual and gender minority statuses. What little evidence exists on health disparities at this intersection came recently from Finnish population-level data (Källström et al. 2022). Källström and colleagues' study showed that although sexual and gender minorities reported worse mental health than did cisgender and heterosexual people, people who were both sexual and gender minorities were no more likely to experience depression or anxiety than sexual or gender minorities.

In the current study, we build on past work and examine physical and mental health disparities at the intersection of gender minority status and sexual minority status. Empirical evidence outlining disadvantages in global and specific health outcomes for sexual minorities and gender minorities individually implies that those who are marginalized in terms of their gender *and* sexuality might experience worse health than those who are not or those who experience marginalization in their gender *or* sexuality. As Gorman and colleagues (2015) argued, merely summing the number of disadvantaged statuses among sexual and/or minority groups to examine associations with health can obscure heterogeneity (see also Lagos 2018). Therefore, we instead adopt an intercategorical approach and model associations *separately* for cisgender heterosexuals, gender minority heterosexuals, cisgender sexual minorities, and people who are both gender and sexual minorities.

### Theories of Double and Multiple Disadvantage

Scholars have developed the *double disadvantage* hypothesis to advance the notion that health is not determined wholly in the context of one system of stratification (Cho et al. 2013; Dowd and Bengston 1978), such as sexism or racism. Instead, systems of stratification overlap and intersect, disproportionately exposing individuals to disadvantage (Denise 2014; Shi and Wu 2020) and directly and indirectly shaping health and well-being across the life course. Theories of intersectionality (Collins 1990; Crenshaw 1989, 1990) have largely developed independently of theories outlining variegated determinants of health and health disparities (Bauer 2014). Yet, many studies examining health disparities at various intersections (e.g., race, gender, sexual orientation) have implicitly or explicitly drawn on central tenets of intersectionality (Denise 2014; Gorman et al. 2015). For instance, some have acknowledged the ways health is shaped by a number of interacting forces (Bowleg 2012), such as racism, sexism, and homophobia. Disproportionate exposure to disadvantage has also been articulated recently in structural perspectives on health, such as in Everett and colleagues' (2022) notion of "structural heteropatriarchy," which draws attention to the systemic privilege conferred to cisgender men *and* heterosexual individuals.

Many studies have tested the double disadvantage hypothesis empirically, examining how the number of minoritized statuses (e.g., woman, racial minority, sexual minority) is associated with health disparities (Denise 2014). Studies have generally supported evidence of double and multiple disadvantage for sexual orientation. For instance, Black sexual minorities tend to report worse health than White sexual minorities (Choi et al. 2021; Liu et al. 2017). In this body of work, scholars often consider sex/gender to be an important axis of stratification along which material and social resources are unevenly distributed, and this distribution is associated with and shapes men's and women's population-level health. That is, women are disadvantaged in double/multiple disadvantage theory. Gorman and colleagues (2015) examined health at the intersection of gender and sexual orientation, finding a disadvantage for bisexual men and bisexual women relative to heterosexual men, heterosexual women, and gays/lesbians. As Lagos (2018) argued, however, the analysis of population-level health disparities must go beyond "male" and "female" to consider sex/gender in the context of cisgender and transgender and provide a comprehensive health profile at the intersection of sexual minority and gender minority statuses.

There are three primary theoretical reasons to expect accumulating disadvantage at the intersection of sexual and gender minority status and thus to expect that people who are both gender and sexual minorities will experience worse physical and mental health than cisgender heterosexuals and even those who are gender or sexual minorities. The first reason is the greater incidence and severity of discrimination. People who are gender *and* sexual minorities are likely to confront more discrimination relative to gender *or* sexual minorities and relative to cisgender and heterosexual people.

Discrimination is inversely associated with health (Denise 2014; Meyer 2003), allowing us to deduce that more discrimination will translate to a larger health disadvantage for people who are both gender and sexual minorities relative to other groups. Sexual minorities and gender minorities experience considerable interpersonal discrimination (e.g., homophobia and transphobia in personal networks and families-of-origin; Reczek and Bosley-Smith 2022) and structural discrimination (e.g., labor market discrimination, wage penalties, discrimination in the doctor's office; Doan and Grace 2022; Mishel 2016; Mize 2016; Seiler-Ramadas et al. 2021; shuster 2021; Tilcsik 2011). Thus, all else being equal, people who are both gender and sexual minorities will be exposed to more and worse discrimination than people who are only gender minorities, only sexual minorities, and cisgender and heterosexual people, undermining health more often and more powerfully. At the same time, relative to cisgender and heterosexual populations or those who are singly disadvantaged, people who are both gender minorities and sexual minorities likely anticipate more and worse incidents of discrimination, which undermine health, as explained in minority stress theory (Brooks 1981; Meyer 2003).

A second reason to expect worse physical and mental health for people who are both gender and sexual minorities relative to other groups is a greater likelihood of misclassification. Gender and sexuality, in interaction, are performed by social actors and are then perceived by others (West and Zimmerman 1987; Westbrook and Schilt 2014). Incongruence between self-perceived and other-perceived gender classifications appears to matter for health and well-being: being incorrectly classified is associated with worse health (Hart et al. 2019; Lagos 2019). In a recent study, transgender men who were auditorily misclassified as women in a telephone survey experienced poorer self-rated health than transgender men whose gender was not misclassified (Lagos 2019). This study, based on an exploitation of a survey error, suggests an important relationship between gender classification and subjective assessments of health (see also Miller and Grollman 2015). At the same time, gender nonconformity is negatively linked with self-rated health when a person's perceptions of their gender do not align with how they believe others perceive them (Hart et al. 2019). Similarly, a heteronormative society assumes that sexual minorities are heterosexual (Pfeffer 2014; Solebello and Elliott 2011). These classifications can be damaging and stressful (Borinca et al. 2021), undermining health. In sum, people who are both gender and sexual minorities have a greater likelihood of experiencing misclassification, which can influence their health and create considerable stress.

The third theoretical reason to expect double disadvantage at the intersection of sexual and gender minority status is compounding misalignment in the sex–gender–sexuality system (Seidman 1995). Extant sexual identity labels (e.g., lesbian, gay, heterosexual) rely on and reinscribe the gender binary when deployed in social life. For example, classification schemes of sexual identity no longer cohere once taken outside the context of the gender binary. What might "gay" or "heterosexual" mean in the context of a genderqueer or gender-nonbinary person? The theoretical linkages between the sex–gender–sexuality system—the myriad forces suggesting that only two genders exist, gender must always reflect biological sex, and only sexual attraction between those two genders is normal and natural (Schilt and Westbrook 2009)—might lead to heightened dysphoria and stress for individuals who experience misalignment between their sex assigned at birth and current gender identity and sexual identity.

The sex–gender–sexuality system is a powerful disciplinary power, considerably shaping cultural and social forces that could very well be associated with health.

These elements reveal numerous empirical and theoretical reasons to expect accumulating disadvantages at the intersection of sexual and gender minority status. More and worse discrimination, a greater likelihood of misclassification, and compounding misalignment in the sex–gender–sexuality system lead us to expect worse physical and mental health for people who are both gender and sexual minorities relative to cisgender heterosexuals and even relative to gender minority heterosexuals and cisgender sexual minorities. Our study asks, How are sexual and gender minority statuses associated with physical and mental health?

## Methods

### Data

We draw on proprietary data from Gallup's National Health and Well-Being Index and publicly available data from the CDC's Behavioral Risk Factor Surveillance System.[1] The NHWI survey was fielded beginning in 2008, employing a repeated cross-sectional design to sample respondents daily on topics such as health and well-being. Gallup sampled individuals via an address-based sampling frame containing a representative list of all U.S. households in all 50 states and the District of Columbia. NHWI data have been collected from U.S. adults aged 18 and older using a dual mail- and web-based methodology since 2018. The response rate in 2018 was 17.3%. We limit our analysis to data from 2018 and 2019, when detailed sexual and gender identity measures were implemented, permitting analyses to examine health disparities at the intersection of sexual and gender minority statuses.

The BRFSS contains a plethora of physical and mental health information. The longest-running repeated cross-sectional health survey in the United States, the BRFSS recruited respondents via random digit dialing of landline and cellular phones using a household-based probability design. We draw on BRFSS data collected between 2018 and 2020 to draw comparable samples across historical time, garner large enough sample sizes to permit analyses at the intersection of sexual and gender minority statuses across our two data sources, and follow the Gender Identity in U.S. Surveillance (GenIUSS) Group's recommendations for minimizing bias from random and nonrandom error. Administered by each U.S. state and territory's public health department, the BRFSS is a nationwide health survey sampling noninstitutionalized U.S. adults. Starting in 2014, the BRFSS implemented optional Sexual Orientation and Gender Identity Modules with measures to identify transgender and sexual minority respondents. Between 2018 and 2020, 41 states and one U.S. territory included the SOGI Module (see the online appendix, Table S1), permitting a potential sample size of 786,083.

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[1] To our knowledge, Gallup's National Health and Well-Being Index data are not publicly available. At the time of our study, our university (The Ohio State University) had a contract with Gallup granting faculty, staff, and students free access to the Gallup data. Many universities have similar contracts with Gallup, so those interested in working with the data could check with their university or Gallup to inquire.

## Sexual and Gender Minority Status

The NHWI measured sexual identity by asking, "Which of the following do you consider yourself to be? You may select one or more." Response categories included straight or heterosexual, lesbian, gay, bisexual, queer, and same-gender loving. Gender identity was assessed via sex assigned at birth (male or female); current gender identity (man, woman, or transgender); and, for respondents identifying as transgender, "trans woman (male-to-female)," "trans man (female-to-male)," or "nonbinary/genderqueer."

The BRFSS assessed sexual identity by asking respondents, "Which of the following best represents how you think of yourself?" Response categories included lesbian or gay,[2] straight (not gay), bisexual, something else, or don't know. For gender identity, the survey asked respondents, "Do you consider yourself to be transgender?" Respondents who replied affirmatively were asked, "Do you consider yourself to be male-to-female, female-to-male, or gender-nonconforming?"[3] If a respondent was confused about the definition of these terms, interviewers were instructed to provide definitions. If respondents replied negatively, interviewers moved on to other questions.

On the basis of the branching of the (trans)gender measure in both the NHWI and BRFSS, we can identify only those gender minorities who first identified as transgender: nonbinary/genderqueer respondents in the NHWI and gender-nonconforming respondents in the BRFSS indicated that they identified as transgender before identifying with more specific gender minority terms. Some gender-nonbinary, genderqueer, and gender-nonconforming people consider themselves to belong under the transgender umbrella, and others do not; we return to this limitation in the Discussion section. Also important is that the sex/gender measures in the NHWI and BRFSS were worded differently, with the SOGI Module in the BRFSS directly asking people if they identified as transgender and the NHWI survey asking respondents for their sex assigned at birth and current gender identity. Such wording variations might lead to slightly different sample sizes of gender minority respondents and could influence the results.

We created a combined *sexual and gender minority status* variable from these indicators in the NHWI and BRFSS. Respondents were categorized as (1) cisgender heterosexuals if they reported alignment between their sex assigned at birth and their current gender identity or indicated that they were not transgender and identified as straight/heterosexual; (2) gender minority heterosexuals if they reported that their current gender identity did not match their sex assigned at birth or identified as transgender and straight/heterosexual; (3) cisgender sexual minorities if they reported alignment between their sex assigned at birth and their current gender identity or that they were not transgender and identified as anything but straight/heterosexual; or (4) people who

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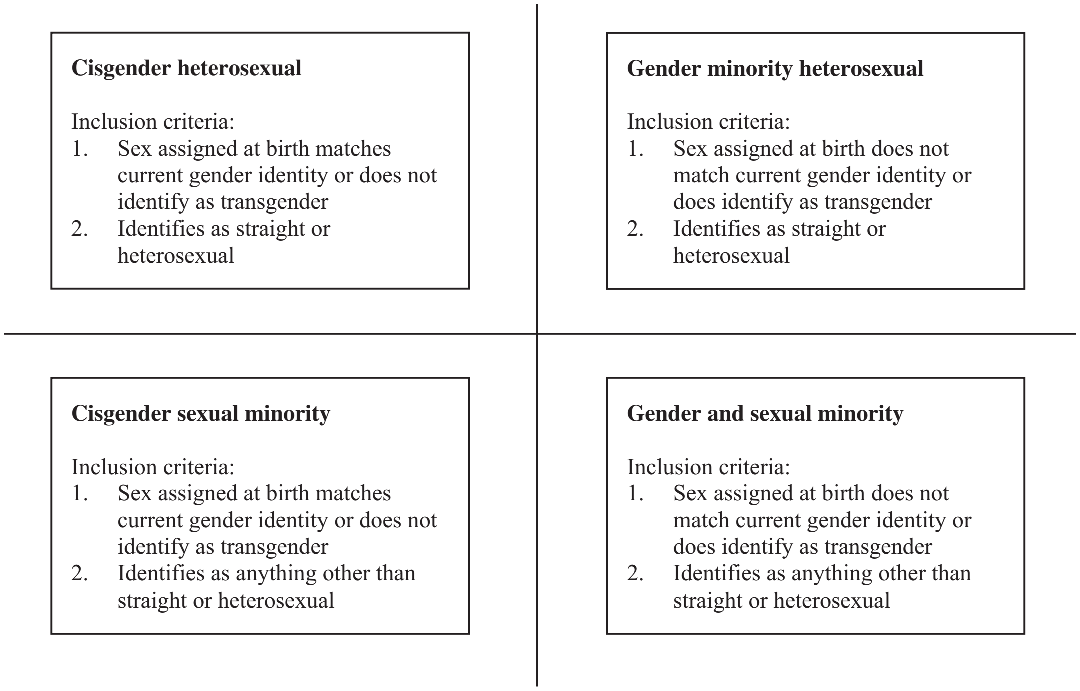
[2] Only those who were identified as female were given the response category of "lesbian or gay." Those identified as male were given only "gay" as a response category.

[3] In both the NHWI and BRFSS, wording of the gender/transgender indicators and accompanying response categories rely on anachronistic terms (e.g., female-to-male) to describe transgender and gender minority individuals and therefore include potentially stigmatizing language. Although these measures permit identification of gender minority populations, and despite the rapid evolution of language to describe sexual and gender minority subpopulations, we echo others' sentiments in encouraging the use of nonstigmatizing language that is as current as possible as it relates to transgender identification processes in national and other surveys (Westbrook and Saperstein 2015).



**Cisgender heterosexual**

Inclusion criteria:

1. Sex assigned at birth matches current gender identity or does not identify as transgender
2. Identifies as straight or heterosexual

**Gender minority heterosexual**

Inclusion criteria:

1. Sex assigned at birth does not match current gender identity or does identify as transgender
2. Identifies as straight or heterosexual

**Cisgender sexual minority**

Inclusion criteria:

1. Sex assigned at birth matches current gender identity or does not identify as transgender
2. Identifies as anything other than straight or heterosexual

**Gender and sexual minority**

Inclusion criteria:

1. Sex assigned at birth does not match current gender identity or does identify as transgender
2. Identifies as anything other than straight or heterosexual

**Fig. 1** Conceptual diagram explaining inclusion criteria for each of the sexual and gender minority statuses

are both gender and sexual minorities if they reported that their current gender identity did not match their sex assigned at birth or identified as transgender and indicated that they were anything but straight/heterosexual (see Figure 1). *Sexual minority* refers to all those who identified as lesbian, gay, bisexual, queer, same-gender loving, or "something else." *Heterosexual* refers to those who identified exclusively as straight or heterosexual. *Gender minority* refers to those whose current gender identity does not align with their sex assigned at birth or those who identified as transgender. *Cisgender* captures those whose current gender identity matches their sex assigned at birth or those who did not identify as transgender. Using these indicators, we can identify unweighted samples of cisgender heterosexuals (NHWI $n=88{,}133$; BRFSS $n=514{,}244$), gender minority heterosexuals (NHWI $n=90$; BRFSS $n=1{,}162$), cisgender sexual minorities (NHWI $n=4{,}752$; BRFSS $n=27{,}326$), and people who are both gender and sexual minorities (NHWI $n=169$; BRFSS $n=985$).

## Dependent Variables

We assess physical and mental health with three outcomes: self-rated health, functional limitations, and diagnosed depression.[4]

In the NHWI and BRFSS, *self-rated health* was measured with a question asking respondents to indicate the general quality of their health as excellent, very good, good, fair, or poor. We dichotomized self-rated health (0 = excellent, very good, or

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[4] In the BRFSS, each state and U.S. territory included self-rated health, functional limitations, and depressive disorders measures as part of core general health, disability, and chronic health modules.

good; 1 = fair or poor). Self-rated health is an independent predictor of mortality and morbidity and is a robust and important global dimension of health status (Idler and Benyamini 1997; Jylhä 2009).

In the NHWI, the presence of *functional limitations* was operationalized via the question, “Do you have any health problems that prevent you from doing any of the things people your age normally can do?” We categorized individuals in the BRFSS sample as having functional limitations if they responded yes to any one of the following questions: (1) “Do you have serious difficulty walking or climbing stairs?”; (2) “Do you have difficulty dressing or bathing?”; and (3) “Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor’s office or shopping?” This variable, for both surveys, is measured dichotomously (0 = no functional limitation; 1 = has functional limitation).

For *diagnosed depression*, respondents in the NHWI were asked whether a doctor, nurse, or other health professional ever told them that they had depression. Respondents in the BRFSS were asked if they were ever told they had “a depressive disorder (including depression, major depression, dysthymia, or minor depression).” For both surveys, this variable is measured dichotomously (0 = no; 1 = yes).

## Covariates

We first adjust for age (in years), race and ethnicity (0 = White; 1 = Black; 3 = Latinx; 4 = other), region of the country (0 = South; 1 = non-South), and survey year (0=2018; 1=2019; 2=2020).[5] We then adjust for current employment status (0 = not employed; 1 = employed), education (0 = less than college; 1 = college education or more), annual household income (0 = less than $60,000 in the NHWI and less than $50,000 in the BRFSS; 1 = $60,000 or more in the NHWI and $50,000 or more in the BRFSS), health insurance coverage (0 = yes; 1 = no), marital status (0 = not married; 1 = married), and whether the respondent has any residential children (0 = no; 1 = yes).

Models adjust for sociodemographic, socioeconomic, and family characteristics that might confound the relationship between sexual and gender minority statuses and health. We adjust for age to account for birth cohort differences in sexual and gender minority identification and the well-established relationship between aging and declines in health (Hammack et al. 2018; Liu and Reczek 2021). Race and ethnicity have been shown to influence health because of racism and other structural forces that disproportionately affect people of color (Gee and Ford 2011); people of color report worse health and are simultaneously more likely to identify as sexual minorities (Bridges and Moore 2018). Region is important to adjust for because SGM identification varies by region of residence, and people who live in the South tend to report worse health (Levi et al. 2015; Rosenfeld 2007; Stone 2018). Studies pooling data across multiple years commonly adjust for survey year (Lagos 2018; Reczek et al. 2017). We control for several socioeconomic characteristics because of variation in education, employment, and income by sexuality and gender (Mishel 2016; Mize 2016) and because of well-established empirical and theoretical work outlining

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[5] NHWI data are available only for 2018 and 2019.

how socioeconomic status shapes health and well-being (Link and Phelan 1995). Finally, we adjust for marital status and the presence of children because marriage and parenting influence health (Liu and Umberson 2008; Waite 1995), and SGM people are less likely to marry and have children (Hsieh and Liu 2019).

### Analytic Plan

We first show unweighted sample sizes and weighted percentages/means and standard deviations across all outcomes and our independent variable and covariates. We then present bivariate results from Wald tests for our outcomes and covariates stratified by sexual and gender minority statuses, comparing (1) gender minority heterosexuals, (2) cisgender sexual minorities, and (3) people who are both gender and sexual minorities with cisgender heterosexuals. We then estimate multivariable logistic regression models to compare how (1) gender minority heterosexuals, (2) cisgender sexual minorities, and (3) people who are both gender and sexual minorities fare relative to cisgender heterosexuals. We also conduct pairwise comparisons to analyze whether SGM groups experience health disparities relative to one another. All analyses are conducted in Stata, version 15. To achieve population representation, we assign survey weights to each respondent using the *svyset* command based on the survey year.[6] The BRFSS weights also accommodate the complex sampling design, adjust for item nonresponse, and reflect the state's population. For ease of interpretation, we present our regression estimates in odds ratios (ORs). However, ORs are relative and do not provide information in the natural metric of the dependent variable (Mize 2019; Mood 2010). Consequently, we also use the suite of margins commands in Stata (Long and Freese 2014) to estimate, as a function of sexual and gender minority statuses, the predicted probabilities of reporting (1) poor/fair self-rated health, (2) functional limitations, and (3) diagnosed depression.

## Results

### Descriptive Results

Table 1 shows weighted descriptive statistics for the NHWI and BRFSS samples. Estimates of the gender minority heterosexual population range from 0.11% to 0.22%, cisgender sexual minorities represent 5.9% to 6.8% of the population, and estimates for people who are both gender and sexual minorities are about 0.24% to 0.36% of the population. From these data, SGM populations in both data sets appear to make up approximately 6% to 7% of the population, which is in line with estimates from other recognized population-level data sources (Gates 2017). The prevalence estimates of

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[6] Gallup created weights to reflect the U.S. population according to age, race, Hispanic ethnicity, gender, education, region, and population density, drawing on data from Current Population Surveys for adults and Nielsen Claritas statistics for metropolitan statistical areas. Population density targets are based on the most recent U.S. Census data. Information on the BRFSS creation of weights can be found online at https://www.cdc.gov/brfss/annual_data/annual_data.htm.

**Table 1** Characteristics of the study population, National Health and Well-Being Index (NHWI) and Behavioral Risk Factor Surveillance System (BRFSS)

| | NHWI | | BRFSS | |
|---|---|---|---|---|
| | Unweighted Sample Size (*n*) | Weighted Mean (SD) / % | Unweighted Sample Size (*n*) | Weighted Mean (SD) / % |
| Poor or Fair Self-rated Health | 12,826 | 15.06 | 93,128 | 16.62 |
| Functional Limitations | 21,994 | 22.19 | 98,854 | 15.70 |
| Diagnosed Depression | 19,524 | 21.90 | 108,187 | 19.29 |
| Sexual and Gender Minority Status | | | | |
| Cisgender heterosexual | 88,183 | 92.73 | 514,244 | 93.63 |
| Gender minority heterosexual | 90 | 0.11 | 1,162 | 0.22 |
| Cisgender sexual minority | 4,752 | 6.80 | 27,326 | 5.91 |
| Gender and sexual minority | 169 | 0.36 | 985 | 0.24 |
| Age | | 46.67 (17.31) | | 48.46 (17.45) |
| Race | | | | |
| White | 76,684 | 67.12 | 420,690 | 65.05 |
| Black | 5,338 | 10.30 | 42,059 | 12.33 |
| Latinx | 5,645 | 14.78 | 37,199 | 15.09 |
| Other | 5,477 | 7.80 | 43,769 | 7.53 |
| Region | | | | |
| Non-South | 61,426 | 62.94 | 362,239 | 57.65 |
| South | 31,718 | 37.06 | 176,910 | 42.28 |
| Guam | — | — | 4,568 | 0.07 |
| Year | | | | |
| 2018 | 87,283 | 93.71 | 182,141 | 31.71 |
| 2019 | 5,861 | 6.29 | 180,314 | 29.72 |
| 2020 | — | — | 181,262 | 38.56 |
| Employment | | | | |
| Not employed | 35,479 | 30.37 | 253,669 | 40.53 |
| Employed | 57,665 | 69.63 | 290,048 | 59.47 |
| Education | | | | |
| Less than college | 47,197 | 64.81 | 323,448 | 70.12 |
| College education or more | 45,947 | 35.19 | 220,269 | 29.87 |
| Income | | | | |
| <\$60,000 (NHWI); <\$50,000 (BRFSS) | 42,352 | 51.00 | 252,931 | 46.67 |
| ≥\$60,000 (NHWI); ≥\$50,000 (BRFSS) | 50,792 | 49.00 | 290,786 | 53.33 |
| Has Health Insurance | 88,612 | 90.60 | 502,582 | 88.47 |
| Union Status | | | | |
| Not married | 40,375 | 44.45 | 253,328 | 47.28 |
| Married | 52,769 | 55.55 | 290,389 | 52.72 |
| Residential Children | | | | |
| No | 70,214 | 63.87 | 394,061 | 63.31 |
| Yes | 22,930 | 36.13 | 149,656 | 36.69 |
| *N* | 93,144 | | 543,717 | |

self-reported poor/fair health are 15.1% and 16.6%, whereas the percentages living with a functional limitation are 15.7% to 22.2%. Finally, 19.3% and 21.9% reported having been diagnosed with depression by a health professional.

Table 2 presents the NHWI and BRFSS weighted percentages and means for all outcome variables and covariates stratified by sexual and gender minority statuses. Evidence for unadjusted health disparities at this important intersection is clear at the bivariate level. Cisgender sexual minorities and people who are both gender and sexual minorities reported elevated rates of poor/fair self-rated health, any functional limitation, and depression diagnoses in both data sources. For example, prevalence estimates for people who are both gender and sexual minorities are 26.8% and 32.9% for poor/fair self-rated health, 33.0% and 45.0% for functional limitations, and 56.5% and 69.4% for depression. Relative to cisgender heterosexuals, gender minority heterosexuals experienced health disparities in functional limitations and depression in the BRFSS data. However, no significant differences were evident at the bivariate level in the NHWI data.

We now turn to demographic characteristics. Despite their higher rates of poor/fair self-rated health, functional limitations, and depression, cisgender sexual minorities and people who are both gender and sexual minorities are considerably younger than cisgender heterosexuals, who are the oldest in the sample, on average; this is in line with evidence suggesting that younger people are more likely to identify as sexual minorities, gender minorities, or both (Liu and Reczek 2021). Descriptive results also show that relative to cisgender heterosexuals, cisgender sexual minorities and people who are both gender and sexual minorities are less likely to be White (see Bridges and Moore 2018). Results for region are inconsistent across data sources. NHWI data suggest that a lower proportion of people who are both gender and sexual minorities reside in the South relative to cisgender heterosexuals, whereas BRFSS data suggest that residence in the South is higher for gender minority heterosexuals and lower for cisgender sexual minorities relative to cisgender heterosexuals.

Table 2 further shows important differences in socioeconomic status and family characteristics by sexual and gender minority statuses. BRFSS data show that people who are both gender and sexual minorities experience lower rates of employment because of unemployment or choice. Similarly, BRFSS data show that gender minority heterosexuals, cisgender sexual minorities, and people who are both gender and sexual minorities are less likely to have a four-year college degree than cisgender heterosexuals. The evidence regarding household income is clear: in the NHWI and BRFSS, gender minority heterosexuals, cisgender sexual minorities, and people who are both gender and sexual minorities are likelier to have household incomes below $60,000 or $50,000, respectively. Similarly, in both data sources, cisgender sexual minorities have lower rates of health insurance coverage than cisgender heterosexuals. However, BRFSS data also show significantly lower rates of health insurance coverage for gender minority heterosexuals and people who are both gender and sexual minorities. Our estimates for marital status are in line with other national estimates (Hsieh and Liu 2019): cisgender sexual minorities and people who are both gender and sexual minorities are less likely to be married than cisgender heterosexuals. Finally, in both data sets, cisgender heterosexuals are more likely than cisgender sexual minorities to have residential children. BRFSS data also suggest that gender minority heterosexuals and people who are both gender and sexual minorities are

**Table 2** Percentages and means (and standard deviations) by sexual and gender minority status

| | NHWI ($N$=93,144) | | | | BRFSS ($N$=543,717) | | | |
|---|---|---|---|---|---|---|---|---|
| | Cisgender Heterosexual | Gender Minority Heterosexual | Cisgender Sexual Minority | Gender Minority and Sexual Minority | Cisgender Heterosexual | Gender Minority Heterosexual | Cisgender Sexual Minority | Gender Minority and Sexual Minority |
| Poor or Fair Self-rated Health | 14.55 | 20.68 | 20.88*** | 32.85** | 16.37 | 15.18 | 20.10*** | 26.77*** |
| Functional Limitation | 21.60 | 24.72 | 28.98*** | 45.00*** | 15.38 | 25.58** | 19.59*** | 33.04*** |
| Diagnosed Depression | 20.31 | 21.45 | 41.10*** | 69.36*** | 18.01 | 27.75** | 37.70*** | 56.46*** |
| Age | 47.32 | 45.79 | 38.47*** | 34.31*** | 49.07 | 47.60 | 39.50*** | 32.41*** |
| | (17.39) | (16.05) | (14.17) | (9.84) | (17.39) | (18.01) | (15.82) | (12.63) |
| Race | | | | | | | | |
| White | 67.97 | 49.53* | 56.79*** | 49.42** | 65.51 | 52.26*** | 58.60*** | 56.21** |
| Black | 10.15 | 17.06 | 12.52 | 4.96* | 12.28 | 18.76* | 12.90 | 9.97 |
| Hispanic/Latinx | 14.22 | 15.48 | 21.50*** | 32.63** | 14.77 | 20.68 | 19.60*** | 22.65* |
| Other | 7.66 | 17.94 | 9.19* | 13.00 | 7.43 | 8.30 | 8.90*** | 11.16* |
| Region | | | | | | | | |
| Non-South | 62.85 | 49.67 | 63.83 | 73.29* | 57.45 | 49.37* | 60.98*** | 61.63 |
| South | 37.15 | 50.33 | 36.17 | 26.71* | 42.48 | 50.37* | 38.94*** | 38.27 |
| Guam | — | — | — | — | 0.07 | 0.26* | 0.08 | 0.10 |
| Year | | | | | | | | |
| 2018 | 93.62 | 94.75 | 95.06** | 91.17 | 31.83 | 37.88 | 29.92*** | 25.38* |
| 2019 | 6.38 | 5.25 | 4.94** | 8.83 | 29.68 | 29.96 | 30.25 | 32.47 |
| 2020 | — | — | — | — | 38.49 | 32.15 | 39.83* | 42.15 |
| Employment | | | | | | | | |
| Not employed | 30.49 | 21.34 | 28.83 | 30.77 | 40.54 | 46.85 | 39.94 | 47.28* |
| Employed | 69.51 | 78.65 | 71.17 | 69.23 | 59.46 | 53.15 | 60.06 | 52.72* |

**Table 2** (continued)

| | NHWI (*N*=93,144) | | | | BRFSS (*N*=543,717) | | | |
|---|---|---|---|---|---|---|---|---|
| | Cisgender Heterosexual | Gender Minority Heterosexual | Cisgender Sexual Minority | Gender Minority and Sexual Minority | Cisgender Heterosexual | Gender Minority Heterosexual | Cisgender Sexual Minority | Gender Minority and Sexual Minority |
| Education | | | | | | | | |
| Less than college | 64.69 | 69.57 | 66.08 | 71.15 | 69.96 | 79.91*** | 72.15*** | 80.73*** |
| College education or more | 35.31 | 30.43 | 33.92 | 28.85 | 30.04 | 20.09*** | 27.85*** | 19.27*** |
| Income | | | | | | | | |
| <$60,000 (NHWI); <$50,000 (BRFSS) | 49.83 | 64.92* | 65.38*** | 76.39*** | 45.87 | 62.88*** | 57.87*** | 66.11*** |
| ≥$60,000 (NHWI); ≥$50,000 (BRFSS) | 50.17 | 35.08* | 34.62*** | 23.61*** | 54.13 | 37.12*** | 42.13*** | 33.89*** |
| Has Health Insurance | | | | | | | | |
| No | 9.14 | 7.48 | 12.45*** | 18.80 | 11.26 | 16.61* | 15.41*** | 16.78* |
| Yes | 90.86 | 92.52 | 87.55*** | 81.20 | 88.74 | 83.39* | 84.59*** | 83.21* |
| Union Status | | | | | | | | |
| Not married | 42.46 | 40.59 | 72.47*** | 81.41*** | 45.70 | 52.44* | 70.71*** | 81.73*** |
| Married | 57.74 | 59.41 | 27.53*** | 18.59*** | 54.30 | 47.56* | 29.29*** | 18.27*** |
| Residential Children | | | | | | | | |
| No | 63.25 | 69.67 | 72.16*** | 66.07 | 63.02 | 70.84** | 67.01*** | 76.40*** |
| Yes | 36.75 | 30.33 | 27.84*** | 33.93 | 36.97 | 29.16** | 32.99*** | 23.60*** |
| Unweighted *n* | 88,133 | 90 | 4,752 | 169 | 514,244 | 1,162 | 27,326 | 985 |

*Notes:* Wald tests were conducted to compare outcomes and covariates stratified by sexual and gender minority statuses, with cisgender heterosexuals as the reference group. Standard deviations are shown in parentheses.

*Sources:* National Health and Well-Being Index (NHWI) and Behavioral Risk Factor Surveillance System (BRFSS).

*$p<.05$; **$p<.01$; ***$p<.001$

less likely than cisgender heterosexuals to have coresident children. Of course, many of these differences are not surprising given the younger average ages for cisgender sexual minorities and people who are both gender and sexual minorities. That is, age differences by sexual and gender minority statuses likely contribute substantially to many other observed demographic differences.

## Regression Results

### *Self-rated Health*

Table 3 shows ORs from logistic regression models predicting poor/fair self-rated health as a function of sexual and gender minority statuses. Models 1 and 3 adjust for age, race and ethnicity, region, and survey year for NHWI and BRFSS data, respectively. Model 1 shows higher rates of poor/fair self-rated health for cisgender sexual minorities (OR = 1.79; $p < .001$) and people who are both gender and sexual minorities (OR = 3.69; $p < .001$) relative to cisgender heterosexuals. Pairwise comparisons further show that people who are both gender and sexual minorities are also more likely than cisgender sexual minorities to report poor/fair self-rated health. Model 3 generally confirms the same pattern of results: poor/fair self-rated health is higher among cisgender sexual minorities (OR = 1.62; $p < .001$) and people who are both gender and sexual minorities (OR = 2.94; $p < .001$) than among cisgender heterosexuals. Pairwise comparisons based on BRFSS data but with a much larger sample size demonstrate that cisgender sexual minorities are disadvantaged relative to gender minority heterosexuals. Further, these comparisons show that people who are both gender and sexual minorities are also disadvantaged in the odds of self-reported health relative to gender minority heterosexuals and cisgender sexual minorities.

Models 2 and 4 of Table 3 show fully adjusted odds ratios after controlling for age, race and ethnicity, region, year, employment, education, income, health insurance coverage, marital status, and residential parent status from the NHWI and BRFSS, respectively. Results show that cisgender sexual minorities and people who are both gender and sexual minorities still experience greater odds of poor/fair self-rated health relative to cisgender heterosexuals, although the odds ratios have been attenuated. Model 4 demonstrates that gender minority heterosexuals experience *lower odds* of poor/fair self-rated health relative to cisgender heterosexuals (OR = 0.68; $p < .01$). Pairwise comparisons in Model 4 illuminate within-group variation: cisgender sexual minorities are disadvantaged relative to gender minority heterosexuals, whereas people who are both gender and sexual minorities are disadvantaged relative to gender minority heterosexuals and cisgender sexual minorities. The NHWI and BRFSS data suggest that even after we adjust for sociodemographic, socioeconomic, and family characteristics—some of which likely absorb some of the association between sexual and gender minority status and self-rated health (e.g., income, marital status)—people who are marginalized in both gender and sexuality are more than twice as likely as cisgender heterosexuals to have poor/fair self-rated health.

Figure 2 shows predicted probabilities of poor/fair self-rated health by sexual and gender minority statuses based on results from fully adjusted models. Probabilities of poor/fair self-rated health are 14.6% and 16.3% for cisgender heterosexuals, 12.1%

**Table 3** Logistic regression results predicting self-rated health: Odds ratios, with 95% confidence intervals shown in parentheses

| | NHWI | | BRFSS | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Sexual and Gender Minority Status (ref. = cisgender heterosexual) | | | | |
| Gender minority heterosexual | 1.47 | 1.53 | 0.85 | 0.68** |
| | (0.66, 3.29) | (0.65, 3.61) | (0.64, 1.13) | (0.61, 0.91) |
| Cisgender sexual minority | 1.79*** | 1.46*** | 1.62***[a] | 1.38***[a] |
| | (1.58, 2.03) | (1.28, 1.67) | (1.52, 1.74) | (1.29, 2.48) |
| Gender and sexual minority | 3.69***[b] | 2.60**[b] | 2.94***[a,b] | 2.02***[a,b] |
| | (2.15, 6.32) | (1.50, 4.51) | (2.25, 3.83) | (1.50, 2.72) |
| Age | 1.02*** | 1.01*** | 1.03*** | 1.02*** |
| | (1.02, 1.02) | (1.01, 1.01) | (1.03, 1.03) | (1.02, 1.02) |
| Race (ref. = White) | | | | |
| Black | 1.51*** | 1.10 | 1.57*** | 1.19*** |
| | (1.236, 1.68) | (0.99, 1.23) | (1.49, 1.64) | (1.13, 1.25) |
| Latinx | 1.33*** | 1.04 | 2.10*** | 1.47*** |
| | (1.20, 1.49) | (0.03, 1.17) | (1.97, 2.24) | (1.38, 1.57) |
| Other | 1.25*** | 1.24*** | 1.19*** | 1.17*** |
| | (1.11, 1.40) | (1.09, 1.40) | (1.11, 1.28) | (1.09, 1.25) |
| Region (ref. = non-South) | | | | |
| South | 1.14*** | 1.06 | 1.25*** | 1.18*** |
| | (1.07, 1.21) | (0.99, 1.13) | (1.21, 1.29) | (1.14, 1.22) |
| Guam | | | 1.52*** | 1.19* |
| | | | (1.37, 1.74) | (1.03, 1.37) |
| Year (ref. = 2018) | | | | |
| 2019 | 0.98 | 0.99 | 0.87*** | 0.87*** |
| | (0.87, 1.10) | (0.87, 1.12) | (0.85, 0.88) | (0.85, 0.88) |
| Employment (ref. = not employed) | | | | |
| Employed | | 0.44*** | | 0.48*** |
| | | (0.41, 0.47) | | (0.46, 0.50) |
| Education (ref. = less than college) | | | | |
| College education or more | | 0.49*** | | 0.53*** |
| | | (0.46, 0.53) | | (0.51, 0.55) |
| Income (ref. <\$60,000 (NHWI); <\$50,000 (BRFSS)) | | | | |
| ≥\$60,000 (NHWI); ≥\$50,000 (BRFSS) | | 0.45*** | | 0.41*** |
| | | (0.41, 0.48) | | (0.39, 0.43) |
| Has Health Insurance | | 0.80*** | | 0.86*** |
| | | (0.71, 0.90) | | (0.81, 0.92) |
| Union Status (ref. = not married) | | | | |
| Married | | 0.81*** | | 0.86*** |
| | | (0.75, 0.86) | | (0.82, 0.89) |
| Residential Children (ref. = no) | | | | |
| Yes | | 0.98 | | 1.01 |
| | | (0.89, 1.07) | | (0.96, 1.06) |
| *F* | 62.42 | 233.38 | 378.36 | 708.87 |
| *N* | 93,144 | 93,144 | 543,717 | 543,717 |

*Sources:* National Health and Well-Being Index (NHWI) and Behavioral Risk Factor Surveillance System (BRFSS).

[a] $p < .05$ compared with gender minority heterosexuals.

[b] $p < .05$ compared with cisgender sexual minorities.

*$p < .05$; **$p < .01$; ***$p < .001$

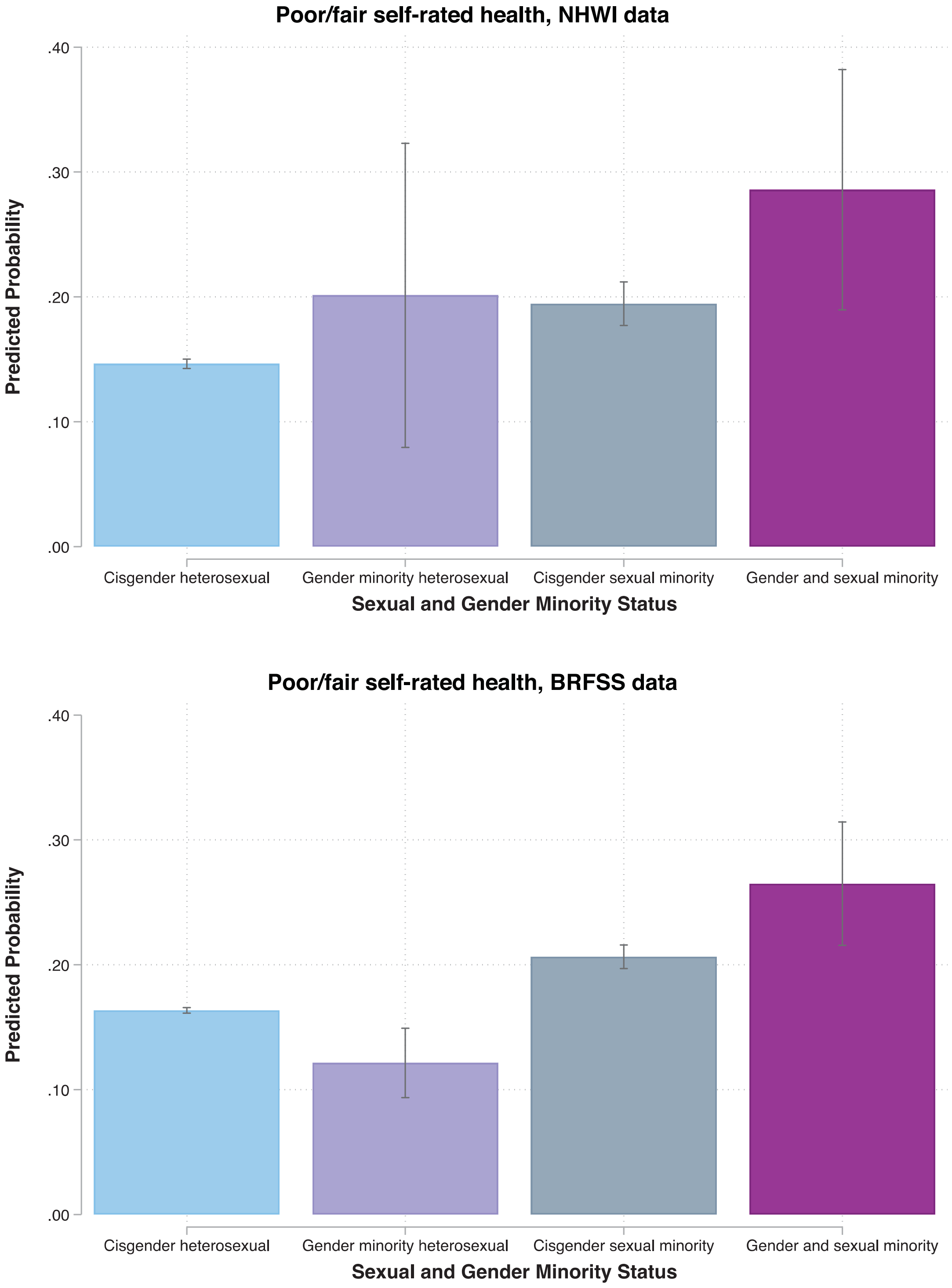

**Fig. 2** Predicted probabilities of poor/fair self-rated health by sexual and gender minority statuses. Models adjust for age, race and ethnicity, region, year, employment status, education, household income, health insurance coverage, marital status, and residential children.

and 20.1% for gender minority heterosexuals, 19.5% and 20.6% for cisgender heterosexuals, and 26.5% and 28.6% for people who are both gender and sexual minorities. Among the latter group, close to one third—a substantial proportion—experience poor/fair self-rated health relative to good, very good, or excellent health.

### *Functional Limitations*

Table 4 shows ORs based on logistic regression models predicting functional limitations as a function of sexual and gender minority statuses. Models 1 and 3 adjust for age, race and ethnicity, region, and year using NHWI and BRFSS data, respectively. Model 1 shows that, relative to cisgender heterosexuals, cisgender sexual minorities (OR = 1.90; $p < .001$) and people who are both gender and sexual minorities (OR = 4.50; $p < .001$) report higher rates of functional limitations. Model 3 generally confirms the same pattern: both cisgender sexual minorities (OR = 2.01; $p < .001$) and people who are both gender and sexual minorities (OR = 6.03; $p < .001$) report heightened rates of functional limitations. However, Model 3 also shows that gender minority heterosexuals are also disadvantaged (OR = 1.94; $p < .01$). Pairwise comparisons based on NHWI and BRFSS data demonstrate that people who are both gender and sexual minorities are also disadvantaged in the odds of reporting functional limitations relative to gender minority heterosexuals and cisgender sexual minorities.

Models 2 and 4 of Table 4 present fully adjusted ORs and show a similar trend of disadvantage as previous models. Model 2 (using NHWI data) and Model 4 (using BRFSS data) demonstrate that cisgender sexual minorities and people who are both gender and sexual minorities still face higher rates of functional limitations than cisgender heterosexuals. Pairwise comparisons remain significant for people who are both gender and sexual minorities relative to gender minority heterosexuals and cisgender sexual minorities even after the models adjust for all covariates. People who are both gender and sexual minorities are more than three times as likely to experience a limitation that hampers daily life than cisgender heterosexuals, the high odds of which are observed *after* we adjust for socioeconomic and family characteristics that likely partially explain why health disparities exist at this important intersection.

Figure 3 presents predicted probabilities of reporting any functional limitation across sexual and gender minority statuses based on results from fully adjusted models. The probability of reporting a functional limitation is 15.3% and 21.6% for cisgender heterosexuals, 21.4% and 25.2% for gender minority heterosexuals, 21.5% and 29.6% for cisgender sexual minorities, and 34.5% and 44.8% for people who are both gender and sexual minorities.

### *Diagnosed Depression*

Table 5 shows logistic regression results from models predicting diagnosed depression by sexual and gender minority statuses. Models 1 and 3 adjust for age, race and ethnicity, region, and year. Model 1, based on NHWI data, shows that cisgender sexual minorities (OR = 2.70; $p < .001$) and people who are both gender and sexual minorities (OR = 8.90; $p < .001$) experience elevated rates of diagnosed depression

**Table 4** Logistic regression results predicting functional limitations: Odds ratios, with 95% confidence intervals shown in parentheses

| | NHWI | | BRFSS | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Sexual and Gender Minority Status (ref. = cisgender heterosexual) | | | | |
| Gender minority heterosexual | 1.22 | 1.25 | 1.94** | 1.65 |
| | (0.57, 2.60) | (0.59, 2.66) | (1.32, 2.88) | (0.99, 2.74) |
| Cisgender sexual minority | 1.90*** | 1.61*** | 2.01*** | 1.66*** |
| | (1.71, 2.12) | (1.44, 1.80) | (1.88, 2.15) | (1.55, 1.78) |
| Gender and sexual minority | 4.50***[a,b] | 3.43***[a,b] | 6.03***[a,b] | 3.84***[a,b] |
| | (2.79, 7.28) | (2.16, 5.44) | (4.54, 8.01) | (2.88, 5.11) |
| Age | 1.03*** | 1.01*** | 1.04*** | 1.03*** |
| | (1.02, 1.03) | (1.01, 1.01) | (1.04, 1.04) | (1.03, 1.03) |
| Race (ref. = White) | | | | |
| Black | 1.09 | 0.87** | 1.45*** | 1.07* |
| | (1.00, 1.20) | (0.79, 0.95) | (1.38, 1.53) | (1.01, 1.13) |
| Latinx | 0.92 | 0.78*** | 1.27*** | 0.90** |
| | (0.83, 1.01) | (0.70, 0.86) | (1.18, 1.36) | (0.84, 0.97) |
| Other | 1.06 | 1.03 | 1.07 | 1.03 |
| | (0.96, 1.16) | (0.93, 1.14) | (0.99, 1.15) | (0.95, 1.10) |
| Region (ref. = non-South) | | | | |
| South | 1.15*** | 1.10*** | 1.29*** | 1.24*** |
| | (1.09, 1.21) | (1.04, 1.16) | (1.25, 1.33) | (1.20, 1.29) |
| Guam | | | 1.28** | 1.01 |
| | | | (1.10, 1.49) | (0.86, 1.20) |
| Year (ref. = 2018) | | | | |
| 2019 | 1.03 | 1.04 | 0.93*** | 0.94*** |
| | (0.93, 1.13) | (0.94, 1.15) | (0.92, 0.95) | (0.92, 0.96) |
| Employment (ref. = not employed) | | | | |
| Employed | | 0.38*** | | 0.31*** |
| | | (0.36, 0.40) | | (0.30, 0.32) |
| Education (ref. = less than college) | | | | |
| College education or more | | 0.67*** | | 0.55*** |
| | | (0.64, 0.71) | | (0.53, 0.58) |
| Income (ref. <$60,000 (NHWI); <$50,000 (BRFSS)) | | | | |
| ≥$60,000 (NHWI); ≥$50,000 (BRFSS) | | 0.57*** | | 0.41*** |
| | | (0.54, 0.60) | | (0.39, 0.43) |
| Has Health Insurance | | 1.11 | | 1.16*** |
| | | (0.99, 1.25) | | (1.09, 1.25) |
| Union Status (ref. = not married) | | | | |
| Married | | 0.93* | | 0.75*** |
| | | (0.88, 0.99) | | (0.72, 0.78) |
| Residential Children (ref. = no) | | | | |
| Yes | | 0.88*** | | 0.99 |
| | | (0.82, 0.94) | | (0.94, 1.04) |
| *F* | 133.51 | 310.3 | 660.06 | 1,031.6 |
| *N* | 93,144 | 93,144 | 543,717 | 543,717 |

*Source:* National Health and Well-Being Index (NHWI) and Behavioral Risk Factor Surveillance System (BRFSS).

[a] $p<.05$ compared with gender minority heterosexuals.

[b] $p<.05$ compared with cisgender sexual minorities.

*$p<.05$; **$p<.01$; ***$p<.001$

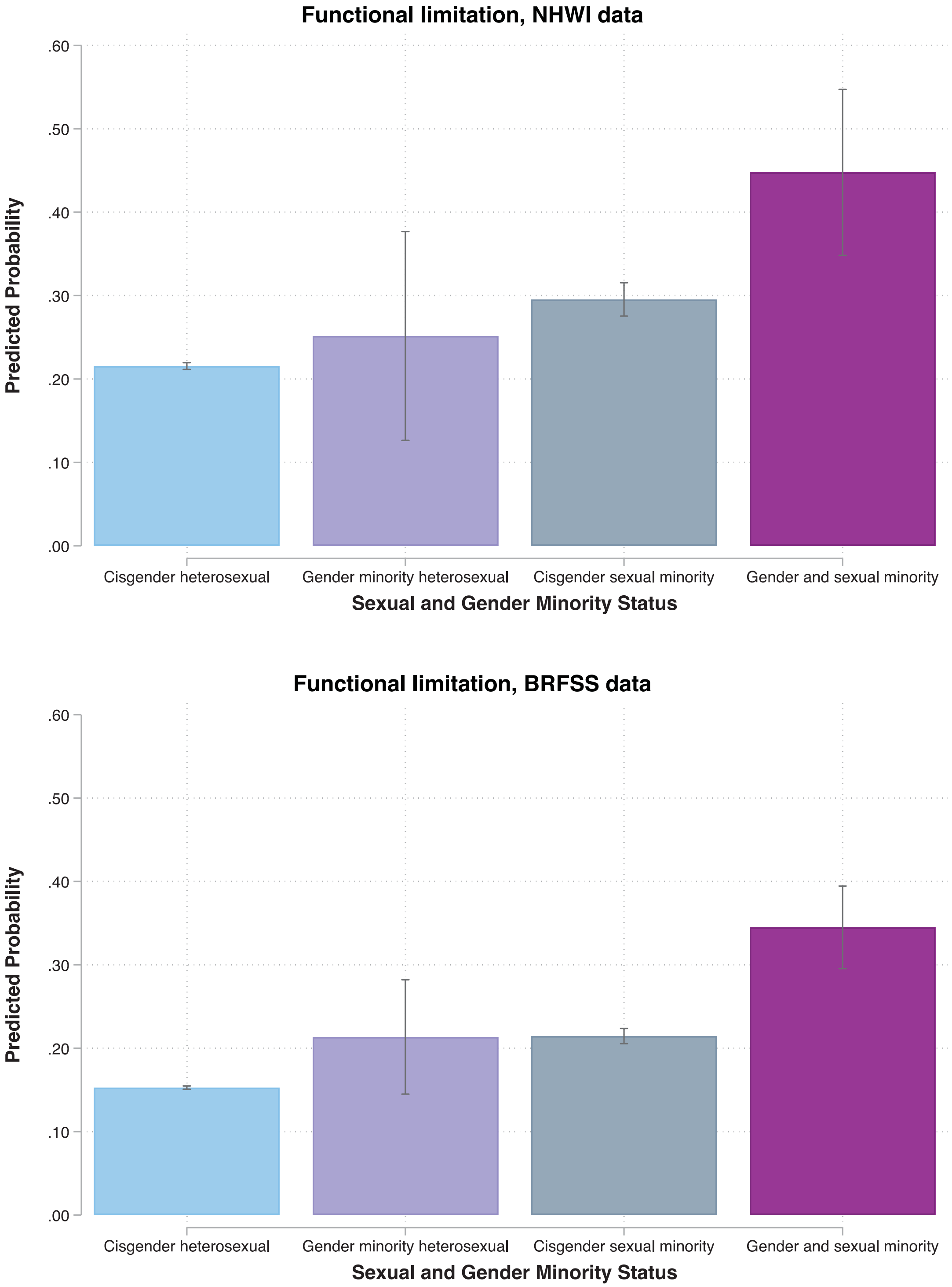

**Fig. 3** Predicted probabilities of functional limitation by sexual and gender minority statuses. Models adjust for age, race and ethnicity, region, year, employment status, education, household income, health insurance coverage, marital status, and residential children.

**Table 5** Logistic regression results predicting diagnosed depression: Odds ratios, with 95% confidence intervals shown in parentheses

| | NHWI | | BRFSS | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 |
| Sexual and Gender Minority Status (ref. = cisgender heterosexual) | | | | |
| Gender minority heterosexual | 1.11 | 1.11 | 1.84*** | 1.68*** |
| | (0.54, 2.28) | (0.50, 2.45) | (1.31, 2.57) | (1.16, 2.44) |
| Cisgender sexual minority | 2.70***[a] | 2.34*** | 2.68***[a] | 2.39*** |
| | (2.44, 2.98) | (2.11, 2.60) | (2.54, 2.82) | (2.26, 2.52) |
| Gender and sexual minority | 8.90***[a,b] | 7.27***[a,b] | 5.58***[a,b] | 4.50***[a,b] |
| | (5.66, 13.97) | (4.63, 11.39) | (4.41, 7.06) | (3.50, 5.79) |
| Age | 0.99*** | 0.99*** | 0.99*** | 0.99*** |
| | (0.99, 1.00) | (0.99, 0.99) | (0.99, 0.99) | (0.99, 0.99) |
| Race (ref. = White) | | | | |
| Black | 0.84** | 0.65*** | 0.67*** | 0.54*** |
| | (0.76, 0.93) | (0.59, 0.72) | (0.64, 0.71) | (0.51, 0.57) |
| Latinx | 0.76*** | 0.64*** | 0.59*** | 0.49*** |
| | (0.69, 0.83) | (0.58, 0.71) | (0.55, 0.62) | (0.46, 0.52) |
| Other | 0.72*** | 0.68*** | 0.60*** | 0.56*** |
| | (0.65, 0.80) | (0.61, 0.76) | (0.57, 0.64) | (0.52, 0.60) |
| Region (ref. = non-South) | | | | |
| South | 1.02 | 1.98 | 1.11*** | 1.10*** |
| | (0.96, 1.08) | (0.93, 1.04) | (1.08, 1.14) | (1.06, 1.13) |
| Guam | | | 0.58*** | 0.52*** |
| | | | (0.49, 0.68) | (0.44, 0.62) |
| Year (ref. = 2018) | | | | |
| 2019 | 1.02 | 1.03 | 1.01 | 1.01 |
| | (0.93, 1.13) | (0.93, 1.14) | (0.99, 1.03) | (0.99, 1.03) |
| Employment (ref. = not employed) | | | | |
| Employed | | 0.53*** | | 0.58*** |
| | | (0.50, 0.57) | | (0.56, 0.60) |
| Education (ref. = less than college) | | | | |
| College education or more | | 0.86*** | | 0.95** |
| | | (0.82, 0.90) | | (0.92, 0.98) |
| Income (ref. <\$60,000 (NHWI); <\$50,000 (BRFSS)) | | | | |
| ≥\$60,000 (NHWI); ≥\$50,000 (BRFSS) | | 0.60*** | | 0.61*** |
| | | (0.57, 0.64) | | (0.59, 0.63) |
| Has Health Insurance | | 1.06 | | 1.28*** |
| | | (0.94, 1.18) | | (1.21, 1.35) |
| Union Status (ref. = not married) | | | | |
| Married | | 0.76*** | | 0.72*** |
| | | (0.69, 0.77) | | (0.69, 0.74) |
| Residential Children (ref. = no) | | | | |
| Yes | | 1.07* | | 1.10*** |
| | | (1.00, 1.15) | | (1.06, 1.14) |
| *F* | 66.2 | 127.58 | 254.18 | 391.51 |
| *N* | 93,144 | 93,144 | 543,717 | 543,717 |

*Source:* National Health and Well-Being Index (NHWI) and Behavioral Risk Factor Surveillance System (BRFSS).

[a] $p < .05$ compared with gender minority heterosexuals.

[b] $p < .05$ compared with cisgender sexual minorities.

*$p < .05$; **$p < .01$; ***$p < .001$

relative to cisgender heterosexuals. Model 3, based on BRFSS data, shows a similar trend of disadvantage for cisgender sexual minorities (OR = 2.68; $p < .001$) and people who are both gender and sexual minorities (OR = 5.58; $p < .001$). However, Model 3 also suggests that gender minority heterosexuals (OR = 1.84; $p < .001$) experience higher odds of diagnosed depression relative to cisgender heterosexuals. Pairwise comparisons based on both data sources illuminate within-group variation in the sexual and gender minority community: cisgender sexual minorities experience higher rates of diagnosed depression relative to gender minority heterosexuals, and people who are both gender and sexual minorities experience higher rates relative to gender minority heterosexuals *and* cisgender sexual minorities.

After we adjust for socioeconomic, marital, and residential parent status, the results still reveal stark disparities in diagnosed depression. Models 2 and 4 show that cisgender sexual minorities and people who are both gender and sexual minorities are more likely to experience diagnosed depression relative to cisgender heterosexuals. Model 4, based on larger sample sizes in the BRFSS data, reveals that gender minority heterosexuals still experience greater odds of depression than cisgender heterosexuals. The pairwise comparisons reveal that people who are both gender and sexual minorities experience detriments relative to gender minority heterosexuals and cisgender sexual minorities. However, after we adjust for all covariates, cisgender sexual minorities no longer experience greater odds of diagnosed depression relative to gender minority heterosexuals. After we adjust for several sociodemographic, socioeconomic, and family characteristics, people who are marginalized in their gender and sexuality are approximately 4.5 and 7.3 times as likely to be diagnosed with depression relative to cisgender heterosexuals.

Figure 4 presents the predicted probabilities of reporting depression by sexual and gender minority statuses based on results from fully adjusted models. The probabilities of reporting a depression diagnosis are 18.2% and 20.6% for cisgender heterosexuals, 22.2% and 26.7% for gender minority heterosexuals, 33.7% and 36.7% for cisgender sexual minorities, and a stark 48.0% and 62.7% for people who are both gender and sexual minorities. These results suggest that approximately one half to nearly two thirds of people who are both gender and sexual minorities report having been *diagnosed* with depression—an astronomically high portion of the community.

## Discussion

Past work has illuminated adverse physical and mental health for gender minorities and sexual minorities (Gonzales et al. 2016; Lagos 2018; Liu and Reczek 2021; Meyer 2003; Stacey et al. 2022). Drawing on population-level data from Gallup's NHWI and the CDC's BRFSS data (which represent 41 states and one U.S. territory), our novel study documents physical and mental health disparities at the intersection of sexual and gender minority statuses with nationally representative samples. Studies have examined disparities for sexual minorities *or* gender minorities relative to their heterosexual and cisgender counterparts, respectively, but population-level research has been hampered by a lack of measures on surveys and sufficient sample sizes to estimate health disparities for individuals who are both gender *and* sexual

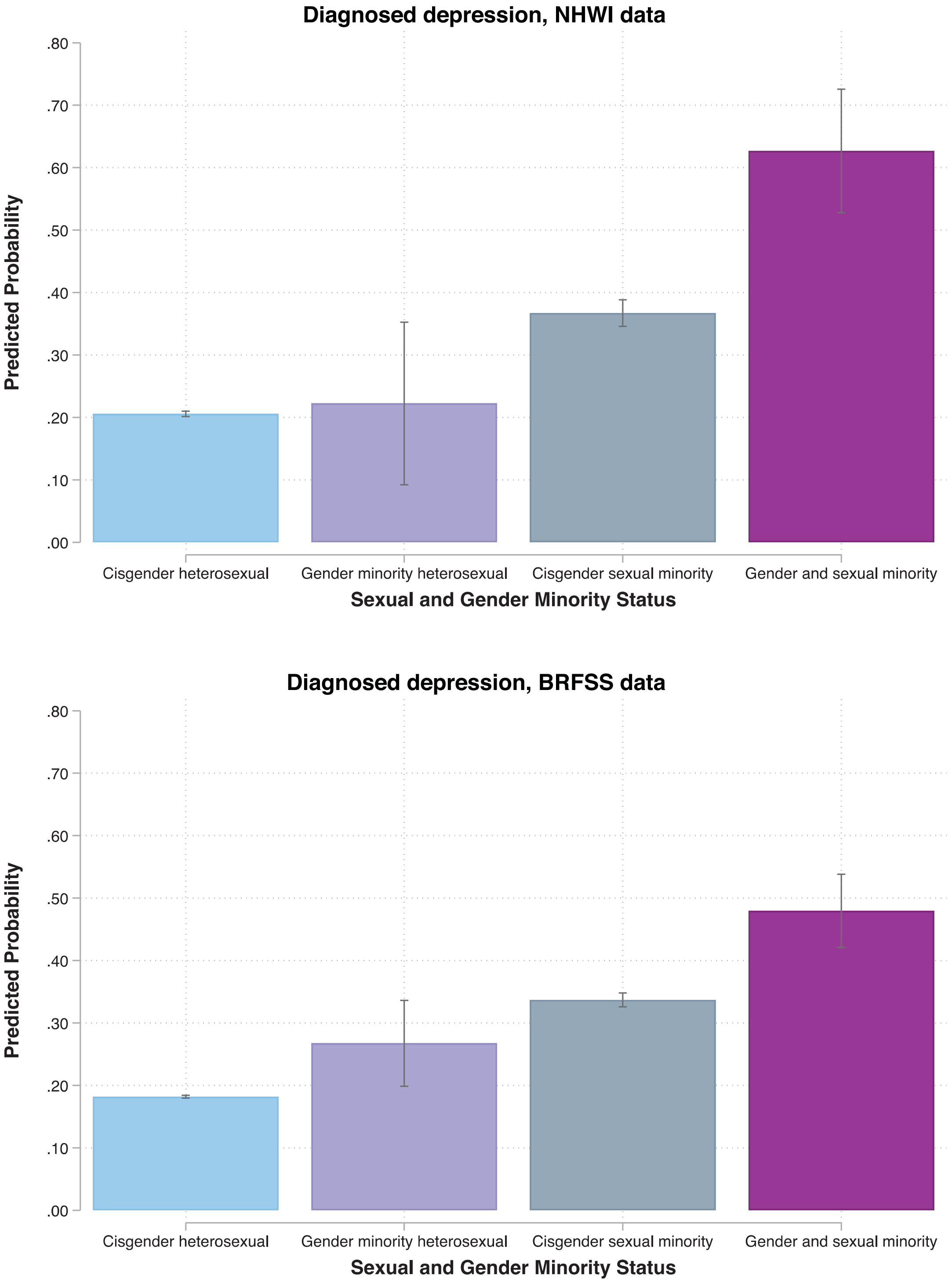

**Fig. 4** Predicted probabilities of diagnosed depression by sexual and gender minority statuses. Models adjust for age, race and ethnicity, region, year, employment status, education, household income, health insurance coverage, marital status, and residential children.

minorities (Mayer et al. 2008). Our study leverages recent advancements in measurement and data collection targeting SGM populations (Lagos and Compton 2021) to construct a sexual and gender minority status variable. Our population-level data from the NHWI and BRFSS yield valid and reliable results and permit us to generalize to the United States, lending confidence about the level of health disparities we document (Gates 2017; Mayer et al. 2008).

Our results build on earlier work and illuminate the cumulative toll of navigating life for people who are both gender minorities and sexual minorities and uncover the ways this burden translates to population health disparities (Källström et al. 2022). Relative to cisgender heterosexuals, people who are both gender and sexual minorities (e.g., gay transgender men, queer nonbinary people) tend to experience the largest physical and mental health disadvantages, with gender minority heterosexuals and cisgender sexual minorities experiencing smaller disadvantages. More than a quarter of people who are gender and sexual minorities experienced poor/fair self-rated health relative to only roughly 15% of cisgender heterosexuals, which is a robust predictor of morbidity and mortality (Idler and Benyamini 1997; Jylhä 2009). The portion of the same community receiving a depression diagnosis relative to cisgender heterosexuals is even higher and is also cause for concern.

Importantly, our study also advances past work by examining critical within-group differences and comparing various sexual and gender minority groups with one another and with cisgender heterosexuals (Stacey et al. 2022). People who are both gender and sexual minorities fared worse on many health outcomes relative to gender minority heterosexuals and cisgender sexual minorities—for example, faring worse in functional limitations and diagnosed depression in both data sets in models adjusting for sociodemographic, socioeconomic, and family characteristics (Källström et al. 2022). Such evidence offers strong support for "double disadvantage" at this important intersection and illuminates acute disadvantages for those who are both gender *and* sexual minorities. Interestingly, the magnitude of health disparities documented remains substantively large after we adjust for socioeconomic and family characteristics, implying that such disparities are driven by other factors, such as the presence of minority stressors (e.g., discrimination, violence, stigma; Meyer 2003). The burden of bearing marginalization by heterosexism, homophobia, and transphobia translates to large disparities that are not driven fully by sociodemographic, socioeconomic, or family characteristics.

We advance double disadvantage theory by explaining potential mechanisms that might explain the magnitude of health disparities observed for people who are both gender and sexual minorities. Such individuals likely experience greater incidence and severity of discrimination because they experience marginalization in terms of their gender minority status and sexual minority status from interpersonal and structural forces (Mishel 2016; Reczek and Bosley-Smith 2022; Tilcsik 2011), which have been linked to adverse health outcomes (Denise 2014; Meyer 2003). Another mechanism could potentially be greater rates of misclassification, which are associated with worse overall assessments of health (Hart et al. 2019; Lagos 2019), for people who are both gender and sexual minorities relative to others. Finally, extant classification schemes of sexuality and gender both rely on and reinscribe gender and sexual binaries, which might lead to heightened dysphoria and stress and undermine health (de Graff et al. 2021; Puckett et al. 2021). Although testing these mechanisms is outside the scope of this study and is not possible with NHWI or BRFSS data, future research should attempt to better understand the reasons for the magnitude of disparities observed in our study.

Examining physical and mental health at the intersection of sexual and gender minority statuses also provides important information about SGM health disparities. Our results complicate prior findings about gender minorities' disadvantages in self-rated health. Transgender and gender-nonconforming populations in the aggregate have been shown to experience worse self-rated health than the cisgender population (Lagos 2018; Meyer et al. 2017), although research shows that gender-nonconforming and gender-nonbinary/genderqueer people tend to experience the largest health differences relative to cisgender people and often experience worse health than transgender men and transgender women (Lagos 2018; Stacey et al. 2022). However, those aggregate findings for gender minorities relative to cisgender people obscure considerable heterogeneity. Our study revealed that only gender minorities who were also sexual minorities experienced worse self-rated health relative to cisgender heterosexuals and that gender minority heterosexuals had comparable self-rated health relative to cisgender heterosexuals. In fact, results based on BRFSS data in models adjusting for sociodemographic, socioeconomic, and family characteristics show that gender minority heterosexuals experienced lower odds of poor/fair self-rated health relative to cisgender heterosexuals. Thus, prior findings on detriments in self-rated health for gender minorities relative to cisgender people might be driven by those people who are *both* gender and sexual minorities, given that gender minorities disproportionately also identify as sexual minorities. The relative advantages of gender minority heterosexuals compared with other sexual and gender minority groups might be explained by the overrepresentation of transgender men and transgender women, who tend to experience better health than nonbinary gender minorities (Lagos 2018; Stacey et al. 2022), in the category of people who are gender minority heterosexuals. Gender-nonconforming people are, conversely, overrepresented in the category of people who are both gender and sexual minorities. That gender minority heterosexuals had better self-rated health but elevated rates of functional limitations and diagnosed depression compared with cisgender heterosexuals should be investigated further.

This study also confirms the results of past work showing notable disparities for sexual minorities relative to heterosexuals (Liu and Reczek 2021; Stacey et al. 2022). Our study revealed that cisgender sexual minorities had a higher likelihood of poor/fair self-rated health, functional limitations affecting daily life, and depression diagnoses relative to cisgender heterosexuals (Gorman et al. 2015; Meyer 2003). In many cases, this population had health comparable to that of gender minority heterosexuals. Although cisgender sexual minorities compose a large share of all sexual minorities, a nonnegligible number of people who are sexual minorities are also gender minorities. Future studies should examine health at the intersection of sexual and gender minority statuses, given the large discrepancies we observed.

Our study faces some limitations—the primary one being the detail sacrificed from dichotomizing sexual identity and gender identity to create our main independent variable of interest. Unfortunately, this limitation means that we obscure heterogeneity within each sexual and gender identity category (Lagos 2018; Liu and Reczek 2021). Health disparities for some specific subgroups at the intersection of sexuality and gender might be driving associations: gender-nonconforming and nonbinary/genderqueer populations (Lagos 2018; Stacey et al. 2022) and bisexual men and women (Gorman et al.

2015; Liu and Reczek 2021) tend to experience worse physical and mental health than other gender and sexual minority subgroups. Because of the disparate discrimination, stigma, and violence these groups face, no doubt partly because they do not fit neatly within existing gender and sexual binary classification schemes (i.e., man–woman and heterosexual–homosexual), these groups are marginalized within the sexual and gender minority population. Unfortunately, we cannot examine how various subpopulations are faring at the intersection of sexuality and gender.

Other limitations are also noteworthy. First, as stated earlier, both indicators in the NHWI and BRFSS identifying gender minorities include only those who first identified as transgender. Some gender-nonbinary and other gender minorities do not identify as transgender, expressing concerns that they are not "trans enough" because they have not suffered as much as they presume transgender people have (Darwin 2020). Consequently, health disparities might be larger for gender minorities who identify as transgender relative to those who do not. Second, the measures we draw on to examine disparities in a depression diagnosis require a visit with a medical provider. LGBTQ people are known to have lower health insurance coverage rates and avoid care that might be stigmatizing and harmful (Dahlhamer et al. 2016; Doan and Grace 2022). Therefore, our estimates are likely biased in the direction of the null and are thus conservative. Third, some of the socioeconomic status covariates that our fully adjusted models accounted for might be endogenous with physical and mental health: sexual minorities, gender minorities, or both might have lower employment rates or household incomes at least partly because they have poorer health, more functional limitations, and a greater likelihood of diagnosed depression. Longitudinal data are needed to better adjudicate between temporal concerns of influences on health and consequences of poor health for various outcomes. Finally, we acknowledge that measuring functional limitations can imperfectly approximate physical health. The NHWI measure's wording implies that a physical disability is inextricably tied to health and functioning, an assumption that rests on a strictly medical model of disability (Bunbury 2019; Hahn 1993). Despite these limitations, we advance past work on SGM health by documenting severe health disparities at the intersection of sexual and gender minority statuses.

## Conclusion

In the United States, SGM populations face ubiquitous physical and mental health disparities relative to cisgender heterosexual populations. Our findings suggest that interventions and programs designed to curtail these health disparities may need to be targeted and tailored differently to populations at the intersection of sexual and gender minority statuses. Striking results across measures of health and well-being point to a glaring gap in our current health care system's attention to SGM people. For too long, public health campaigns and strategies have grouped SGM people under the same umbrella, failing to acknowledge the specific needs of those who are marginalized in terms of sexual *and* gender minority status. Our results also suggest that providing competent medical knowledge and addressing concerns unique to sexual minorities (i.e., same-sex safe sex, fertility, PrEP) or gender minorities (i.e., gender-affirming care, gender confirmation surgery, hormone blockers) are insufficient. Providers must also be able to provide adequate and supportive health care to people who are both gender and sexual minorities, given the disproportionate percentage of gender minorities who are sexual minorities and the magnitude of this population's deleterious health outcomes.

Our results also highlight the necessity of mental health programs and better data collection efforts to understand SGM health disparities more thoroughly. The staggering rates of diagnosed depression for gender and sexual minorities necessitate the implementation of mental health programs and support structures tailored to this population's unique needs. It is worth mentioning the very real possibility that depression rates are higher than documented given the limitations of using a diagnosis measure. Such distinct struggles with depression require further research and the development of specialized solutions to reduce the disparities this group experiences. We echo the thoughts of other scholars and the U.S. Department of Health and Human Services in recommending the inclusion of routine survey measures to identify both sexual and gender minorities in large-scale surveys. We must also target and oversample SGM individuals in national- and state-level surveys to yield sufficient sample sizes and provide valid and reliable estimates of health and other disparities. Further, we must incorporate measures to elucidate and quantify the explanatory role of possible mechanisms, such as discrimination (Meyer 2003), that drive these disparities. Engaging with these efforts will enable scholars to pursue analyses like those we have done here and provide a firmer foundation on which public health can work to reduce SGM health disparities. ■

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# Editorial: Evidence on the benefits of integrating mental health and HIV into packages of essential services and care

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KEYWORDS

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Editorial on the Research Topic
Evidence on the benefits of integrating mental health and hiv into packages of essential services and care

## Introduction

People living with HIV (PLWH) suffer disproportionately higher levels of mental disorders than the general population, both in high-income and low- and middle-income countries (1). There is also evidence to suggest that the burden of mental disorders is worse `in HIV compared to other chronic diseases (2). Mental disorders negatively affect client engagement and care retention and result in significant distortions in health outcomes at every stage of the HIV care continuum (1). The need for mental health care for PLWH is critical to mitigate HIV transmission and progression and improve clinical outcomes by creating awareness for mental disorders and integrating mental health services into the HIV care continuum. The Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO) have underscored the importance of integrating HIV and mental health services, considering that both conditions accentuate each other's risk. Also, Integrated HIV-mental health approaches lead to better health outcomes, overall well-being and quality of life (3). More so, the "feasibility and acceptability of integrating mental health screening into an existing community-based program for prevention of mother-to-child transmission of HIV targeted at pregnant women and their male partners" is acceptable (4). For success, service integration should conform with all the critical elements of integrated service delivery as outlined by the WHO- "*the management and delivery of health care services so that the clients receive a continuum of preventive and curative services that cater to their needs over time and across different levels of the health system*" (5).

This editorial highlights some of the benefits of HIV-mental health services integration by introducing nine manuscripts published as a collection in response to the Research Topic: *Evidence on the Benefits of Integrating Mental Health and HIV into Packages of*

TABLE 1 Summary of studies in this collection.

| s/n | Study theme | Title | Authors | Setting Study | Study Design | Objective(s) | Sample size | Study population |
|---|---|---|---|---|---|---|---|---|
| 1 | HIV infection is disproportionately associated with mental disorders | Depression and Perceived stress among perinatal women living with HIV in Nigeria | Akinsolu et al | Southwest, Nigeria | Cross-sectional | To determine the prevalence and factors associated with depression and psychological stress | 402 | Pregnant or recently delivered women (within two years) living with HIV aged 19 to 49 years |
| 2 | | Association between depression and HIV infection vulnerable populations in United States adults: a cross-sectional analysis of NHANES from 1999 to 2018 | Xu et al | United States of America | Cross-sectional | To review and evaluate the association between depression and HIV infection | 16,584 | HIV adult vulnerable populations |
| 3 | | Loneliness as a mediation from social support leading to a decrease of health-related quality of life among PLWHIV | Qian et al | China | Cross-sectional | To investigate the potential mediation mechanism of loneliness between social support and HRQoL | 201 | Adults accessing HIV care in a hospital |
| 4 | | HIV-related stress predicts depression over five years among people living with HIV. | Liu et al | China | Longitudinal observational | To explore the longitudinal relationship between HIV-related stress, social support, and depression among people living with HIV | 320 | Adults living with HIV |
| 5 | | Prevalence of suicide ideation among HIV/AIDS patients in China: A systematic review and meta-analysis | Li et al. | China | Systematic Review | To comprehensively analyze the prevalence of suicidal ideation among HIV/AIDS patients | 6,174 | Cross-sectional studies of adults with a sample size greater than 25 |
| 6 | | Implementation of trauma-informed care and trauma-responsive services in clinical settings: a latent class regression analysis | Anderson et al | Southeastern United States of America | Cross-sectional | To identify subgroups of HIV clinics based on their unique profiles of inner setting characteristics and assess how subgroup membership is related to the degree of TIC implementation and number of trauma-responsive services offered | 317 (and 47 clinics) | Employees of HIV clinics |
| 7 | Mental disorders adversely affect HIV-related health outcomes | Loneliness as a mediation from social support leading to a decrease of health-related quality of life among PLWHIV | Qian et al. | China | Cross-sectional | To investigate the potential mediation mechanism of loneliness between social support and HRQoL | 201 | Adults accessing HIV care in a hospital |
| | | Prevalence of suicide ideation among HIV/AIDS patients in China: A systematic review and meta-analysis | Li et al. | China | Systematic Review | To comprehensively analyze the prevalence of suicidal ideation among HIV/AIDS patients | 6,174 | Cross-sectional studies of adults with a sample size greater than 25 |
| | | Factors influencing self-efficacy for self-management among adult people with human immune deficiency virus on antiretroviral therapy in public hospitals of south-west Ethiopia | Aldisa et al | Southwest, Ethiopia | Cross-sectional | To identify factors influencing self-efficacy for HIV self-management | 413 | Adults accessing antiretroviral therapy in public hospitals |
| 8 | HIV-mental health service integration is beneficial | Exploring experiences of HIV care to optimize patient-centred care in Conakry, Guinea: a qualitative study | Kolie et al | Conakry, Guinea | Qualitative exploratory | To describe the patient-provider relationship and explore the challenges to optimal and patient-centred care | 17 in-depth interviews and six focused group discussions | Adults accessing HIV care and caregivers in urban health facilities |
| 9 | | Higher rates of mental health screening of | Concepcion et al | Thika, Kenya | Qualitative exploratory and | To design and pilot an evidence-based provider | 1,154 | Adolescent girls and young women |

(*Continued*)

TABLE 1 Continued

| s/n | Study theme | Title | Authors | Setting Study | Study Design | Objective(s) | Sample size | Study population |
|---|---|---|---|---|---|---|---|---|
| | | adolescents recorded after provider training using simulated patients in a Kenyan HIV clinic: results of a pilot study | | | interrupted time series | training strategy, simulated patient encounters | | seeking health services at public HIV clinics |
| | | Implementation of trauma-informed care and trauma-responsive services in clinical settings: a latent class regression analysis | Anderson et al | Southeastern United States of America | Cross-sectional | To identify subgroups of HIV clinics based on their unique profiles of inner setting characteristics and assess how subgroup membership is related to the degree of TIC implementation and number of trauma-responsive services offered | 317 (and 47 clinics) | Employees of HIV clinics |

*Essential Services and Care*. The manuscripts are from both high-income and low- and middle-income countries. Specifically, three are from China, two from the United States of America and one each from Ethiopia, Guinea, Kenya and Nigeria. The manuscripts (1) underscore the high prevalence of mental disorders among people living with HIV, (2) demonstrate that mental disorders lead to suboptimal health outcomes among PLWH, and (3) demonstrate the value of integrating mental health care into HIV care programs (Table 1).

## HIV infection is disproportionately associated with mental disorders

PLWH experience disproportionately high levels of many common mental disorders. Depression is significantly associated with HIV infection in studies from Nigeria, the US and China (Akinsolu et al., Xu et al., Qian et al., Liu et al.). The accentuated burden of depression in HIV, which likely exceeds that of other chronic diseases, is thought to be mediated by HIV-related stress (2). Depression is also commoner among HIV-vulnerable populations (Xu et al.), suggesting that the drives of HIV infection may also drive depression. This collection emphasizes the mediatory role of stress and loneliness in HIV-related depression. Stress is prevalent among PLWH (Akinsolu et al.), and stress and loneliness are potent predictors of depression and anxiety among PLWH, especially in the early stages of HIV infection (Liu et al., Qian et al.). Also, suicidal ideation is prevalent and rising among PLWH (6, 7). A meta-analysis of sixteen Chinese studies shows that about one-third of PLWH had suicidal ideation (Li et al.). Furthermore, interpersonal violence is also common among PLWH (Anderson et al.).

Although it has been demonstrated that mental disorders are commoner among PLWH than the general population, it is unlikely that all HIV subpopulations are equally vulnerable to mental disorders. This collection shows that men, homosexuals, unmarried and the depressed are more affected by suicidal ideations. Also, longer periods since HIV diagnosis and lower CD4 cell counts were associated with a higher risk of suicidal ideation (Li et al.). Other factors that are related to mental disorders in PLWH include being female, serodiscordant partners, low-income levels, lack of family support, duration on ART and the gestational age among HIV-positive pregnant women (Akinsolu et al.).

## Mental disorders adversely affect HIV-related health outcomes

Mental disorders are associated with HIV progression, poor medication adherence and exacerbation of the social and economic barriers to accessing HIV care, resulting in poor health outcomes and suboptimal quality of life (8). In this collection, Qian et al. used a Structural Equation Model to demonstrate a link between loneliness and reduction in health-related quality of life. Suicidal ideation is also associated with lower CD4 counts (Li et al.), while low self-efficacy is also related to drug side effects (Abdisa et al.). More so, the social context and stigmatising social process in which PLWH live, causes them to be stigmatised which further affects HIV-related health outcomes (9).

## HIV-mental health service integration is beneficial

Integrating mental health services into HIV care programs has the potential to mitigate the risk of disease progression and engender better health outcomes. Integrated service delivery also increases health system efficiency and patient satisfaction. Although available evidence demonstrates the value of service integration, health system challenges, including human resources, infrastructure and supply chain management, often constitute significant hindrances. Critical success factors include human capital development, awareness creation, stakeholder ownership and commitment and continuous health system development (5).

This collection also demonstrates the benefit (real or potential) of implementing mental health care interventions within HIV care programs. Integration of psychosocial counselling into HIV care promotes confidentiality, provider availability and care, improved access to antiretrovirals and patient preferences. These factors in turn optimize patient-centred care and result in better health outcomes for people living with HIV (Kolie et al.). Also, building the capacity of HIV caregivers will increase the enhance the diagnosis and referral of mental disorders. Concepcion et al. piloted a three-day Simulated Patient Encounter training on HIV care providers in Kenya. The study shows that evidence-based provider training can improve their competencies and service delivery for common mental disorders in HIV care settings. Anderson et al. underlined the significance of implementing trauma-informed care and trauma-responsive services in HIV settings to avoid re-traumatization in those with experience of intimate partner violence. The study also demonstrates that the success of HIV-mental health integration strategies hinges on the appropriate characterization of health facilities based on critical success factors depending on the core issue under consideration.

In summary, mental disorders disproportionately affect PLWH and result in poor HIV and mental health outcomes. Integrating mental health and HIV into Packages of Essential Services and Care will help recognize and address mental health needs and result in better health outcomes among PLWH.

## Author contributions

OA: Writing – original draft, Writing – review & editing. TI: Writing – original draft, Writing – review & editing. SL: Writing – original draft, Writing – review & editing.

## Conflict of interest

The authors declare that this research conduct was without any commercial or financial relationships that could constitute a potential conflict of interest.

## Publisher's note

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