Examining How Health Navigation Affects Mental Health Among Gay, Bisexual, and Other Men Who Have Sex with Men Living with Human Immunodeficiency Virus in Guatemala

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Abstract

Gay, bisexual, and other men who have sex with men (GBMSM) are disproportionately affected by mental health problems and human immunodeficiency virus (HIV). Health navigation has the potential to improve both HIV and mental health outcomes; however, few studies have measured the impact of navigation on mental health among people living with HIV. We analyzed longitudinal data from a sociobehavioral survey and navigation monitoring system with GBMSM living with HIV in Guatemala ($n = 346$) that participated in a 12-month differentiated care intervention. We examined relationships between navigation characteristics (frequency, duration, mode of interactions, and level of emotional, instrumental, and informational navigation support) and anxiety and depression using fixed-effects regression. We also examined if these relationships were moderated by baseline social support. We found that as navigation interactions increased, anxiety significantly improved [$B = -0.03$, standard error (SE) $= 0.01$ $p = 0.05$]. Participants who received high levels of informational navigator support also experienced a significant improvement in anxiety compared with those receiving low levels of informational support ($B = -0.81$, SE $= 0.40$, $p = 0.04$). Unexpectedly, we found that as the proportion of in-person navigation interactions increased, anxiety worsened ($B = 1.12$, SE $= 0.54$, $p = 0.04$). No aspects of navigation were significantly associated with depression and baseline social support did not moderate the relationship between navigation and anxiety and depression. To improve the mental health of key populations affected by HIV, health navigation programs should prioritize frequent interaction and informational navigation support for clients with anxiety while considering other strategies that specifically target reducing depressive symptoms, including other cost-effective modalities, such as mobile apps.

Keywords: health navigation, mental health, HIV, social support, MSM, Guatemala

Introduction

GAY, BISEXUAL, AND other men who have sex with men (GBMSM) are disproportionately affected by mental health problems, including depression and anxiety.[1–4] These mental health disparities are even worse for GBMSM living with human immunodeficiency virus (HIV),[3] among whom mental health is associated with suboptimal engagement in HIV care and adherence to antiretroviral therapy (ART).[1,5] Yet there are few successful interventions specifically for GBMSM living with HIV that address the role of mental health.[6]

Health navigation is an intervention strategy that has the potential to improve both mental health and HIV outcomes for GBMSM. Health navigation is a strengths-based model originally developed in the context of cancer care that has

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been adapted to support people living with HIV (PLHIV) to negotiate social and structural barriers to care.[7] Navigation aims to provide emotional, instrumental, and informational support while identifying strategies for using existing resources and seeking out additional resources to maintain health and well-being.[8]

In a 2018 systematic review, 17 of the 20 included studies reported positive associations between navigation and HIV outcomes, including linkage to care, retention in care, ART adherence, and viral suppression.[9] Because, by design, navigators respond to the individual needs of those they support, few studies have examined what characteristics make health navigation successful, such as the frequency, duration, mode, and content of interactions between navigators and patients;[9–11] this information is essential to inform cost-effective scale-up of this intervention strategy.

In addition, whereas navigators are often tasked with providing emotional support to their clients, few studies have measured the impact of health navigation on mental health outcomes among PLHIV.[9] Outside the HIV context, navigators have had a positive impact on the mental health of patients[12,13] and researchers have identified health navigation as having the potential to improve mental health outcomes;[14–18] but further studies are needed to assess if and how health navigation affects mental health outcomes among PLHIV.

The primary objective of this study was to assess the association between frequency, duration, mode of navigator–participant interactions, and level of emotional, instrumental, and informational navigation support and change in anxiety and depression among GBMSM living with HIV. Based on prior navigation studies and social support theory, which posits that more support results in better health and well-being,[8] we hypothesized that GBMSM with more navigation frequency, duration, proportion of in-person contacts, and higher levels of emotional navigation support would experience a greater improvement in anxiety and depression over time. We also hypothesized that these relationships would be moderated by higher baseline social support, such that the association would be weaker for GBMSM with higher social support from family and friends at baseline.

Methods

Setting and parent study

HIV prevalence among GBMSM in Guatemala is 10.5% compared with only 0.8% in the general adult population.[19] Although little research has been conducted on the mental health of GBMSM in Guatemala, they report a lack of social support and fear, stigma, and discrimination owing to their sexual orientation as negatively affecting their mental health, and inhibiting HIV testing and engagement in HIV care.[20–23] Barriers to HIV care are further exacerbated by the Guatemalan health system that is relatively centralized compared with other countries in the region. ART is free for PLHIV in Guatemala, but is only available at 17 Ministry of Health-run HIV clinics throughout the country.[24] To address these challenges being tested for HIV and linked to care, our team designed and implemented the first navigation pilot intervention to promote timely linkage to care in Guatemala city in 2014.[25] Based on encouraging results of the pilot and the high levels of satisfaction among participants and clinics, health navigation was expanded and integrated into HIV prevention and care programs throughout Guatemala and Central America.[26]

For this study, we extended that pilot model and implemented health navigation to promote retention in HIV care and adherence to ART as part of a differentiated care model for GBMSM in Guatemala City, which also included voluntary decentralization for stable patients and an emotional well-being intervention for newly diagnosed/re-engaged patients.[27] The sample included three groups, each of which comprised different eligibility requirements: (i) stable (viral load ≤1000 copies/mL) and decentralized to smaller clinic; (ii) stable and decentralization-eligible, but stayed at main clinic; and (iii) newly diagnosed and/or unstable; received care at main clinic. Navigators provided reminders and accompaniment to HIV appointments, assisted in disclosure of HIV status, sent regular motivational messages, and talked through personal, professional, and HIV-related issues with participants, depending on their needs and desires. Navigators also worked with participants to address barriers to accessing care, develop strategies to use their existing resources, cultivate additional resources to maintain health and well-being, and, when needed, advocate for their rights.

The team included nine health navigators with an average age of 28 years. The majority had completed at least some university education. Most navigators were not peers, but had previous experience working with HIV programs. All navigators were trained in the study protocol and HIV knowledge. Beyond providing appointment reminders, navigators were suggested to maintain, at a minimum, monthly communication with each participant; navigators were assigned 30–60 participants. The study was reviewed and approved by the Ethics Committees for the Protection of Human Subjects of the Guatemalan Ministry of Health and the Universidad del Valle de Guatemala and the Institutional Review Board of the University of North Carolina at Chapel Hill (UNC). This project was also reviewed in accordance with the Centers for Disease Control and Prevention (CDC) human research protection procedures and was determined to be research, but CDC investigators did not interact with human subjects or have access to identifiable data or specimens for research purposes.

Recruitment

Between January and June 2017, we recruited 374 GBMSM living with HIV. Eligibility included the following: being at least 18 years old; male; self-reported ever having sex with men; Spanish-speaking; and received HIV care at the Hospital Roosevelt Infectious Disease Clinic in Guatemala City. This study only includes participants who had at least one interaction with a navigator during the 12-month study period ($n = 346$). All participants provided informed consent.

Procedures

Data were obtained from sociobehavioral surveys, laboratory procedures, and a monitoring system for participant–navigator interactions between January 2017 and July 2018. Surveys were administered in Spanish by trained interviewers at baseline and endline (12-month follow-up) in private locations at the study sites using tablets. The navigation monitoring system, described in detail elsewhere,[28] allowed navigators to document information about each interaction

with participants using a mobile application (app), including mode of interaction (in-person or remote), duration of the interaction (in minutes), and content of the interaction (appointment reminder, HIV education, emotional support, etc.).

Measures

Dependent variables

Anxiety. We screened for anxiety during past 2 weeks using the two-item Generalized Anxiety Disorder assessment (GAD-2).[29] Scores on the two items were summed (range, 0–6), with a score of 3 considered the optimal cut-point for screening purposes. The item correlation was 0.79 ($p < 0.001$) for the two anxiety items in our sample.

Depression. We screened for depressive symptoms during the previous 2 weeks using the two-item Patient Health Questionnaire (PHQ-2).[30] The PHQ-2 score ranges from 0 to 6, with a score of 3 considered the optimal cut-point for screening purposes.[30] The item correlation was 0.64 ($p < 0.001$) for the two depression items in our sample.

Independent variables.

To measure different characteristics of health navigation, we created independent variables using count and proportion data from the navigation monitoring system.

Navigation frequency. The frequency of participant–navigator interactions is a count of every documented interaction, remote or in-person, between the navigator and the participant over the 12-month intervention period.

Navigation minutes. We assessed navigation minutes by summing all minutes reported from every navigator–participant interaction over the 12-month intervention period.

Proportion of in-person navigation interactions. We assessed the proportion of navigator–participant interactions that occurred in-person by dividing the count of all interactions (in-person and remote) by the count of just in-person interactions that occurred over the 12-month intervention period.

Level of emotional support. We categorized topics covered in navigator–participant interactions into three forms of social support: emotional, instrumental, and informational.[8] Emotional support included the navigator–participant interactions categorized by navigators as mental health, alcohol, drugs, family, work, or partner in the navigation monitoring app. For interpretability, levels of emotional support were assigned using dummy variables: low (0–50%; 0–4 interactions), medium (51–75%; 5–9 interactions), high (76–90%; 10–13 interactions), and very high (91–100%; 14–55 interactions); low was the reference group.

Level of instrumental support. Instrumental support included the navigator–participant interactions categorized by navigators as appointment reminders in the navigation monitoring app. For interpretability, levels of instrumental support were assigned using dummy variables: low (0–50%; 0–3 interactions), medium (51–75%; 4–5 interactions), high (76–90%; 6–8 interactions), and very high (91–100%; 9–20 interactions); low was the reference group.

Level of informational support. Informational support included the navigator–participant interactions categorized by navigators as HIV, legal framework, sexually transmitted infections (STI), sexual health, opportunistic infections, clinic, laboratory, counseling, and biosecurity in the navigation monitoring app. For interpretability, levels of informational support were assigned using dummy variables: low (0–50%; 0–3 interactions), medium (51–75%; 4–6 interactions), high (76–90%; 7–10 interactions), and very high (91–100%; 11–38 interactions); low was the reference group.

Covariates.

Six covariates were included in all models. All covariates were obtained from the sociobehavioral surveys or laboratory procedures.

GBMSM stigma. We asked participants to respond ''yes'' or ''no'' to the question ''in the past 12 months, have you experienced any type of mistreatment for being a man who has sex with men (gay, bisexual, etc.)?''

HIV stigma. We asked participants to respond ''yes'' or ''no'' to the question ''in the past 12 months, have you experienced any type of mistreatment because you live with HIV?''

Adherence. We asked participants to respond ''yes'' or ''no'' to the question ''in the past 6 months, have you suspended your ART?''

Retention. We asked participants to respond ''yes'' or ''no'' to the question ''in the past 6 months, have you missed an HIV-related appointment?''

Parent study group. We created a dummy variable to control for the parent study intervention group (1 = stable and decentralized to smaller clinic; 2 = stable and decentralization-eligible, but stayed at main clinic; 3 = newly diagnosed and/or unstable; received care at main clinic).

Viral load. We obtained viral load count (copies/mL) from laboratories collected as part of the study at baseline and endline to account for participant's state of HIV care.

Moderator variable

Social support. We used a reduced version of the Medical Outcomes Study Social Support (MOS-SS) scale including 13 items.[31] We created a total social support variable by summing the score from all 13 items from the baseline survey, with a higher score indicating more social support (Cronbach's $\alpha = 0.89$, $p < 0.001$).

Data analysis

To evaluate our first objective, we used first difference estimation to assess if navigation frequency, duration, proportion of in-person navigator interactions, and levels of emotional, instrumental, and informational navigation support were associated with anxiety and depression (separate models), controlling for covariates. First difference estimation is an extension of fixed-effects regression used to control for all stable characteristics of individuals, observed or unobserved, in longitudinal analyses.[32] We report the multiple correlation coefficient (R^2) to determine how much of change in anxiety and depression was accounted for by health navigation. We assess the beta coefficient estimate and the associated p-value (<0.05 considered significant).

In addition, we assessed moderation of the direct effects of independent variables on anxiety and depression by social support at baseline. To test our hypotheses, we followed Hayes'[33] steps for testing moderation. For the model that included multiple interaction terms, we conducted an incremental *F*-test to determine the significance of the set of interaction terms. All analyses were conducted using SAS version 9.4.

Results

Sample characteristics

As reported in Table 1, mean age was 30 years (range, 18–63). The majority of participants self-identified as gay (74.9%) and Mestizo/Ladino (mixed Indigenous, European, and African ancestry; 87.9%). Nearly half (46.0%) had at least some college education and the majority (76.0%) were employed at the time of the survey; median monthly income was USD $378 (range, $0–3934). Mean time since HIV diagnosis was 4.3 years (range, 0–29). At baseline, nearly a third screened positive for anxiety (28.9%) and 19.1% screened positive for depression. In the previous 12 months, 18.8% and 5.5% reported experiencing stigma based on their sexual orientation and HIV status, respectively. A third (32.4%) had interrupted ART and 13.6% had missed an HIV appointment in the previous 6 months; 66.8% were virally suppressed at baseline.

Table 1. Baseline Sociodemographic Characteristics of Study Participants ($N=346$)

Variables	N *(%)*
Age (mean, range)	30 (18–63)
Ethnicity	
Mestizo/Ladino	304 (87.9)
Maya/Xinka (indigenous)	31 (9.0)
Garífuna	1 (0.3)
White	1 (0.3)
Other	5 (1.5)
Sexual orientation	
Gay	259 (74.9)
Bisexual	81 (23.4)
Heterosexual	6 (1.7)
Education	
No education	4 (1.2)
Some/completed primary	31 (9.0)
Some/completed secondary	152 (43.9)
Some/completed university	159 (46.0)
Currently employed	263 (76.0)
Monthly salary in USD (median, range)	378 (0–3934)
Mental health	
Screened for anxiety	100 (28.9)
Screened for depression	66 (19.1)
Stigma	
Stigma based on sexual orientation	65 (18.8)
Stigma based on HIV status	19 (5.5)
HIV outcomes	
Stopped ART	112 (32.4)
Missed HIV appointment	47 (13.6)
Undetectable HIV viral load	231 (66.8)
Parent study group	
Group 1	118 (34.1)
Group 2	119 (34.4)
Group 3	109 (31.5)

HIV, human immunodeficiency virus; ART, anti-retroviral therapy.

Health navigation utilization

As reported in Table 2, the median number of navigation interactions during the 12-month intervention period was 10 (range, 1–46) and the median proportion of in-person navigation interactions was 0.33 (range, 0.00–1.00). Over the course of the 12 months, the median duration of total navigation interaction was 600 min (range, 0–3444); the median duration of phone calls was 6 min (range, 1–60); and the median duration of in-person interactions was 180 min (range, 2–540).

Multivariable and moderation analyses

In multivariable analyses, we found a marginally significant association between frequency of navigator interactions and anxiety. For every 10 additional navigator interactions of any type, anxiety improved by 0.3 points [$B=-0.03$, standard error (SE) $=0.01$, $p=0.05$], after adjusting for covariates (Table 3). In addition, participants who received very high levels of informational navigator support experienced a 0.81 point improvement in anxiety compared with those receiving low levels of informational support ($B=-0.81$, SE $=0.40$, $p=0.04$) after adjusting for covariates; contrary to expectations, emotional and instrumental navigation support were not significantly associated with anxiety. Unexpectedly, after adjusting for covariates, we also found a positive association between in-person navigation interactions and anxiety; within the same time period, as the proportion of in-person

Table 2. Health Navigation Utilization Among Gay, Bisexual, and Other Men Who Have Sex with Men (GBMSM) Living with HIV in Guatemala ($N=346$)

Variables	n *(%)*
Frequency of navigation interactions (median, range)	10 (1–46)
Minutes of navigation interactions (median, range)	600 (0–3440)[a]
Proportion of in-person navigation interactions (median, range)	0.33 (0.00–1.00)
Level of emotional navigation support	
Low	171 (49.4)
Medium	97 (28.0)
High	41 (11.9)
Very high	37 (10.7)
Level of instrumental navigation support	
Low	163 (47.1)
Medium	91 (26.3)
High	68 (19.7)
Very high	24 (6.9)
Level of informational navigation support	
Low	181 (52.3)
Medium	85 (24.6)
High	43 (12.4)
Very high	37 (10.7)

[a]Some remote interactions were 0 min due to the nature of the interaction, such as appointment reminders.

Table 3. Multivariable Results of Navigation on Anxiety and Depression Among Gay, Bisexual, and Other Men Who Have Sex with Men (GBMSM) Living with HIV in Guatemala ($N = 346$)

	Anxiety				*Depression*			
	Estimate	*SE*	p-*Value*	R^2	*Estimate*	*SE*	p-*Value*	R^2
Model 1[a]			**<0.001**	0.07			0.12	0.03
Navigation frequency	−0.03	0.01	**0.05**		−0.01	0.01	0.22	
Model 2[a]			**<0.01**	0.06			0.11	0.03
Navigation minutes	−0.0002	0.0002	0.48		−0.0003	0.0002	0.18	
Model 3[a]			**0.03**	0.07			0.16	0.03
Proportion of in-person Nav Interactions	1.12	0.54	**0.04**		0.35	0.47	0.47	
Model 4[a]			**<0.01**	0.08			0.18	0.06
Medium emotional Nav support	0.21	0.26	0.42		0.24	0.23	0.29	
High emotional Nav support	−0.02	0.38	0.95		−0.25	0.33	0.44	
Very high emotional Nav support	0.36	0.41	0.39		0.51	0.36	0.15	
Medium instrumental Nav support	−0.20	0.27	0.46		−0.25	0.23	0.29	
High instrumental Nav support	−0.04	0.30	0.89		−0.06	0.26	0.82	
Very high instrumental Nav support	−0.13	0.46	0.78		−0.50	0.40	0.21	
Medium informational Nav support	0.05	0.28	0.86		−0.18	0.24	0.46	
High informational Nav support	−0.39	0.35	0.28		−0.17	0.31	0.58	
Very high informational Nav support	−0.81	0.40	**0.04**		−0.60	0.34	0.08	

Bold indicates statistically significant ($p < 0.05$).
[a]All models controlled for GBMSM stigma, HIV stigma, viral load, adherence, retention, and parent study group.
GBMSM, gay, bisexual, and other men who have sex with men; HIV, human immunodeficiency virus; SE, standard error.

navigation interactions increased, anxiety worsened ($B = 1.12$, SE = 0.54, $p = 0.04$). Duration (total minutes) of navigation was not significantly associated with anxiety, and no aspects of navigation were significantly associated with depression in any of our models. Baseline social support did not significantly influence the relationship between navigation and anxiety and depression in any of our models.

Discussion

We found mixed results in how different characteristics of health navigation may have affected the mental health of GBMSM living with HIV. Frequency of navigator–participant interactions and high levels of informational navigation support were associated with improved anxiety ($p = 0.05$ and $p = 0.04$, respectively). A higher proportion of in-person navigator–participant interactions, however, was significantly associated with worsened anxiety ($p = 0.04$). No characteristics of navigation were significantly associated with depression. Our finding that, in general, more interaction with a navigator may contribute to improved anxiety among this population partially supports our hypothesis and suggests that the quantity of navigation interactions plays an important role in observing a change in mental health. Although no literature exists examining the frequency of health navigation interactions on mental health among PLHIV, previous studies of peer navigators among people living with severe mental illness found that weekly peer support resulted in fewer hospitalizations.[15] Similarly, previous work by Cabral et al. found that early, intensive frequency of contact with a peer navigator among PLHIV can improve HIV outcomes, such as retention in HIV care.[34] Understanding how frequency of navigator interactions affects health outcomes is important for scale-up. Future studies should explore if there is an ideal range of frequency of interactions to reduce anxiety.

Unexpectedly, we found that more in-person navigation support was significantly associated with higher levels of anxiety. Although our methods controlled for many characteristics, it is possible that other anxiety-invoking circumstances that required more in-person navigator support, such as ending a relationship or change in employment status, may explain this finding. Future navigation studies should document who initiated communication (navigator or participant) to assess if more anxious participants seek more navigation support. In addition, participants' awareness of the end of navigation support may have produced anxiety. In a metasynthesis of qualitative data on health navigation among PLHIV, participants from several studies described increased anxiety as navigation interventions ended and they worried about a future without a navigator.[35] This highlights the importance of preventing dependency on navigators and having an intentional off-boarding process for interventions that include these relational components.[21,35]

Contrary to our hypothesis, higher levels of informational navigator support were significantly associated with improved anxiety, but not emotional or instrumental navigator support. Although emotional support has been found to be particularly important to the mental health of sexual minorities, our results mirror findings from another navigation intervention among racial and ethnic minorities living with HIV in the United States that highlighted the importance of informational support over other types of support on a variety of health outcomes.[34] As the mean time since HIV diagnosis was 4.3 years in our sample, this also emphasizes the importance of ongoing informational support among all PLHIV. In addition, the significant effect of informational support on anxiety may be explained by recognizing that anxiety is a fear or worry that typically occurs when an individual faces a threat to self-preservation, and is often associated with the future and potential negative outcomes.[36] HIV-related and other informational support provided by

navigators may therefore help to reduce the uncertainty about possible future threats to participants' health and well-being, a key component of reducing anxiety.[36]

Although anxiety is associated with a future orientation, depression is often associated with a past orientation, caused by some sort of goal loss that results in sadness and/or distress.[36] This may explain why we did not find any significant associations between different characteristics of navigation and depression. The support provided by navigators all focused on improving HIV outcomes, such as retention in care and ART adherence. Although they often assisted participants in solving problems (both HIV-related and not), their focus was almost always geared toward future goals. There was little opportunity for navigators to address past events in participants' lives that may have contributed to depressive symptoms. Other peer-delivered interventions that provided informational, emotional, affirmational, and practical support to participants with a variety of health conditions (not including HIV) also found no effect on depression.[37]

Our finding that baseline social support did not moderate the effect of different aspects of navigation on anxiety or depression may be owing to the fact that the MOS-SS scale we used to measure social support focuses on support provided by family and friends, which is different from support provided by navigators.[31] Although participants may have reported more social support from family and friends to assist with everyday circumstances and challenges, it is possible that this support did not address their HIV-related needs. This would be especially true of participants who had not disclosed their HIV status to family and friends.

There are several limitations to our study. Because of the nature of our study design, we are unable to assess causation. However, we used an approach that allowed us to approximate the change in mental health over the same time period they were exposed to navigation, controlling for all time-invariant variables and many plausible time-varying confounders. In addition, although navigators were trained and periodically reviewed, variability across navigators' provision and documentation of support is possible. Furthermore, the categorization of levels of emotional, instrumental, and informational navigation support may not reflect the complete nature of each interaction and are limited to the services provided by navigators in our intervention. Navigation-like interventions in other settings often provide additional forms of instrumental support, such as provision of transportation and food incentives, which may impact mental health of those navigated.[38]

To improve the mental health of key populations affected by HIV, health navigation programs should prioritize frequent interaction and informational navigation support for clients with anxiety while considering other strategies that specifically target reducing depressive symptoms. Promoting navigation services to clients with high anxiety is essential to ensuring that those with the biggest need are reached, as research in the United States has found that over a third of PLHIV did not use health navigation despite having a need for it.[39] Although our findings suggest that navigation interventions may have a positive impact on anxiety among GBMSM living with HIV, many interactions between a navigator and patient were needed to see a significant effect. This may be cost-prohibitive in some settings. Future research should explore if certain components of health navigation, such as informational support, may be delivered in other cost-effective modalities. For example, mHealth interventions have been found to improve HIV outcomes, anxiety, and depression in low- and middle-income countries and among GBMSM.[40–43]

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