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The Effect of State Changes in the Availability of LGBT-specific Mental Health Services on LGBT Mental Health Outcomes, 2015-2018

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By

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An abstract of a thesis submitted to the Faculty of the Rollins School of Public Health of Emory University in partial fulfillment of the requirements for the degree of Master of Public Health in Behavioral, Social, and Health Education Sciences 2021

Abstract

Purpose: LGBT individuals experience poorer mental health status and worse outcomes across multiple health indicators than their non-LGBT counterparts. LGBT individuals also face other access barriers to mental health services particularly due to discrimination, stigma, and prejudice. Available LGBT-specific mental health services may improve LGBT individuals' mental health status through employing evidence-based treatment modalities and decreasing access barriers to use mental health services. We examined the population-level impact of LGBT-specific mental health services through available national health survey data.
Methods: The study merged 2015-2018 data from the National Mental Health Services Survey (NMHSS) and Behavioral Risk Factor Surveillance System (BRFSS). We determined how state availability of LGBT-specific services changed across twelve study states. Next, we conducted difference-in difference-in-difference (DDD) regressions to estimate the effect of these changes on mental health outcomes of LGBT individuals (N=18,415) in study states.
Results: LGBT individuals experienced worse outcomes across all reported mental health indicators. Compared to non-LGBT participants, LGBT participants also reported disparities in key social determinants of health and healthcare utilization. Specifically, LGBT participants compared with non-LGBT respondents reported disparities related to insurance access (84.15% [82.96%, 85.35%] vs. 89.37% [89.11%, 89.62%]; p=<0.0001), income (14.50% [13.45%, 15.54%] vs. 8.62% [8.40%, 8.83%] more likely to make <$15,000 a year and 39.54% [38.11%, 40.97%] vs. 52.30% [51.96%, 52.65%] less likely to make $50,000+ a year; p=<0.0001), education level (16.90% [15.64%, 18.15%] vs. 11.50% [11.23%, 11.77%] more likely to not graduate from high school and 25.22% [24.22%, 26.23%] vs. 28.18% [27.93%, 28.43%] less likely to graduate from college or technical school; p=<0.0001), and employment status (48.39% [46.98%, 49.80%] vs. 49.19% [48.87%, 49.52%] less likely to be employed for wages, 3.90% [3.14%, 4.66%] vs. 2.44% [2.33%, 2.55%] more likely to be out of work for >1 year and 8.34% [7.61%, 9.07%] vs. 6.16% [6.00%, 6.31%] unable to work; p=<0.0001). From 2015 to 2018, there was a statistically significant increase in the percentage of clinics offering LGBT-specific mental health services (p=<0.0001). However, DDD estimates showed no statistically significant effect of state LGBT-specific mental health services and number of mentally unhealthy days (b=-.03 [-0.54,.47]), physically unhealthy days (b=0.01 [-0.43, 0.45]), having a routine check-up in the past year (OR=1.10 [0.97, 1.24]), or self-rated health (OR=1.02 [0.89, 1.16]).
Conclusions: With increasing LGBT-specific mental health services availability, policies or healthcare institution practice modifications should address social determinants that underlie a need for LGBT-specific mental health services and prevent LGBT individuals from accessing mental health services. Moreover, more states should report LGBT health data to national surveys to improve LGBT mental health policy making.
Keywords: mental health, LGBT-specific mental health services, BRFSS, NMHSS

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I am incredibly grateful for all the support I received from multiple individuals to successfully write and defend my thesis, particularly under a global pandemic context. I extend a special note of gratitude to Dr. Livingston, my thesis chair. First off, I am grateful that you taught me to become comfortable as a quantitative researcher. Not only did you build my skill base, but you also were an encouraging and personable mentor as I acquired new knowledge. Thank you for your editing support and willingness to be available by email or Zoom for questions across each stage of my thesis. I am grateful as well for the help of Dr. Walker, who served on my committee. Thank you for offering your mental health expertise to my thesis as a whole and feedback on my chapters. Thank you for being available for questions through Zoom meetings and for your incredible ability to offer the emotional support necessary to achieve this milestone. Thank you both for your flexibility and attentiveness to my needs outside of the thesis, especially with the thesis being conceptualized and written under the pandemic context. Additionally, thank you for taking the time to talk about and offer references to support my post-MPH plans. I would also like to extend gratitude to my amazing friends I have made at Rollins with whom I had scheduled thesis accountability sessions. I am also grateful to my amazing circle of friends from college and family and friends in Boston who consistently offered love and encouragement throughout this process.

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Chapter 1: Introduction

Lesbian, gay, bisexual, and transgender (LGBT) individuals confront mental health and mental health-related physical health conditions such as depression, anxiety, substance use disorder, certain cancers, and functional limitations at higher rates than their non-LGBT counterparts (King et al., 2008; Medley et al., 2016; Wanta, Niforatos, Durbak, Viguera, & Altinay, 2019; Quinn et al., 2015; Frederiksen-Goldsen, Kim, Shui, & Bryan, 2017). Minority stress explains why LGBT individuals experience these health disparities (Meyer, 2003). For LGBT individuals, minority stress is defined as stress that is caused by the perceptions that LGBT individuals have of themselves not matching to social constructs imposed by a heteronormative or cisnormative dominant culture (Meyer, 2003). Therefore, LGBT individuals experience stress that is additive to and distinct from stress experienced by all individuals and that is stable because of prevailing social constructs (Meyer, 2003). Discrimination, stigma, and prejudice experienced by LGBT individuals because of their minority position are managed through effective or maladaptive coping (Hatzenbuehler, 2009; Balsam, Martell, & Safren, 2006). Access to mental health services may support LGBT individuals to more effectively cope with minority stress (Whaibeh, Mahmoud, & Vogt, 2009).

LGBT individuals' ability to access mental health services, however, is impacted by the same social constructs that create minority stress (Whaibeh, Mahmoud, & Vogt, 2009; Meyer, 2003). Discrimination, stigma, and prejudice impose barriers to access mental health services for LGBT individuals at the interpersonal, institutional, and policy levels (Whaibeh, Mahmoud, & Vogt, 2009). At the interpersonal level, providers may discriminate against LGBT individuals or stigmatize their LGBT identity through using abusive and harsh language, not recognizing when LGBT individuals seek care to address LGBT health challenges, or not having training to

provide appropriate care ("When Health Care Isn't Caring", 2010; Bonvicini, 2017; Whitehead, Shaver, & Stephenson, 2016). Healthcare institutions may discriminate against LGBT individuals and stigmatize their identity by not having protocols or policies in place that use LGBT-inclusive language (Wingo, Ingraham, & Roberts, 2018). These institutions may enact prejudice by refusing health services to LGBT individuals which is common among religiously affiliated healthcare institutions (Smith & Turell, 2017). Policies at the state and federal level enable institutions and providers to refuse health services to LGBT individuals or they create insurance barriers to access these services (Bonvicini, 2017; Coursolle & Holtzman, 2019). Multi-level barriers restrict access to mental health services for LGBT individuals and compromise their utilization of these services (Whaibeh, Mahmoud, & Vogt, 2009).

LGBT individuals' utilization of mental health services in the face of access barriers depends on the interaction of these access barriers with individual circumstances that predispose, enable, or encourage a need to use mental health services (Babitsch, Gohl, & von Lengerke, 2012). For example, an LGBT individual with low knowledge of available mental health services (predisposing factor) but who seeks general health services regularly (enabling factor) with a provider that prompts them to perceive a need for mental health services (need-based factor) may utilize mental health services even when confronted with access barriers (Bonvicini, 2017; Smith & Turell, 2017; Whaibeh, Mahmoud, & Vogt, 2009). Nonetheless, other LGBT individuals may still be unable to utilize mental health services, or they may utilize mental health services that do not meet their needs depending on how access barriers combine with individual circumstances of utilization (Whaibeh, Mahmoud, & Vogt, 2009; Babitsch, Gohl, & von Lengerke, 2012).

LGBT-affirming mental health services offer a solution to reduce access barriers that impact LGBT individuals' utilization of mental health services and their mental health status

(Pachankis, 2018). In being framed within a minority stress lens, these services aim to reduce discrimination, stigma, and prejudice, as they affect LGBT individuals, through various treatment targets and the delivery setting of treatment (Pachankis, 2018; Meyer, 2003). Treatment targets of LGBT-affirming mental health services include addressing how minority stress contributes to low self-worth and high social isolation among LGBT individuals (Hatzenbuehler, 2009; Pachankis, 2018). These services may also target LGBT-specific health topics such as body image issues and HIV risk through a minority stress lens (Pachankis & Bränström, 2018; Hamilton & Mahalik, 2009; Pachankis et al., 2015). These services are typically delivered in reduced stigma settings with other LGBT individuals (Pachankis, 2018; Meyer, 2003). LGBT-affirming mental health services may improve mental health outcomes for LGBT individuals and their access to and utilization of mental health services by acknowledging minority stress (Pachankis, 2018; Meyer, 2003; Whaibeh, Mahmoud, & Vogt, 2009).

Problem Statement

Barriers that LGBT individuals confront to access mental health services are well documented. These access barriers interrupt the mechanisms through which LGBT individuals may utilize mental health services to improve mental health. LGBT-affirming mental health services may decrease discrimination, stigma, and prejudice that LGBT individuals face to access mental health services. Whether these services improve mental health outcomes tied to specific LGBT health disparities is sparsely documented. Moreover, if mental health outcomes of LGBT individuals improve based on the degree to which LGBT-affirming mental health services are available across states is poorly understood.

Purpose Statement and Research Questions

The aim of this study is to assess the impact of LGBT-affirming mental health services based on the availability of these services in states and across years through a difference-in-difference-in-difference design. This design will illuminate how changes in the availability of these services have affected specific LGBT mental health-related health outcomes. The research questions for the study are:

1. Do state-level changes in the availability of LGBT-affirming mental health services between 2015-2018 improve:
    a. the number of mentally unhealthy days that LGBT individuals experience?
    b. the number of physically unhealthy days that LGBT individuals experience?
    c. LGBT individuals' self-reported health?
    d. LGBT individuals' likelihood of receiving routine healthcare?

Theoretical Framework

The minority stress model provides an overarching framework for the current study (Meyer, 2003). This model understands that LGBT health disparities result from the continual discrimination, stigma, and prejudice that LGBT individuals experience under a heteronormative or cisnormative dominant culture (Meyer, 2003). The treatment targets and setting of delivery of LGBT-affirming mental health services are grounded in the minority stress model (Pachankis, 2018; Meyer, 2003). These services aim to reduce discrimination, stigma, and prejudice that contribute to LGBT individuals' stress, exacerbate health disparities, and that are present for LGBT individuals to access mental health services (Pachankis, 2018; Meyer, 2003). The Behavioral Model of Health Services Utilization (BMHSU) is paired with the minority stress model in the current study to hypothesize how access barriers to mental health services may be

reduced through LGBT-affirming mental health services (Babitsch, Gohl, & von Lengerke, 2012). Access determinants interact with individual-level characteristics that predispose, enable, or encourage a need to utilize health services (Babitsch, Gohl, & von Lengerke, 2012). An improved understanding of how LGBT-affirming mental health services impact mental health outcomes based on their current availability would target strategies, informed by a minority stress perspective, to improve access to these services and increase their utilization.

Significance Statement

LGBT-affirming mental health services may improve LGBT mental health outcomes while simultaneously addressing access barriers that LGBT individuals confront to use mental health services. Both LGBT mental health status and access barriers that LGBT individuals face to use mental health services are affected by discrimination, stigma, and prejudice. As LGBT-affirming mental health services become more available, it is important to study the impact of these services on LGBT mental health outcomes in order to increase their accessibility. It would then be possible to see if these services are having their intended effect of improving LGBT mental health outcomes when they can be used or how they could be better used or delivered.

Chapter 2: Literature Review

Overview of LGBT Mental Health Status and Mental Health-related Health Outcomes

LGBT individuals experience higher rates of mental health problems such as anxiety, mood disorders, and suicide compared to their non-LGBT counterparts (King et al., 2008). Depression and anxiety risk for LGB individuals is 1.5 times higher than for non-LGB individuals and LGB individuals are more than twice as likely to have attempted suicide compared to their non-LGB peers (King et al., 2008). Population-level research on transgender mental health is limited; one indicator suggests that transgender individuals are 2.5 times more likely to have attempted suicide than non-transgender individuals (Su et al., 2016). The risk of experiencing any mental health condition is three times higher for LGBT individuals than non-LGBT individuals (Medley et al., 2016).

Consequences of poor mental health among LGBT individuals also exacerbate other health conditions (Potter & Patterson, 2019). LGB individuals are twice as likely to experience a substance use disorder compared to heterosexual individuals and transgender individuals are four times as likely to experience a substance use disorder compared to cisgender individuals (Medley et al. 2016; Wanta, Niforatos, Durbak, Viguera, & Altinay, 2019). LGBT adults are also at an increased risk of cardiovascular disease due to the intersection of poor mental health with elevated tobacco and alcohol use (Caceres et al., 2017). Alcohol and tobacco use, obesity, and engagement in risky sexual behaviors which are higher among LGBT individuals due to elevated stress, also contribute to higher cancer risk for LGBT individuals (Quinn et al., 2015). Stress associated with stigma and discrimination experienced by LGBT individuals with healthcare providers results in delayed initiation of screening for risk factors for cancer and other health conditions (Damaskos, Amaya, Gordon, & Walters, 2018). Therefore, LGBT individuals are

affected by conditions such as cancer diagnosis at later stages of disease progression (Damaskos, Amaya, Gordon, & Walters, 2018). For older LGBT adults, experiencing stress across the life course leads these individuals to have weaker immune systems and a higher degree of chronic physical health problems and functional limitations (Frederiksen-Goldsen, Kim, Shui, & Bryan, 2017; Frederiksen-Goldsen, Kim, Barkan, Muraco, Hoy-Ellis, 2013; Gonzales & Henning-Smith, 2015). Understanding the social mechanisms that create stress and contribute to poor mental and physical health outcomes is important for addressing LGBT mental health needs (Meyer, 2003).

The Social Environment Creates Poor Mental Health Outcomes for LGBT Individuals

Social stress is a concept that links how conditions in the social environment result in mental health problems (Meyer, 2003). Individuals belonging to stigmatized social categories are more likely to experience social stress because of prejudice and discrimination (Crocker, Major, & Steele. 1998). Minority stress is the specific application of the social stress concept to individuals with minority identities who experience stress because of their stigmatized minority position (Meyer, 2003). How individuals of stigmatized minority groups perceive themselves is not matched to expectations imposed by the dominant culture (Lazarus & Folkman, 1984). In this sense, minority stress is additive stress to that experienced by all individuals and it is persistent because the social constructs that create it are stable (Meyer, 2003).

Universal factors across minority groups and LGBT-specific factors determine how minority stress is processed and coped with by LGBT individuals to impact mental health outcomes (Pachankis, 2018; Meyer, 2003). Negative social attitudes towards LGBT individuals, because of their minority group status, become internalized by LGBT individuals (Meyer, 2003). LGBT individuals, for example, may experience workplace discrimination and thus further

conceal their identity (Wax, Coletti, & Ogaz, 2018). Consistent experiences of prejudice may lead to internally stigmatized beliefs about one's LGBT identity (Meyer & Dean, 1998). How LGBT individuals process internalized stigma depends on how they weigh their LGBT identity with other identities, especially if they are part of other minority groups, or integrate it with other identities based on their degree of acceptance of being LGBT (Deaux, 1993; Rosenberg & Gara, 1985; Thoits, 1999). Social support and community affiliation may buffer the impact of minority stress by improving self-esteem, reducing psychological distress, or providing connection to available mental health services (Branscombe, Schmitt, & Harvey, 1999; Crocker & Major, 1989; Miller & Major, 2000; Trujillo, Perrin, Sutter, Tabaac, & Benotsch, 2017).

Multi-Level Barriers Impact Access to Mental Health Services Among LGBT Individuals

Further understanding LGBT individuals' access barriers to mental health services is important because LGBT individuals may delay or forego mental health services use if available services exacerbate the mental health consequences of minority stress (Whaibeh, Mahmoud, & Vogt, 2009; Jaffee, Shires, & Stroumsa, 2016). At the interpersonal and institutional level, discrimination in healthcare settings prevents LGBT individuals from accessing mental health services (Coursolle & Holtzman, 2019). At the interpersonal level, discrimination from providers not only imposes barriers for LGBT individuals to receive needed mental health treatment but it also alters their evaluated desire to seek treatment (Whitehead, Shaver, & Stephenson, 2016). Providers may discriminate against LGBT individuals by using harsh or abusive language during patient encounters or blaming LGBT individuals for their health status ("When Health Care Isn't Caring", 2010). This discrimination is increased for LGBT individuals from low-income households and for LGBT individuals of color (Gilman et al., 2001). Having a strong patient-

provider relationship is particularly important in the context of receiving mental health care (Coursolle & Holtzman, 2019). LGBT individuals must disclose their identity for mental health treatment to better target their needs and life experiences as individuals belonging to marginalized social groups (Hollander, 2013). In doing so, they confront stigma that is additional to that caused by seeking mental health treatment generally (Whitehead, Shaver, & Stephenson, 2016). While stigma maybe reduced if providers and the institutions with which they are affiliated encourage LGBT individuals to receive care that meets their needs, there is a shortage of providers who are trained to understand LGBT mental health needs (Bonvicini, 2017). This shortage stems from training not being available, mandatory or updated with current knowledge (Bonvicini, 2017). Provider-patient barriers for LGBT individuals to access mental health services are related to institutional practices and policies (Whaibeh, Mahmoud, & Vogt, 2009).

Healthcare settings impose discriminatory practices and policies that impact LGBT individuals' experiences receiving care with their providers and at the institutions where their providers work (Whaibeh, Mahmoud, & Vogt, 2009). For example, institutional intake forms or protocols for LGBT individuals to receive services maybe cis- or heteronormative (Wingo, Ingraham, & Roberts, 2018). Moreover, having one's identity invalidated within healthcare institutions may make LGBT individuals less likely to seek care at certain institutions (Wingo, Ingraham, & Roberts, 2018). Institutions may also enact prejudice by refusing health services to LGBT individuals, which is particularly the case with some religiously affiliated institutions (Smith & Turell, 2017). Religious refusal to provide health services may exacerbate the mental health challenges for which LGBT individuals are seeking health services within accessible healthcare settings in the first place (Smith & Turell, 2017). Some religious-based institutions may not offer assisted reproductive technologies or gender-affirming surgeries which may affect

the mental health of LGBT individuals who seek these services (Shepherd et al., 2018). Mental health services that are offered along with these LGBT-specific health services may not be available within religious-based institutions (Ayvaci, 2017).

Policy-level factors exacerbate interpersonal and institutional barriers for LGBT individuals to access mental health services (Coursolle & Holtzman, 2019). Multiple federal and state laws have been passed to restrict LGBT individuals to access health services (Whaibeh, Mahmoud, & Vogt, 2009; Bonvicini, 2017). Federal legislation has allowed individual providers to refuse to provide health services, including lifesaving care, to LGBT individuals based on personal religious beliefs (Bonvicini, 2017). State legislation has allowed local businesses to refuse to provide services to LGBT individuals based on perceived sexual or gender minority status (Bonvicini, 2017). Moreover, some states have recently reversed laws that have ensured LGBT individuals' right to healthcare (Bonvicini, 2017). These laws may result, for example, in screenings for sexually transmitted infections for gay and bisexual men, gender affirmation treatment for transgender individuals, and fertility treatments for lesbian women or couples to not be provided (Mirza & Rooney, 2019). Not having access to these health services that allow for identity disclosure may inhibit LGBT individuals from being referred to non-discriminatory and non-stigmatizing mental health services (Centers for Disease Control and Prevention, 2020).

Policies related to health insurance also create issues for LGBT individuals to access mental health services (Coursolle & Holtzman, 2019). For example, some state Medicaid programs do not cover medications or behavioral therapy for opioid use disorders (Kaiser Family Foundation, 2020). LGBT individuals are more likely to have substance use disorder and be living in poverty compared to heterosexual individuals, further necessitating Medicaid coverage to access health services (Schuler, Rice, Evans-Polce, & Collins, 2018). Having access to private

insurance coverage, however, does not guarantee access to mental health services for LGBT individuals (Coursolle & Holtzman, 2019). Even with new Affordable Care Act protections which require insurance plans to offer mental health services in parity with other medical benefits, LGBT individuals still encounter barriers to access mental health services that meet their specific mental health needs (National Alliance on Mental Illness; Coursolle & Holtzman, 2019). Both insurance network and geographic barriers impose difficulties for LGBT individuals to access mental health services with providers who acknowledge some LGBT health challenges (Coursolle & Holtzman, 2019). These providers maybe in different states or regions than where LGBT individuals reside, especially if they reside in a rural setting (Whaibeh, Mahmoud, & Vogt, 2009). Most mental health services in the United States are offered in urban tertiary health centers (Whaibeh, Mahmoud, & Vogt, 2009). Insurance plans across regions also vary in terms of providers who are trained to address LGBT mental health needs (Coursolle & Holtzman, 2019). Some insurance plans may also require LGBT individuals to incur treatment costs for mental health conditions related to LGBT identity (The Kennedy Forum). For example, transgender individuals may have to share costs to treat gender dysphoria-induced anxiety, a common condition that results from the mismatch between their biological sex and gender identity (Coursolle & Holtzman, 2019).

Access Barriers Impact the Utilization of Mental Health Services by LGBT Individuals

The previously mentioned barriers to access mental health services interact with predisposing, enabling, or need-based mechanisms at the individual level to determine if LGBT individuals use mental health services (Babitsch, Gohl, & von Lengerke, 2012). Predisposing mechanisms include LGBT individuals' biological sex, race, partnership status, and knowledge of available health services, which make some LGBT individuals more or less likely to use

mental health services (Mirza & Rooney, 2019; Gilman et al., 2001; Bonvicini, 2017). Health insurance and poverty status, place of residence, and whether healthcare is provided regularly to LGBT individuals may enable or further prohibit their use of mental health services (Coursolle & Holtzman, 2019; Gilman et al., 2001; Whaibeh, Mahmoud, & Vogt, 2009; Wingo, Ingraham, & Roberts, 2018; Smith & Turell, 2017). Depending on whether LGBT individuals are prompted by providers or their own evaluation of their health status to perceive a need for certain health services related to their LGBT identity, they may be more or less likely to use mental health services to address mental health challenges (Whaibeh, Mahmoud, & Vogt, 2009). Reducing discrimination, stigma, and prejudice to access mental health services may alter how the previously mentioned mechanisms and characteristics determine the use of mental health services (Whaibeh, Mahmoud, & Vogt, 2009; Babitsch, Gohl, & von Lengerke, 2012).

LGBT-Affirming Services May Decrease Access Barriers that LGBT Individuals Confront to Use Mental Health Services and Improve LGBT Individuals' Mental Health Needs

LGBT-affirming mental health services may reduce access barriers to use mental health barriers for LGBT individuals by recognizing how discrimination, stigma, and prejudice affect LGBT individuals' ability to access mental health services (Pachankis, 2018). The treatment targets and delivery methods of these services are informed by the discrimination, stigma, and prejudice faced by LGBT individuals and thus may also address their mental health needs (Pachankis, 2018). These services may target emotions such as guilt, hopelessness, and low self-worth and forms of emotional processing such as rumination and social isolation through understanding the influence of social conditions and structures that lead to these emotions and forms of emotional processing due to LGBT minority stress (Hatzenbuehler, 2009). In addition, these services may address how LGBT individuals internalize stigma, for example, through

concealing identity, having a distorted body image or expectations of rejection, or practicing HIV risk behaviors (Pachankis & Bränström, 2018; Hamilton & Mahalik, 2009; Pachankis et al., 2015). These services may reveal characteristics of LGBT identity that lead to internalized stigma, for example, negative self-evaluation which prevents LGBT individuals from coming out (Hossain & Ferreira, 2019). Outside of mitigating the effects of negative emotional processing, these services teach coping mechanisms that LGBT individuals may use to deal with stressful experiences (Balsam, Martell, & Safren, 2006). LGBT-affirming mental health services are held within settings where social stigma is reduced and therefore, they allow for re-appraisal of stressful events experienced in environments of the dominant culture (Pachankis, 2018; Meyer, 2003). Affiliation with others who identify as LGBT in affirming spaces may mitigate the impact of stress experienced in non-affirming settings due to minority status (Jones et al., 1984).

Understanding Mental Health Effects of LGBT-affirming Mental Health Services Based On Their Availability May Support Improving Access to These Services

LGBT-affirming mental health services may reduce discrimination, stigma, and prejudice that LGBT individuals confront to access mental health services and that contribute to poor mental health outcomes (Pachankis, 2018). The current study will assess if changes in the number of LGBT-affirming mental health services at the state level improve LGBT mental health status and other health indicators tied to minority stress such as physical and self-reported health and regular healthcare provider visits (Potter & Patterson, 2019; Solazzo, Brown, & Gorman, 2018). Knowing how LGBT-affirming services impact LGBT mental health indicators, based on the availability of these services, may inform tailored strategies to reduce access barriers to these services at the interpersonal, institutional, and policy levels so that LGBT individuals may use these services to improve their mental health.

Chapter 3: Student Contribution

The current study grew from discussions with the thesis committee chair, Dr. Melvin Livingston. The MPH student conducted independent research on the use of large-scale population health surveys administered in the United States as they are applied to answer research questions on the health needs of sexual and gender minority populations. After seeing that some large-scale population health surveys address LGBT mental health needs, the MPH student approached Dr. Livingston with the idea to use large-scale population health surveys, namely the Behavioral Risk Factor Surveillance System (BRFSS) and National Mental Health Services Survey (NMHSS) to answer the research questions, indicated in Chapter 1, about LGBT mental health status.

Difference-in-difference-in difference design, a method that the MPH student was oriented to by Dr. Livingston, was chosen to answer the research questions of interest. Through this method, it is possible to isolate the impact of LGBT-affirming mental health services for LGBT individuals within states and control for interventions that may improve both the mental health of LGBT and non-LGBT individuals. Merging NMHSS and BRFSS datasets across years grouped by state would support the use of difference-in-difference-in difference design, a quasi-natural longitudinal experiment design. A single NMHSS item accounts for the percentage of mental health programs that offer LGBT-affirming mental health services in states. Various BRFSS items account for LGBT mental health outcomes and factors that impact the mental health of LGBT individuals in states.

The MPH student established the years 2015-2018, that would be used for data analysis on the merged final dataset. The difference-in-difference-in difference design requires the same states to be used across years. BRFSS adopted a universal sexual orientation and gender identity

module in 2014 to systematically collect LGBT health data across states which, to date, not all 50 states have adopted. The 2015-2018 range would maximize the number of same states with the most current data, while also considering the aforementioned limitation.

To conduct the difference-in-difference-in difference analyses, outcomes and covariates were selected, as detailed in the manuscript. Once basic frequencies were obtained for outcomes and covariates for LGBT individuals and non-LGBT individuals, the MPH student carried out linear or logistic regression analyses in SAS for outcomes for LGBT individuals based on their relationship to the predictor variable, the percentage of mental health programs in states offering LGBT-affirming mental health services, and how this predictor has changed from 2015 to 2018.

First, crude analyses were conducted without individual-level covariates. Next, models were run with individual-level covariates. Finally, state-specific time trends were added to control for potential violations in the parallel trends assumption. To obtain betas for linear regressions, odds ratios for logistic regressions, 95% confidence intervals for all regressions, and basic frequencies for all variables, complex survey analysis was used to reflect the use of a large quantity of nationally representative data.

The thesis writing and manuscript drafting processes were completed independently by the MPH student under the close mentorship of Dr. Livingston. Dr. Livingston offered feedback on chapter drafts and on sections of the manuscript, ensuring the accuracy of methods used and described and results obtained. Thesis committee member, Dr. Walker, consulted on chapter drafts. Drs. Livingston and Walker strategized with the student on journals of choice for the manuscript submission. It was decided that the MPH student would submit to *LGBT Health.*

Chapter 4: Manuscript

The Effect of State Changes in the Availability of LGBT-specific Mental Health Services on LGBT Mental Health Outcomes, 2015-2018

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Abstract

Purpose: LGBT individuals experience poorer mental health status and worse outcomes across multiple health indicators than their non-LGBT counterparts. LGBT individuals also face other access barriers to mental health services particularly due to discrimination, stigma, and prejudice. Available LGBT-specific mental health services may improve LGBT individuals' mental health status through employing evidence-based treatment modalities and decreasing access barriers to use mental health services. We examined the population-level impact of LGBT-specific mental health services through available national health survey data.
Methods: The study merged 2015-2018 data from the National Mental Health Services Survey (NMHSS) and Behavioral Risk Factor Surveillance System (BRFSS). We determined how state availability of LGBT-specific services changed across twelve study states. Next, we conducted difference-in difference-in-difference (DDD) regressions to estimate the effect of these changes on mental health outcomes of LGBT individuals (N=18,415) in study states.
Results: LGBT individuals experienced worse outcomes across all reported mental health indicators. Compared to non-LGBT participants, LGBT participants also reported disparities in key social determinants of health and healthcare utilization. Specifically, LGBT participants compared with non-LGBT respondents reported disparities related to insurance access (84.15% [82.96%, 85.35%] vs. 89.37% [89.11%, 89.62%]; p=<0.0001), income (14.50% [13.45%, 15.54%] vs. 8.62% [8.40%, 8.83%] more likely to make <$15,000 a year and 39.54% [38.11%, 40.97%] vs. 52.30% [51.96%, 52.65%] less likely to make $50,000+ a year; p=<0.0001), education level (16.90% [15.64%, 18.15%] vs. 11.50% [11.23%, 11.77%] more likely to not graduate from high school and 25.22% [24.22%, 26.23%] vs. 28.18% [27.93%, 28.43%] less likely to graduate from college or technical school; p=<0.0001), and employment status (48.39% [46.98%, 49.80%] vs. 49.19% [48.87%, 49.52%] less likely to be employed for wages, 3.90% [3.14%, 4.66%] vs. 2.44% [2.33%, 2.55%] more likely to be out of work for >1 year and 8.34% [7.61%, 9.07%] vs. 6.16% [6.00%, 6.31%] unable to work; p=<0.0001). From 2015 to 2018, there was a statistically significant increase in the percentage of clinics offering LGBT-specific mental health services (p=<0.0001). However, DDD estimates showed no statistically significant effect of state LGBT-specific mental health services and number of mentally unhealthy days (b=-.03 [-0.54,.47]), physically unhealthy days (b=0.01 [-0.43, 0.45]), having a routine check-up in the past year (OR=1.10 [0.97, 1.24]), or self-rated health (OR=1.02 [0.89, 1.16]).
Conclusions: With increasing LGBT-specific mental health services availability, policies or healthcare institution practice modifications should address social determinants that underlie a need for LGBT-specific mental health services and prevent LGBT individuals from accessing mental health services. Moreover, more states should report LGBT health data to national surveys to improve LGBT mental health policy making.
Keywords: mental health, LGBT-specific mental health services, BRFSS, NMHSS

Introduction

LGBT individuals confront mental health conditions such as anxiety and depression at higher rates than their non-LGBT counterparts.[1,2] These mental health conditions increase suicide risk for LGBT individuals.[1,2] Moreover, they cause or exacerbate health conditions for which LGBT individuals are risk susceptible such as substance use disorder, obesity, cancer, and functional limitations.[2–5] Stress in LGBT individuals' social environment contributes to poor mental health and overall health status.[6]

Minority stress theory dictates that individuals belonging to minority groups experience stress because social expectations of dominant groups enact discrimination, stigma, and prejudice onto those who do not meet these expectations.[6] Stress experienced by individuals of minority groups is additive to stress experienced by all individuals and is persistent because social constructs that create it are stable.[6] Minority stress may result in LGBT identity concealment because consistent experiences of discrimination and prejudice create internally stigmatized beliefs about LGBT identity.[6,7] Internalized stigma may impact LGBT individuals' mental health outcomes based on the degree to which LGBT individuals weigh or integrate their LGBT identity with other identities, especially if they belong to other minority groups.[8–10]

LGBT individuals' access to mental health services that could reduce poor mental health consequences caused by minority stress is impacted by discrimination, stigma, and prejudice at the interpersonal, institutional, and policy levels.[6,11] At the interpersonal level, providers may discriminate against LGBT individuals or stigmatize their LGBT identity through using abusive and harsh language, not recognizing when LGBT individuals seek care to address LGBT health challenges, or not having training to provide appropriate care.[12,13] Healthcare institutions may discriminate against LGBT individuals and stigmatize their identity by not having protocols or

policies in place that use LGBT-inclusive language.[14] These institutions may enact prejudice by refusing health services to LGBT individuals, a common practice of religiously-affiliated healthcare institutions.[15] Policies at the state and federal level enable institutions and providers to refuse health services to LGBT individuals or create insurance barriers to access health services.[16]

LGBT individuals' use of mental health services in the face of access barriers depends on the interaction of access barriers with individual circumstances that predispose, enable, or encourage a need to use mental health services.[17] Predisposing characteristics include LGBT individuals' biological sex, race, partnership status, and knowledge of available health services, which make some LGBT individuals more or less likely to use mental health services.[18–20] Health insurance and poverty status, place of residence, and if healthcare is provided regularly to LGBT individuals may enable or further prohibit their use of mental health services.[11,14–16,19] If LGBT individuals are prompted by providers or their own evaluation of their health status to perceive a need for certain health services related to their LGBT identity, they may be more or less likely to use mental health services to address mental health challenges.[11] Reducing discrimination, stigma, and prejudice to access mental health services may alter how the previously mentioned mechanisms determine mental health services use.[11,17]

LGBT-specific mental health services offer a solution to decrease access barriers that impact LGBT individuals' use of mental health services and their health status.[21] These services aim to reduce discrimination, stigma, and prejudice, as they affect LGBT individuals, through various treatment targets and the delivery setting of treatment.[21] Treatment targets of LGBT-specific mental health services include addressing how minority stress contributes to identity concealment, low self-worth, and high social isolation among LGBT individuals.[22–25] These

services may address LGBT-specific health topics such as body image issues and HIV risk through a minority stress lens.[23–25] These services are typically delivered by or with other LGBT individuals.[21,26] Social support and community affiliation within reduced stigma settings may improve self-esteem or reduce psychological distress.[27,28] LGBT-specific mental health services may improve LGBT individuals' health outcomes and their access to and use of mental health services by acknowledging minority stress.[6,21] However, the limited population health data that has assessed the availability of LGBT-specific mental health services across states has found that the percentage of mental health programs that offer LGBT-specific services in states is low for the population density of LGBT individuals in each state.[29]

The goal of this study is to assess: 1) changes in the availability of LGBT-specific mental health services across states from 2015-2018; and 2) the association between changes in the availability of LGBT-specific mental health services across states and LGBT mental health, physical health, and overall health status. It is hypothesized that increases in the availability of services will improve these outcomes.

Methods

Data

The study uses data from the Behavioral Risk Factor Surveillance System (BRFSS) and the National Mental Health Services Survey (NMHSS) from 2015-2018. The BRFSS is a nationally representative cross-sectional survey administered annually to United States adults by the Centers for Disease Control and Prevention. It collects health data from sexual and gender minority respondents through a sexual orientation and gender identity module.[30] The NMHSS is a survey administered annually by the Substance Abuse and Mental Health Services

Administration. It collects information about mental health services offered by healthcare facilities across the United States, such as designated programs for LGBT clients.[31]

Design

We used a difference-in difference-in-difference (DDD) design to estimate the effect of availability of LGBT-specific services on LGBT mental health and service utilization using NMHSS and BRFSS. The DDD design is an extension of the difference-in-difference (DiD) design. In a DiD design, the effect of LGBT-specific services is estimated by within state changes over time in the percentage of clinics that offer LGBT-specific mental health services. The DiD design controls for fixed state and year effects that may influence outcomes of interest. The key assumption of the DiD design is that in the absence of treatment, outcome trends between an intervention and comparison group are the same over time. The DDD design refines this assumption by comparing the estimated DiD effect in a specified intervention group compared to a control group where the intervention is assumed to have no effect. In this study we assume that LGBT individuals as opposed to non-LGBT individuals benefit from LGBT-specific mental health services. Therefore, the additional design control of the DDD isolates the impact of LGBT-specific mental health services for LGBT individuals by removing residual confounding not adequately accounted for by comparisons across states.[32]

Measures

The dichotomous item that we used to assess state availability in LGBT-specific mental health services originates from the NMHSS. It is: "Does this facility offer a mental health treatment program or group designed exclusively for clients in any of the following categories: Lesbian, gay, bisexual, or transgender clients (LGBT)?" Based on mental health clinics that

responded ‘yes’ in each state, we created a new variable to assess the percentage of clinics by state and year with LGBT-specific services.

Outcomes and covariates came from the BRFSS. Outcomes included mental health status, physical health status, overall health status, and routine healthcare. Mental health status was assessed using the item: ‘‘Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?’’. This item is a standard and validated measure used in population-health surveillance of mental health status.[33] Physical health status was assessed using the item: ‘‘Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?’’ This outcome was included because LGBT mental health status is closely integrated with physical health status.[33,34] Overall health status was assessed using the item: “Would you say that in general, your health is…‘excellent, very good, good, fair, poor’” This outcome was dichotomized into excellent/very good/good vs. fair/poor to distinguish disparities among adult sub-groups who report good or better health, and was included due to its validity in predicting mortality and morbidity, especially due to mental health conditions.[35] Routine healthcare was assessed using the item: “About how long has it been since you last visited a doctor for a routine checkup?”. This outcome was dichotomized to assess whether a respondent visited a doctor in the past year, and was included because regular healthcare visits may allow LGBT individuals to receive or be referred to mental health services that could improve their mental health status.[35] We also included access to health insurance, income, race/ethnicity, education level, employment status, age, and place of residence as covariates. These factors may combine at the level of access to

mental health services to determine if and how services are used, particularly for LGBT individuals.

To operationalize our DDD design, we selected the years 2015-2018 and create a merged NMHSS and BRFSS dataset. 2015-2018 was selected because this time range allowed for the highest number of same states with sufficient variability in the predictor variable over time to be used for analysis. State-level LGBT health data in BRFSS was not systematically collected until 2014 when BRFSS created a sexual orientation and gender identity module which, to date, not all states have adopted.[36] The twelve states that we could use for analysis were Connecticut, Delaware, Hawaii, Illinois, Minnesota, Nevada, New York, Ohio, Pennsylvania, Texas, Virginia, and Wisconsin.

Regression analyses

To estimate the effects of LGBT-specific services from our DDD design, we analyzed a series of regression models of the following form:

$$Y_{ist}=\beta_0+ \beta_1 LGBTServices_{st} + \beta_2 LGBT_{ist} + \beta_3 LGBT_{ist}*LGBTServices_{st} +State + Year_t + Z_{ist}$$

Where Y is the outcome of interest, LGBTServices is the percent of clinics in a state and year that offer LGBT-specific services, LGBT is an indicator for whether the participants identified as LGBT, State is a series of state fixed effects, Year is a series of year fixed effects, and Z represents our individual level covariates. The coefficient for the interaction between LGBT identification and LGBT services, β_3, represents the DDD estimate. To account for BRFSS complex survey design, we estimated all continuous outcomes using PROC SURVEYREG and all binary outcomes using PROC SURVEYLOGISTIC in SAS v9.4.

We first estimated crude DDD models without individual-level covariates for all outcomes. We then estimated a series of robustness tests to assess whether our estimates were

driven by violations in our design assumptions. First, models on all outcomes were run with additional individual level covariates. Next, state-specific time trends were added to the models with covariates for all outcomes to relax the assumption of parallel trends.

Results

Figure 1 provides state changes in the percentage of clinics with available LGBT-specific mental health services which varied significantly from 2015 to 2018 (p=<0.0001). In 2015, the mean percentage of clinics offering LGBT-specific mental health services across the 12 study states was 18.43, decreasing to 13.17 in 2016. However, the availability of LGBT-specific mental health services increased to 17.64 in 2017 and 19.49 in 2018, representing an overall increase from 2015 to 2018. Connecticut exhibited the steepest increase in the percentage of clinics with available LGBT-specific mental health services, increasing from 19.50 in 2015 to 32.16 in 2018. Six of the eleven remaining states demonstrated some increased difference from 2015 to 2018, while five states experienced a decrease in the percentage of clinics with LGBT-specific services.

Table 1 presents descriptive statistics for LGBT (N=18,415) and non-LGBT (N=382,156) BRFSS respondents for all outcomes and covariates. LGBT respondents experienced worse health consequences across all outcomes of interest compared to non-LGBT respondents. LGBT respondents reported more mentally and physically unhealthy days (6.93 [6.64,7.22] and 4.70 [4.45,4.95] days, respectively) compared to non-LGBT respondents (3.57 [3.52, 3.62] and 3.87 [3.78, 3.89] days, respectively; p=<0.0001 for both mentally and physically unhealthy days). Moreover, LGBT respondents were less likely than non-LGBT respondents to receive a routine check-up in the past year (69.85% [68.49%-71.21%] vs. 73.77% [73.47%-74.07%]; p=<0.0001). Additionally, LGBT respondents were less likely to report excellent, very good, or good self-

reported health than non-LGBT respondents (78.36% [77.18%-79.53%] vs. 82.84% [82.58%-83.09%]; p=<0.0001).

Similar disparities by LGBT status were observed across measured covariates. LGBT respondents were less likely than non-LGBT respondents to have access to health insurance (84.15% [82.96%, 85.35%] vs. 89.37% [89.11%, 89.62%]; p=<0.0001). The distribution of income also varied significantly by LGBT status (p=<0.0001). LGBT respondents were more likely to make <$15,000 a year compared to non-LGBT respondents (14.50% [13.45%, 15.54%] vs. 8.62% [8.40%, 8.83%]) and less likely to make $50,000+ a year than non-LGBT respondents (39.54% [38.11%, 40.97%] vs. 52.30% [51.96%, 52.65%]). LGBT respondents were also more likely to report falling within lower-middle income categories than non-LGBT respondents. Education level completed was also an area in which there was a significant difference between LGBT and non-LGBT respondents (p=<0.0001). LGBT respondents were more likely to not graduate from high school (16.90% [15.64%, 18.15%]) than non-LGBT respondents (11.50% [11.23%, 11.77%]) and less likely to graduate from college or technical school (25.22% [24.22%, 26.23%]) than non-LGBT respondents (28.18% [27.93%, 28.43%]). There was also a significant difference between LGBT and non-LGBT respondents by employment status (p=<0.0001). LGBT respondents compared to non-LGBT respondents were less likely to be employed for wages (48.39% [46.98%, 49.80%] vs. 49.19% [48.87%, 49.52%], more likely to be out of work for >1 year (3.90% [3.14%, 4.66%] vs. 2.44% [2.33%, 2.55%]), and unable to work (8.34% [7.61%, 9.07%] vs. 6.16% [6.00%, 6.31%]). The distribution of age, race/ethnicity, and setting of residence varied significantly by LGBT status (p=<0.0001). LGBT respondents tended to be younger, Hispanic, and more likely to reside in urban locations compared to non-LGBT respondents (Table 1).

Table 2 shows the results of the three specifications for our DDD models. Across all regression specifications, increases in LGBT-specific mental health services showed no significant association with any outcome. Further examination of the effects within LGBT respondents similarly showed no statistically significant effect on any outcome.

Discussion

From 2015-2018, within state availability of LGBT-specific services increased, particularly after 2016. However, the main findings from our DDD regression models, including those with covariates and state-specific time trends, did not confirm the hypothesis that increases in the availability of LGBT-specific mental health services improve health outcomes. These findings should be considered in the context of the wide range of interpretations, treatment targets, or institutional practices that could lead a mental health program to report offering of LGBT-specific services in the NMHSS; it is possible that some portion of these programs may not include effective, evidence-based, practices.[29,37] Regardless, these findings may reflect a need to address the social determinants that underlie the need for LGBT specific services. LGBT individuals face marked disparities in terms of health insurance access and poverty status, among other demographic variables.[36,38] These factors should be considered alongside the multi-level stigma, discrimination, and prejudice that LGBT individuals confront in mental health treatment settings.[6,11] Even if effective LGBT-specific mental health services are available, the aforementioned determinants may still inhibit access to and utilization of these services by LGBT individuals.[6,11,29]

To our knowledge, we are the first study to analyze changes in the availability of LGBT-specific services across years with the NMHSS measure. Our study also confirms, through its use of BRFSS data, documented disparities that exist between LGBT and non-LGBT individuals

across common mental health outcome indicators.[34] We further document disparities in social determinants factors that could impact their access to and utilization of LGBT specific mental health services. We can show the persistence of these disparities in states over a wider and more recent time frame than existing studies.[36] Additionally, we maintain a geographically diverse sample of states from which BRFSS respondents originate. However, like other research, we acknowledge the need for more representation of southern and western states in our analysis.[39] We also captured the setting of residence of LGBT individuals in our BRFSS analysis, and therefore confirm a need to capture LGBT BRFSS information on a smaller unit than a state because our findings indicate that LGBT individuals reside across settings, which could potentially impact their mental health services use.[35]

Our study also uses comprehensive population-based surveys to document LGBT mental health status and access to mental health services. Research using such data may encourage healthcare institutions to make practice modifications and states to enact policies that expand access to LGBT-specific mental health services and increase their current low availability.[40] By merging BRFSS and NMHSS data we have made it possible to see at the population level, whether LGBT-specific mental health services, potentially grounded in the minority stress theory, are having their intended effect of improving LGBT mental health outcomes. As LGBT-specific mental health services become more available, it is important to address the interpersonal, institutional, and policy access barriers to these services that interact with individual circumstances of services use for which LGBT individuals confront disparities.

Our study must be interpreted considering its limitations. First, there is a lack of clear definition about what constitutes an LGBT-specific service in the NMHSS, and whether these services are evidence-based. A second limitation of this study is that only twelve states could be

included in DDD regression specifications because not all fifty states use or consistently collect LGBT health data from the BRFSS sexual orientation and gender identity module. As more states adopt this module, it will be important to conduct a similar longitudinal analysis to determine the population-level health impacts of LGBT-specific mental health services use with a larger, more geographically diverse sample of states. Finally, the BRFSS and NMHSS only permit grouping at the state level. Thus, we were unable to discern how access factors of LGBT individuals within states, particularly at smaller units of analysis such as cities where LGBT-specific mental health services could be available, drive LGBT individuals to use LGBT-specific mental health services.

Conclusion

This is one of the first studies that has used national comprehensive population health-level data to determine whether available LGBT-specific mental health services improve LGBT mental health status and service utilization. Available data demonstrate a statistically significant increase in the availability of LGBT-specific mental health services across states in recent years, though availability remains low.[29] As LGBT health data become more available, future research should expand on our study by including more states and years. Our findings highlight the need for better quality and higher precision data on both LGBT health and LGBT- specific services, as well as the social determinants that lead to service use. Ultimately, more detail about LGBT-specific services is needed to assess which services may form the basis for an effective strategy to improve population level LGBT mental health and service utilization outcomes.

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Chapter 5: Public Health Implications

The purpose of this study is to assess how the availability of LGBT-specific mental health services has changed in recent years and how these changes are associated with improvements in LGBT mental health-related outcomes. The study uses two national health surveys, the Behavioral Risk Factor Surveillance System (BRFSS) and the National Mental Health Services Survey (NMHSS). These surveys collect LGBT health data at the individual and health services level, respectively, and were grouped by state for analyses. With LGBT health data being only recently included in these surveys, particularly in BRFSS, analyses relied on data from twelve states from 2015-2018 (Gonzales & Ehrenfeld, 2018).

Findings (Figure 1) indicated that changes in the availability of LGBT-specific mental health services across twelve states over the study period were statistically significant. In 2015, the mean percentage of clinics offering LGBT-specific mental health services across the 12 study states was 18.43, decreasing to 13.17 in 2016. However, the availability of LGBT-specific mental health services increased to 17.64 in 2017 and 19.49 in 2018, representing an overall increase from 2015 to 2018. Connecticut exhibited the steepest increase in the percentage of clinics with available LGBT-specific mental health services, increasing from 19.50 in 2015 to 32.16 in 2018. Six of the eleven remaining states demonstrated some increased difference from 2015 to 2018, while five states experienced a decrease in clinics with LGBT-specific services. Regression models estimating the effect of changes in LGBT-specific mental health services on mental health-related outcomes such as mentally and physically unhealthy days, a routine check-up in the past year, and self-reported health all showed no statistically significant effect on these outcomes (Table 2). These findings were consistent across models that included covariates and

state-specific time trends. Despite our study not showing its hypothesized relationships, it has multiple important implications for public health practice.

We are the first study, to our knowledge, to document within state changes and increases in the availability of LGBT-specific services across years with the NMHSS measure. Future efforts should be made to understand the types of programs reporting their offering of LGBT-specific services with this measure. Some portion of LGBT-specific services reported by programs may not include effective, evidence-based practices (Williams & Fish, 2020; Cochran, Peavy, & Robohm, 2007). As reported in other studies, we were also able to document disparities in social determinants factors that could impact LGBT individuals' access to and utilization of LGBT- specific mental health services (Gonzales & Ehrenfeld, 2018). (Table 1). LGBT BRFSS respondents were less likely than non-LGBT respondents to: have received a routine check-up in the past year (69.85% [68.49%-71.21%] vs. 73.77% [73.47%-74.07%]; p=<0.0001), have access to health insurance (84.15% [82.96%, 85.35%] vs. 89.37% [89.11%, 89.62%]; p=<0.0001), and be employed for wages (48.39% [46.98%, 49.80%] vs. 49.19% [48.87%, 49.52%]. Additionally, LGBT respondents were more likely than non-LGBT respondents to not graduate from high school (16.90% [15.64%, 18.15%] vs. 11.50% [11.23%, 11.77%]). Our study shows the persistence of these disparities in states over a wider and more recent time frame than existing studies (Gonzales & Ehrenfeld, 2018).

Additionally, we maintain a geographically diverse sample of states from which BRFSS respondents originate. We also use comprehensive population-based surveys to document LGBT mental health status and access to mental health services. Research using such data may encourage healthcare institutions to make practice modifications and states to enact policies that expand access to LGBT-specific mental health services and increase their current low

availability (American Psychological Association, 2016). By merging BRFSS and NMHSS data, we have made it possible to see at the population level whether LGBT-specific mental health services, potentially grounded in the minority stress theory, are having their intended effect of improving LGBT mental health outcomes (Pachankis, 2018; Meyer, 2003).

Limitations of our study include a lack of a clear definition about what constitutes an LGBT-specific service in the NMHSS; the fact that only 12 states could be included in DDD regression specifications because not all 50 states use or consistently collect LGBT health data from the BRFSS sexual orientation and gender identity module; and the fact that BRFSS and NMHSS only permit grouping at the state level and not at smaller units of analysis such as cities. Future research should include more states and years in analysis and efforts to improve the quality and precision of data on LGBT health and LGBT-specific mental health services. Future research alongside our study will contribute to our understanding of whether LGBT-specific services effectively improve population-level LGBT mental health and service utilization outcomes.

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Tables

TABLE 1. SOCIODEMOGRAPHICS FOR LGBT AND NON-LGBT BRFSS RESPONDENTS 2015-2018

Variable		**LGBT (N=18,415)**	**Non-LGBT (N=382,156)**	**p-value**
		estimate (95%CI)	*estimate (95%CI)*	
Mentally unhealthy days in the past 30 days (Mean)		6.93 (6.64, 7.22)	3.57 (3.52,3.62)	<0.0001
Physically unhealthy days in the past 30 days (Mean)		4.70 (4.45,4.95)	3.87 (3.78, 3.89)	<0.0001
Routine check-up in past year (%)		69.85 (68.49, 71.21)	73.77 (73.47, 74.07)	<0.0001
Excellent, very good, or good self-reported health (%)		78.36 (77.18, 79.53)	82.84 (82.58, 83.09)	<0.0001
Any Health Insurance Access (%)		84.15 (82.96, 85.35)	89.37 (89.11, 89.62)	<0.0001
Income Categories (%)				<0.0001
	<$15,000	14.50 (13.45, 15.54)	8.62 (8.40, 8.83)	
	$15,000-<$25,000	21.79 (20.45, 23.14)	15.62 (15.35, 15.89)	
	$25,000-<$35,000	11.40 (10.42, 12.39)	10.03 (9.81, 10.24)	
	$35,000-<$50,000	12.77 (11.78, 13.76)	13.43 (13.20, 13.67)	

	$50,000+	39.54 (38.11, 40.97)	52.30 (51.96, 52.65)	
Race/ethnicity (%)				<0.0001
	White only, non-Hispanic	57.83 (56.38, 59.28)	67.47 (67.14, 67.80)	
	Black only, non-Hispanic	12.27 (11.29, 13.26)	11.39 (11.17,11.61)	
	American Indian or Alaskan Native, Non-Hispanic	0.76 (0.59, 0.93)	0.48 (0.44, 0.52)	
	Asian Only, non-Hispanic	5.02 (4.34, 5.70)	4.62 (4.46, 4.78)	
	Native Hawaiian or other Pacific Islander only, Non-Hispanic	0.39 (0.29, 0.50)	0.22 (0.20, 0.24)	
	Other race only, non-Hispanic	0.39 (0.27, 0.52)	0.25 (0.23, 0.27)	
	Multiracial, non-Hispanic	2.67 (2.30, 3.02)	1.32 (1.26, 1.38)	
	Hispanic	20.66 (19.30, 22.10)	14.25 (13.96, 14.54)	
Education Level Completed (%)				<0.0001

	Did not graduate high school	16.90 (15.64, 18.15)	11.50 (11.23, 11.77)	
	Graduated high school	27.84 (26.55, 29.13)	29.36 (29.06, 29.65)	
	Attended college or technical school	30.04 (28.73, 31.36)	30.97 (30.66, 31.27)	
	Graduated from college or technical school	25.22 (24.22, 26.23)	28.18 (27.93, 28.43)	
Employment Status (%)				<0.0001
	Employed for wages	48.39 (46.98, 49.80)	49.19 (48.87, 49.52)	
	Self-Employed	8.93 (8.11, 9.76)	9.11 (8.91, 9.31)	
	Out of work >1 year	3.90 (3.14, 4.66)	2.44 (2.33, 2.55)	
	Out of work <1 year	4.47 (3.85, 5.08)	2.62 (2.50, 2.73)	
	Homemaker	5.19 (4.52, 5.87)	5.95 (5.77, 6.12)	
	Student	10.06 (9.19, 10.93)	5.27 (5.08, 5.46)	
	Retired	10.72 (10.03, 11.41)	19.26 (19.04, 19.47)	
	Unable to work	8.34 (7.61, 9.07)	6.16 (6.00, 6.31)	
Age Categories (%)				<0.0001
	18-24	24.60 (23.28, 25.92)	11.28 (11.02, 11.53)	
	25-34	23.00 (21.80, 24.20)	15.25 (15.00, 15.51)	

	35-44	15.26 (14.20, 16.31)	16.02 (15.77, 16.27)	
	45-54	13.52 (12.65, 14.39)	17.63 (17.39, 17.88)	
	55-64	12.10 (11.28, 12.91)	18.16 (17.93, 18.38)	
	65+	11.52 (10.75, 12.30)	21.66 (21.44, 21.88)	
Setting of residence (%)				<0.0001
	Within center city of metropolitan statistical area (MSA)	50.95 (48.58, 53.31)	44.94 (44.49, 45.38)	
	Outside of center city of MSA but in county of center city	21.10 (19.04, 23.15)	22.78 (22.40, 23.15)	
	Inside a suburban county of MSA	13.17 (11.46, 14.88)	15.22 (14.91, 15.53)	
	Not in MSA	14.79 (13.19, 16.39)	17.07 (16.75, 17.38)	

TABLE 2. RESULTS OF DIFFERENCE- IN DIFFERENCE- IN DIFFERENCE ANALYSES FOR OUTCOMES BASED ON STATE INCREASES IN LGBT-SPECIFIC MENTAL HEALTH SERVICES

Outcomes	**Model 1* DDD Estimate and 95% CI**	**Model 2** DDD Estimate and 95% CI**	**Model 3*** DDD Estimate and 95% CI**
Number of Mentally Unhealthy Days in the past 30 days (Beta)	-0.03 (-0.54, .47)	-0.15 (-0.96, 0.67)	-0.14 (-1.0, 0.67)
Number of Physically Unhealthy Days in the past 30 days (Beta)	0.01 (-0.43,.45)	-0.21 (-1.04, 0.62)	-0.21 (-1.05, 0.62)
Routine Check-up in the past year (OR)	1.10 (0.97, 1.24)	0.80 (0.62, 1.02)	0.80 (0.62,1.02)
Excellent, very good, or good self-reported health (OR)	1.02 (0.89,1.16)	0.95 (0.74, 1.22)	0.95 (0.74, 1.22)

*crude DDD

**DDD adjusted for potential time varying covariates

***DDD adjusted for potential time varying covariates and LGBT specific linear time trends

Figures

FIGURE 1. STATE CHANGES IN THE PERCENTAGE OF MENTAL HEALTH TREATMENT PROGRAMS THAT ARE LGBT-SPECIFIC, YEARS 2015-2018