HOTLINE USE IN THE UNITED STATES: RESULTS FROM THE COLLABORATIVE PSYCHIATRIC EPIDEMIOLOGY SURVEYS

Kimberly B. Roth, PhD, MHS[1], **Hannah S. Szlyk, PhD, LCSW**[1]

[1]Washington University in St. Louis, Brown School of Social Work, Center for Mental Health Services and Research, Campus Box 1196, One Brookings Drive, St. Louis, MO, 63130, USA

Abstract

Introduction: Crisis hotlines are a fixture in providing mental health services to individuals experiencing mental and behavioral problems in the United States (U.S.). Despite this, and the growing need for easily-accessible, anonymous, and free services amidst the suicide and opioid crises, there is no study reporting U.S. national prevalence and correlates of hotline use.

Methods: Data on n=18,909 participants from the Collaborative Psychiatric Epidemiology Surveys (CPES), a group of three nationally-representative, population-based studies, were used to estimate the prevalence of lifetime and past 12-month hotline use. A series of logistic regression models examined sociodemographic, clinical history and service use correlates of hotline use.

Results: Lifetime and past 12-month hotline use was estimated at 2.5% and 0.5%, respectively. Being female, having a mental or behavioral disorder, experiencing suicidality, or interacting with other formal and informal sectors of the mental health service system were significant correlates of use.

Discussion: This study provides the first national estimates of crisis hotline usage in the U.S. Hotlines are more likely to be used by certain sociodemographic subgroups, but these differences may be due to differing psychiatric history and service use patterns. Efforts should be made to ensure that crisis hotlines are being utilized by other marginalized populations at high risk of suicide or overdose amidst the current public health crises in the US, such as racial/ethnic minorities or youth. To evaluate the role that crisis hotlines play in the mental health service system, national surveys should aim to monitor trends and correlates over time.

Keywords

Crisis hotlines; epidemiology; mental disorders; suicidality; mental health services

INTRODUCTION

Hotlines, also known as lifelines, crisis lines or call centers, provide crucial publicly-accessible pathways for linking individuals who are experiencing behavioral health crises with needed resources, and they offer opportunities for averting suicide attempts and deaths by drug overdose (Hom et al., 2015). In the United States (U.S.), many people who urgently need professional help for emotional and behavioral problems that include current suicidality and risk of overdose do not use formal behavioral health care services (Andrade et al., 2014; Corrigan & Watson, 2002; Green et al., 2020; Kim et al., 2017). In 2018, 47.6 million U.S. adults reported living with a mental illness (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019) and over 19 million U.S. adults met criteria for a substance use disorder. However, only 43.3% of these U.S. adults had used any mental health services in the past 12 months (SAMHSA, 2019), , and only 3.5 million adults had used any substance use treatment services (SAMHSA, 2019). Reasons why people suffering from acute symptoms of mental health and substance use disorders do not obtain needed care include attitudinal factors, which vary by age, gender, and ethnic identity; stigma from others or self-imposed stigma for receiving help for mental health and substance use issues (Andrade et al., 2014; Corrigan & Watson, 2002; Green et al., 2020); and structural barriers are those related to cost, availability of services, and physical access (Andrade et al., 2014). Hotlines may address some of these barriers to care, since they offer free and anonymous crisis services and are often accessible 24 hours a day, seven days a week. However, information on the numbers and characteristics of persons who use hotlines are not available in prior services research.

Hotlines are a fixture of preventive and crisis services in the United States. It is credited that the first telephone hotline was housed by the Children's Hospital of Los Angeles starting in 1968. Local suicide prevention hotlines also emerged in the mid-20th century in the U.S. (Crosby Budinger et al., 2015). The first national suicide hotline was launched in 1999 (Spencer-Thomas & Jahn, 2012), followed by the National Suicide Prevention Lifeline (NSPL) in 2005 (Crosby Budinger et al., 2015). Today, hotlines are available to assist people with various personal issues, including domestic and sexual violence, bullying, and general mental health issues (Ingram et al., 2008), and may specialize in serving specific populations (e.g. sexual minority youth or veterans) (Ramchand et al., 2016).

Despite the lengthy history of hotlines in the U.S. and the growing need for crisis services and service linkage, there is minimal research on nationally-representative hotline use. For example, studies on national hotlines usually only include samples from select crisis centers within the larger network, while studies on local hotlines are confined to small samples (Ingram et al., 2008). Additionally, national surveillance surveys often group hotline use into other types of alternative mental health service use. Therefore, assumptions about hotline use can currently only be informed by literature on in-person service use. For instance, it is estimated that approximately 50% or less of persons with recent histories of suicidality and mental health disorders have used in-person mental health services (i.e. visit a mental health professional) in the past 12 months (Byers et al., 2016). According to the CDC (2018), more than half of adults who die by suicide did not have a known mental health condition, which may imply that these individuals never accessed mental health care to receive a diagnosis.

This highlights the need to understand a person's lifetime clinical history as well as their contact with the mental health service system. Research also suggests that the odds of receiving any mental health treatment in the past 12 months is significantly related to being younger (under 60 years old), female, and non-Hispanic white (Wang, Lane, et al., 2005). However, given the paucity of literature specific to hotline use, it is impossible to know how these findings compare to correlates of hotline use in the U.S.

Because frameworks specific to hotline use are needed, current research must be guided by in-person mental health care models. Andersen and Newman's (2005) model of behavioral health service use suggests that predisposing factors (e.g., demographic characteristics), enabling factors (e.g., financial assets), and need (perceived and/or evaluated health) impacts health care use, and, eventually, health outcomes (Andersen, 2008). Additionally, models of pathway to care (Goldberg & Huxley, 2001; Goldberg & Huxley, 1992) indicate the need to consider whether hotline users participate in other mental health care services. For instance, there is contrasting research on whether hotline users over-rely on hotlines for their clinical needs rather than engage services in the larger mental and behavioral health system (Gould et al., 2007; Kalafat et al., 2007; Middleton et al., 2016). Informed by traditional models of health care utilization, this study intended to address this gap in the literature by examining hotline use at the turn of the 21st century. The main objectives of this study were: 1) to estimate the lifetime and past 12-month prevalence of hotline use in the United States; and 2) to identify independent sociodemographic, clinical history, and service use correlates of lifetime and past 12-month hotline use. In light of current knowledge on in-person service use, we expected that those utilizing hotlines would be more likely to be female and have a mental health diagnosis. We also expected variation by geographic location. Because there are fewer barriers preventing access to hotlines versus in-person services, we expected those using hotlines to be more racially/ethnically diverse, younger, and have fewer financial resources. Additionally, due to these reduced barriers, we expected there would be a large proportion of users who had not used other mental health services.

METHODS

Sample

The Collaborative Psychiatric Epidemiology Surveys (CPES) are three nationally-representative, cross-sectional studies conducted from 2001 to 2003: the National Comorbidity Survey Replication (NCS-R), the National Latino and Asian American Study (NLAAS), and the National Survey of American Life (NSAL). Response rates for the three studies were 70.9%, 75.7% and 71.5%, respectively. Their design has been described in full elsewhere (Alegría et al., 2004; Heeringa et al., 2004; Jackson et al., 2004; Kessler, Berglund, et al., 2004; Pennell et al., 2004). Survey study procedures were approved by institutional review boards and informed consent was obtained from all participants. Interviews were completed at the respondent's home and administered by trained, lay interviewers. The CPES had a total of 20,013 respondents (N=9,282 NCS-R; N=4,649 NLAAS; N=6,082 NSAL). The analytic sample for this study was restricted to the 18,909 respondents (94.48% of the original sample) with non-missing information on lifetime hotline usage.

Measures

Hotline Use—Lifetime hotline use was assessed via two questions: "Have you ever used a hotline [for problems with your emotions, nerves or mental health, or your use of alcohol or drugs]?" and "Did you ever use a hotline for problems with your emotions or nerves?" If the answer to either was yes, follow-up questions were asked regarding the age of first use, the last time used, and number of times used in the past 12 months. For this study, a binary variable indicating any past 12-month usage was coded yes if the number of times used in the past 12 months was greater than zero.

Sociodemographics

Predisposing factors: Age at time of interview, gender, race/ethnicity, years of education, marital status, and employment status. Country quadrant (Northeast, Midwest, South, and West) where the respondent was living was also included, as access to and utilization of in-person mental health services vary by geographic location (Andrilla et al., 2018; Golberstein et al., 2015; Kim et al., 2017). Enabling factors pertained to financial resources: Yearly household income, divided into quartiles. Insurance was categorized into no insurance, private insurance, and government/other insurance (e.g., military, Medicare).

Clinical History

Need factors: Psychiatric disorders were assessed using a modified version of the World Mental Health Composite International Diagnostic Interview (WMH-CIDI; Kessler, Abelson, et al., 2004) according to Diagnostic and Statistical Manual, Fourth Edition (DSM-IV; American Psychiatric Association, 1994) criteria. Disorders were categorized into any depressive (Major Depressive Disorder/Episode or Dysthymia), any anxiety (Post Traumatic Stress Disorder, Panic Disorder, Social Phobia, Agoraphobia, or Generalized Anxiety Disorder), any eating (Anorexia, Bulimia, Binge Eating Disorder), and any substance use disorder (alcohol and/or illicit drug abuse and/or dependence) for both lifetime and in the past 12 months. No disorder (not meeting criteria for any of the prior disorders) was also examined in order to assess usage among individuals not necessarily meeting the clinical threshold for disorder. Lifetime suicidal ideation was assessed by asking whether a respondent had ever seriously thought about committing suicide. Respondents were also asked about ever having a plan and making an attempt, but only among those who reported suicidal thoughts.

Service Use—Service use was defined as access to mental health care across several service system domains, assessed by participant self-report of a visit to any mental health provider, general medical provider or use of an informal service for emotions, nerves or substance use issues (Alegría et al., 2008). Lifetime visit to a professional for mental health or substance use problems included any of the following professionals: psychiatrist, general practitioner or family doctor, any other medical doctor, psychologist, social worker, counselor, any other mental health professional, nurse, occupational therapist, other health professional, religious/spiritual advisor, or other healer (e.g., herbalist, chiropractor). Informal services for emotions or nerves included internet support groups, chat rooms, and self-help groups. Lifetime and past 12-month admission for an overnight hospital stay

for issues related to problems with emotions, nerves, mental health, or use of alcohol or drugs was also included to ascertain more serious encounters with the service system. For those indicating a stay, the number of times ever hospitalized was also recorded. Finally, a measure of "no care" (i.e., participants not reporting having accessed any of these services for emotions, nerves or substance use issues in their lifetime) was created.

Data Analysis

All statistical analyses were conducted in Stata Version 14 (StataCorp, 2015) using the program's suite of *svy* procedures to account for the CPES complex survey design. Weighted prevalences were reported for the overall sample and also by: 1) ever versus never lifetime hotline use, and 2) hotline use in the past 12 months (versus no past 12-month use). Comparisons were made using a design-based F statistic (Rao & Scott, 1984) for categorical variables and an adjusted Wald test for continuous variables. For each outcome (lifetime and past 12-month hotline use) a series of logistic regression models were fit. In the first (Model 1), all sociodemographics were entered as independent variables. In the second, clinical history variables (DSM-IV diagnosis categories and suicidal ideation) were added (Model 2). Suicide plan and attempt were not included due to collinearity with ideation. Finally, service use variables were included (Model 3). Formulas for the model specifications are available in Appendix 1. After each new block of variables was added to the model, an adjusted Wald test was performed to test the statistical significance of including the new variables in the model. Listwise deletion was used in all multivariate analyses due to low amounts (<5%) of missing data (Tabachnick & Fidell, 2019).

RESULTS

Lifetime hotline use

In the total sample, 364 respondents (1.9% of the study sample) reported ever using a hotline in their lifetime, corresponding to 2.5% of the U.S. population (Table 1). Ever hotline users (versus never users) were more likely to be between the ages of 35 and 49 (52.2% vs. 31.0%, p<0.0001), female (71.1% vs. 51.4%, p<0.0001), and Non-Latino White (81.0% vs. 69.2%, p<0.0001). They were also more likely to be divorced, separated, or widowed (32.3% vs. 19.3%, p=0.0001) and more likely to be in the work force (31.9% vs. 25.9%, p=0.0004) than their non-hotline-using counterparts. There were no significant differences in educational attainment, household income, insurance status or location in the country.

Lifetime hotline users were significantly more likely (all p<0.0001) to have a history of all mental and behavioral disorders than those never using hotlines (Table 1). Over half had a history of a depressive disorder (59.6%) or anxiety disorder (62.7%). Approximately 10 percent met criteria for an eating disorder, and 37.6% for any substance use disorder. Less than one-fifth (17.1%) of lifetime users never met criteria for a psychiatric diagnosis in their lifetime, in contrast to over half (65.6%) of people who had never used a hotline (p<0.0001). Over half (54.4%) reported lifetime suicidal ideation (compared to 13.8% of hotline non-users, p<0.0001). Of those, over half also reported ever having a plan (54.5%) or making an attempt (54.9%).

Hotline users were also significantly (all p<0.0001) more likely to report ever having used services, both formal and informal, for mental health or substance use problems. Almost all (93.6%) reported ever seeing a health professional, 33.5% reported an overnight stay in a hospital (mean number of times=2.40), and 41.5% reported using informal services. Only 5% of users never reported receiving care for mental and emotional problems in another service sector (health professional, informal services or overnight hospital stay), compared with 57.5% of never hotline users (p<0.0001).

Past 12-month hotline use

Only 0.5% of the U.S. population used a hotline in the past 12 months (n=79 participants; Table 2). Of these, the majority (70.9%) reported calling only one to two times (median: 2 times, interquartile range: 1-3; data not shown). These individuals were more likely to be female (80.8% vs. 51.7%, p=0.0003), non-Latino White (74.1% vs. 69.5%, p<0.0001), divorced, separated, widowed (39.5% vs. 19.6%) or never married (33.6% vs. 22.5%, p=0.0002), or not be in the work force (44.9% vs. 25.9%, p=0.0050) as compared to those not using hotlines in the past year. They were more likely to have a depressive (57.7% vs. 8.1%), anxiety (67.4% vs. 12.2%), or eating disorder (6.8% vs. 0.8%) in the past 12 months (all p<=0.0001). They were also more likely to have a substance use disorder (24.1% vs. 3.3%, p<0.0001), irrespective of whether it pertained to alcohol or drug use. Recent users were approximately half as likely to not have a mental or behavioral disorder as those not using a hotline in the last year (42.9% vs. 85.4%, p<0.0001) Over half of recent users (57.2%) reported lifetime suicidal ideation, and of those individuals, 66.6% and 72.5% reported ever making a plan or attempt, respectively. All measures of suicidality were significantly elevated among recent hotline users as compared to non-users (all p<0.001).

Again, hotline users (versus non-users) were significantly more likely to report all types of service use for mental, emotional or substance use problems (all p<0.0001). Almost all (96.4%) had ever used a health professional, 45.8% had an overnight stay in a hospital (mean number of times = 2.53), and 41.2% ever used informal services. Only 3.5% of users had not received care from another service sector, versus over half (56.4%) of non-users (p<0.0001). Recent hotline users were also significantly more likely to have had an overnight hospital stay in the past 12 months (16.4% vs. 0.7%, p<0.0001).

Correlates of hotline use

In the sociodemographic model (Model 1, predisposing and enabling factors), being 35-49 years old, female, and divorced, separated, or widowed increased the odds of lifetime hotline use by approximately two-fold as compared to 18-34 year-olds, males, and married/ cohabitating adults, respectively (Table 3). Individuals with government or other insurance were more likely to use hotlines than those with no insurance. Those who were 65 and older were less likely to ever use a hotline (versus 18-34 year olds), along with blacks, Latinos and Asians (compared to non-Latino whites). Annual household income of at least $80,000 significantly decreased odds of hotline use compared with the lowest income category.

When including lifetime clinical history (Model 2, adding need factors), all psychiatric disorder categories significantly increased the odds of lifetime hotline use by approximately

two-fold. Suicidality increased odds of use by almost three-fold. Finally, after adjusting for lifetime service use (Model 3, adding other potential pathways to care), all sociodemographics were no longer significantly associated with hotline use, except for gender. Females were 1.62 times more likely to ever use a hotline (95% CI: 1.21-2.18). However, even after adjusting for sociodemographics and service use, all lifetime diagnoses of psychiatric disorders increased the odds of using a hotline. This ranged from any substance use disorder (OR=1.50, 95% CI: 1.06-2.12) to an eating disorder (OR=2.09, 95% CI: 1.46-2.98). Those ever experiencing suicidal ideation were over two times more likely to ever use a hotline (OR=2.18, 95% CI: 1.51-3.14).The strongest correlate of hotline use was ever seeing a mental health professional; this increased the odds of hotline use by over six-fold (OR=6.26, 95%CI: 3.48-11.26), regardless of psychiatric history or demographics. Using other informal services increased odds of hotline use by 2.66 times (95% CI: 1.78-3.97).

Past 12-month hotline use was similarly associated with age, gender, race/ethnicity, marital status, and employment in the sociodemographic model (Model 1, Table 4, predisposing and enabling factors). In Model 2 (adding need factors), after adjusting for sociodemographics, having a depressive, anxiety or substance use disorder significantly increased the odds of using a hotline in the past year. However, having an eating disorder or ever experiencing suicidal ideation was not significantly related to recent hotline use. In the final model (Model 3, adding other pathways to care), past-year hotline use was significantly related to being female (OR=2.76, 95% CI: 1.16-6.57) and being divorced, separated or widowed (OR=2.84, 95% CI: 1.33-6.06). Being 65 or older decreased the odds of past-year use by 81% (OR=0.19, 95% CI: 0.04-0.89) as compared to the youngest age group. Further, being in the South or West (versus Northeast) also decreased odds of recent hotline use by approximately half (ORs=0.47 and 0.52, respectively). Increased recent hotline use was associated with having a depressive disorder (OR=2.67, 95% CI: 1.39-5.13), anxiety disorder (OR=3.27, 95%CI: 1.45-7.41) or substance use disorder (OR=2.35, 95% CI: 1.04-5.32), independent of sociodemographics and service use. Additionally, those ever seeing a mental health professional were over five times more likely than those never seeing a professional to use a hotline in the past 12 months (OR=5.32, 95% CI: 1.93-14.68) even after adjusting for sociodemographics and recent clinical history. Increased 12-month hotline use was also independently associated with reporting an overnight hospital stay for mental health problems (OR=4.59, 95% CI: 1.65-12.78) and informal service use (OR=2.14, 95% CI: 1.07-4.31).

DISCUSSION

Despite it being a free, anonymous, and relatively easy-to-access service, only a small fraction of the U.S. population reported ever using a hotline. An estimated 0.5% of persons reported using one in the 12 months prior to the interview. In context, the NSPL received over 2 million calls in 2017, which reflected approximately 0.6% of the U.S. population that year. It is also clear that hotlines are more likely to be used by certain types of people – namely younger females who identify as non-Latino white and persons who were previously married. This is consistent with findings on in-person mental health service use (Wang, Lane, et al., 2005). However, the findings from the final regression models demonstrate

that a female gender identity is the only significant predisposing sociodemographic factor for predicting both lifetime and past-year hotline use after adjusting for clinical history (mental health and behavioral need) and service use. (An age of 65 or older and being previously married were the only other independent predisposing factors among past year hotline users). Therefore, accounting for need and other service utilization attenuates the sociodemographic disparities apparent in the unadjusted models, such as for race/ethnicity, income level, employment status, and access to insurance. Thus, this study's findings are hopeful, as they suggest that hotlines may help to promote equity in treatment entry for individuals with mental and behavioral needs. This is significant, considering that persons with serious mental illness often experience socioeconomically disadvantages which can impede access to appropriate care (Johnson et al., 2019). Because this population also has a high rate of suicide (Chesney et al., 2014), access to hotlines may be an important point of immediate care due to their potential for greater equity.

However, considering that males die by suicide (Hedegaard et al., 2020), and opioid-related causes (Wilson et al., 2020) at higher rates than females, it is crucial that efforts be made to engage more men in hotline use (Hunt et al., 2018). As more females use in-person mental health services than males (Parslow & Jorm, 2000; Villatoro et al., 2018; Wang, Lane, et al., 2005), it could be hypothesized that gendered attitudinal barriers regarding treatment-seeking may also impact hotline use (Andrade et al., 2014; Corrigan & Watson, 2002). Therefore, future research should explore barriers specific to hotline use among males with mental health and substance use problems in order to lessen this disparity.

Mental and behavioral health need (i.e., meeting criteria for DSM diagnoses and/or endorsing suicidality) increased odds of hotline use, a finding which corresponds to hotline research abroad (Bassilios et al., 2015). This is reassuring, as a primary motivation for the establishment of hotlines was to provide immediate crisis services and service linkage (Crosby Budinger et al., 2015) in an effort to reduce potentially fatal issues and behaviors, such as suicidality, through treatment participation (Busby et al., 2020). The associations with need factors remain strong and robust even after adjusting for other personal characteristics and use of services for mental and behavioral health problems. The results also suggest that participants were more likely to have interactions with other mental health services, supporting previous research on hotline users (Bassilios et al., 2015; Burgess et al., 2008). However, in the absence of longitudinal data, the direction of this association is unable to be ascertained. Longitudinal studies are needed to understand how hotline use fits into pathways of care for healthcare consumers – that is, whether contact with a hotline or other services occurred first.

While presence of a substance use disorder was a significant predictor of both lifetime and past 12-month hotline use, this diagnosis had a less robust relationship with hotline use as compared to having a history of a mental disorder (i.e. depression or anxiety) after adjusting for service use, particularly among past-year users. This finding may be illustrative of low and delayed rates of help-seeking among persons with substance use problems (SAMHSA, 2019; Wang, Berglund, et al., 2005), something that may extend to hotlines. Therefore, hotlines should strive to play a more prominent role in linking individuals with substance use problems to treatment, particularly if this is a person's first point of

contact for specialized support. Hotline providers and health services researchers should identify strategies to increase hotline engagement and service uptake among individuals with substance use disorders, particularly in light of the opioid crisis.

Considering that the majority of both lifetime and 12-month hotline users reported a clinical disorder (83% and 57%, respectively) and had accessed care (95% and 96%), it is possible that many hotline users are mental health care consumers that are having their clinical needs met (i.e., proportions of reported clinical disorders match or exceed proportions of services used). This finding contrasts those from most epidemiological studies showing that many individuals with mental and behavioral health problems have low or no access to appropriate services and therefore do not have their mental health needs met (Alegría et al., 2002; Byers et al., 2016; Wang, Lane, et al., 2005). Additionally, the finding of high service utilization (96%) among past 12-month hotline users suggests that callers may use hotlines are one part of their regular care. This is important, because although hotlines are traditionally viewed as a crisis service, literature suggests that some users call hotlines as part of a range of mental healthcare services (Bassilios et al., 2015; Burgess et al., 2008; Middleton et al., 2016).

Overall, while the findings indicate some demographic similarities to the profiles of people who use in-person mental health services (Parslow & Jorm, 2000; Villatoro et al., 2018; Wang, Lane, et al., 2005), they also suggest that hotlines may be one strategy to promote racial and ethnic equity in service access for individuals with mental and behavioral health needs. However, it remains essential to examine how other specific predisposing (e.g., gender) and enabling factors (e.g., employment, income, and insurance) impact hotline use. While these factors are often related to service access (Alegría et al., 2002; Wang, Lane, et al., 2005), use of government or other insurance and higher income (among lifetime hotline users) and being out of the workforce (among 12-month hotline users) were not independent predictors of hotline use after adjusting for in-person service use. Therefore, traditional in-person service use models, such as the Andersen model, may not be as useful in explaining factors related to hotline use, highlighting a need for model development and testing in this area. As hotlines are often perceived as the entry point to mental health care (Joiner et al., 2007), this may mean that the sociodemographic disparities observed in mental health issues and healthcare utilization, such as gender, may start very early in the pathway to care. Future studies should incorporate additional survey items or a qualitative component to understand why hotline users access both hotlines and face-to-face services, and why non-hotline users may prefer to seek mental health support elsewhere (Middleton et al., 2016).

LIMITATIONS

This is a cross-sectional, observational study. As noted above, any associations are not indications of causal relationships. In addition, the analysis of correlates of lifetime hotline use may not reflect the rationale underlying the design of hotlines, namely, assisting individuals experiencing acute crises. The data are also approximately 15 years old and much has changed with technology and telephone service in that time. Therefore, we cannot make any statements regarding current hotline usage. Further, the data were collected prior to the onset of the opioid and suicide public health crises, which incited wide-spread

promotion of crisis services and hotlines (Ayers et al., 2019). However, these are the only data on psychiatric disorder, mental health service use, and both lifetime and past 12-month hotline use at a national level. It is important to have up-to-date national surveillance of hotline use that can inform hotlines on how to increase awareness of their services (Ayers et al., 2019) and to determine staffing and funding needs. It should be a priority of the federal government to fund and implement a current wave of the CPES or similar study. Additionally, incorporating several questions regarding hotline use into existing nationally-representative studies, particularly longitudinal ones, would be beneficial for understanding current usage and correlates. While scholars do their best to use available and local hotline data, these findings do not provide insight on national trends.

This study was unable to examine rural/urban differences in hotline use due to data limitations. Research suggests that individuals living in rural areas experience unique barriers to receiving healthcare (Douthit et al., 2015; Johnson et al., 2006). Future research should explore whether hotlines are helping to fill this gap. Finally, these data rely on self-report and are therefore subject to bias. However, while the psychiatric diagnoses rely on accurate reporting of mental health symptoms by participants, structured interviews like the CIDI are the best approximation to diagnosis by psychiatrist available in large epidemiologic surveys. Data limitations also did not allow investigation of current distress, which is important to capture usage by individuals not meeting criteria for a psychiatric diagnosis. Future studies with this type of data should explore whether hotline use is associated with sub-clinical distress.

CONCLUSIONS

This study addresses a notable gap in crisis hotline research by examining nationally-representative hotline use in the U.S. It provides the first estimates of lifetime and past-year hotline use, as well as correlates theorized to be important in service use: namely, predisposing, enabling, and need factors, along with service use from other sectors relevant in the pathways to care. Despite the limitations, this study provides foundational information about who uses hotlines, and highlights the unique role hotlines may play in promoting equitable access to mental and behavioral health services. It also suggests that hotlines may in fact be a part of a range of services used by healthcare consumers. As the findings on hotline user gender mirror the literature on in-person mental health service use, this study underscores the importance of designing and implementing hotlines that can engage and support vulnerable demographics of the U.S. population. Findings emphasize that increased attention should be given to understand and track hotline usage in the U.S., given that hotlines are used by diverse populations with clinical needs and they serve as key referral sources for additional mental health services. Future research on hotline use should include collection of current nationally-representative surveillance data, longitudinal tracking of mental illness and service use trends, and qualitative components to understand how technology-enhanced services and face-to-face care meet consumers' mental health needs.

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Appendix 1.: Formulas for multiple linear regressions

The models to be estimated are:

$$logit[Prob(Y_i = 1)] = \beta_0 + \beta_1 X_{i1} \tag{1}$$

$$logit[Prob(Y_i = 1)] = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} \tag{2}$$

$$logit[Prob(Y_i = 1)] = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} \tag{3}$$

where, for a given individual i, Y_i is hotline use, X_{i1} is a vector of sociodemographic variables, X_{i2} is a vector of clinical history variables, X_{i3} is a vector of service use variables, and β_1, β_2 and β_3 are vectors of their respective regression coefficients.

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Table 1.

Sample characteristics, by lifetime hotline use (weighted estimates[a])

| | Lifetime Hotline Use | | | | |
Sociodemographics	Overall Sample n=18,909 100% weighted %	No n=18,545 97.5% weighted %	Yes n=364 2.5% weighted %	F statistic	p-value
Age, years					
18-34	32.1%	32.3%	25.0%		
35-49	31.5%	31.0%	52.2%		
50-64	20.8%	20.9%	18.3%		
65 and older	15.5%	15.8%	4.5%	**12.99**	**<0.0001**
Gender					
Male	48.1%	48.6%	28.9%		
Female	51.9%	51.4%	71.1%	**56.46**	**<0.0001**
Race/Ethnicity					
Non-Latino White	69.5%	69.2%	81.0%		
Non-Latino Black	11.4%	11.6%	6.5%		
Latino	12.4%	12.6%	6.1%		
Asian	4.6%	4.6%	1.8%		
All Other	2.1%	2.0%	4.6%	**13.24**	**<0.0001**
Years of Education					
0-11 Years	17.9%	18.0%	14.4%		
12 Years	31.1%	31.1%	29.8%		
13-15 Years	27.0%	26.9%	29.7%		
>=16 Years	24.0%	24.0%	26.2%	0.77	0.4996
Household Income					
<US$17000	20.3%	20.2%	24.9%		
US$17000-44999	21.8%	21.7%	24.8%		
US$45000-79999	27.6%	27.5%	27.6%		
>=US$80000	30.3%	30.6%	22.8%	2.28	0.0815
Marital Status					
Married/Cohabitating	57.8%	58.1%	45.7%		
Divorced/Separated/Widowed	19.7%	19.3%	32.3%		
Never Married	22.5%	22.5%	21.9%	**11.27**	**0.0001**
Employment Status					
Employed	65.5%	65.5%	65.4%		
Unemployed	8.5%	8.6%	2.7%		
Not in Work Force	26.0%	25.9%	31.9%	**8.46**	**0.0004**
Insurance					
No insurance	16.0%	16.0%	15.6%		

	Lifetime Hotline Use				
	Overall Sample	**No**	**Yes**		
	n=18,909	**n=18,545**	**n=364**		
	100%	**97.5%**	**2.5%**		
Sociodemographics	weighted %	weighted %	weighted %	**F statistic**	**p-value**
Private insurance	57.7%	57.8%	54.1%		
Government/Other	26.4%	26.2%	31.3%	1.57	0.2127
Country Quadrant					
Northeast	19.8%	19.7%	24.1%		
Midwest	23.0%	23.0%	23.2%		
South	33.2%	33.4%	24.6%		
West	24.1%	23.9%	28.1%	2.56	0.0687
Clinical History, lifetime					
Any Depressive Disorder	18.8%	17.8%	59.6%	**294.95**	**<0.0001**
Any Anxiety Disorder	21.4%	20.4%	62.7%	**234.42**	**<0.0001**
Any Eating Disorder	2.0%	1.8%	9.5%	**144.86**	**<0.0001**
Any Substance Use Disorder	12.6%	11.9%	37.6%	**179.02**	**<0.0001**
Alcohol	11.4%	10.8%	35.0%	**192.54**	**<0.0001**
Illicit Drugs	6.9%	6.4%	24.8%	**106.80**	**<0.0001**
No Disorder	64.3%	65.6%	17.1%	**307.47**	**<0.0001**
Suicidality					
Ideation	14.8%	13.8%	54.4%	**189.93**	**<0.0001**
Plan[b]	34.8%	32.8%	54.5%	**16.75**	**0.0001**
Attempt[b]	31.9%	29.5%	54.9%	**40.39**	**<0.0001**
Service Use, lifetime					
Health Professional	43.0%	41.7%	93.6%	**376.65**	**<0.0001**
Overnight stay	7.8%	7.1%	33.5%	**296.91**	**<0.0001**
# of times, *mean*	1.79	1.66	2.40	**24.51**	**<0.0001**
Informal Services	7.8%	6.9%	41.5%	**288.62**	**<0.0001**
No Care[c]	56.2%	57.5%	5.0%	**326.29**	**<0.0001**

[a]All percentages are weighted estimates

[b]Only assessed on respondents reporting suicidal ideation

[c]No use of a health professional, informal services or overnight hospital stay

Table 2.

Sample characteristics, by past 12-month hotline use (weighted estimates[a])

	Past 12 Month Hotline Use				
	Overall Sample	No	Yes		
	n=18,909	n=18,830	n=79		
	100%	99.5%	0.5%		
Sociodemographics	weighted %	weighted %	weighted %	**F statistic**	**p-value**
Age, years					
18-34	32.1%	32.1%	35.1%		
35-49	31.5%	31.5%	40.8%		
50-64	20.8%	20.8%	22.2%		
65 and older	15.5%	15.6%	2.0%	1.68	0.1871
Gender					
Male	48.1%	48.3%	19.2%		
Female	51.9%	51.7%	80.8%	**13.60**	**0.0003**
Race/Ethnicity					
Non-Latino White	69.5%	69.5%	74.1%		
Non-Latino Black	11.4%	11.5%	7.2%		
Latino	12.4%	12.4%	7.2%		
Asian	4.6%	4.6%	3.0%		
All Other	2.1%	2.0%	8.5%	**10.03**	**<0.0001**
Years of Education					
0-11 Years	17.9%	17.9%	18.0%		
12 Years	31.1%	31.1%	25.1%		
13-15 Years	27.0%	26.9%	37.8%		
>=16 Years	24.0%	24.0%	19.2%	0.88	0.4260
Household Income					
<US$17000	20.3%	20.3%	28.2%		
US$17000-44999	21.8%	21.8%	29.2%		
US$45000-79999	27.6%	27.6%	26.5%		
>=US$80000	30.3%	30.4%	1.6%	1.32	0.2677
Marital Status					
Married/Cohabitating	57.8%	58.0%	26.9%		
Divorced/Separated/Widowed	19.7%	19.6%	39.5%		
Never Married	22.5%	22.5%	33.6%	**9.49**	**0.0002**
Employment Status					
Employed	65.5%	65.6%	50.1%		
Unemployed	8.5%	8.5%	5.0%		
Not in Work Force	26.0%	25.9%	44.9%	**5.69**	**0.0050**
Insurance					
No insurance	16.0%	15.9%	23.1%		

	Past 12 Month Hotline Use				
	Overall Sample	**No**	**Yes**		
	n=18,909	**n=18,830**	**n=79**		
	100%	**99.5%**	**0.5%**		
Sociodemographics	weighted %	weighted %	weighted %	**F statistic**	**p-value**
Private insurance	57.7%	57.8%	41.9%		
Government/Other	26.4%	26.3%	35.1%	2.27	0.1163
Country Quadrant					
Northeast	19.8%	19.8%	22.9%		
Midwest	23.0%	23.0%	31.7%		
South	33.2%	33.2%	21.6%		
West	24.1%	24.1%	23.8%	1.97	0.1192
Clinical History, past 12 months					
Any Depressive Disorder	8.3%	8.1%	57.7%	**238.18**	**<0.0001**
Any Anxiety Disorder	12.5%	12.2%	67.4%	**118.43**	**<0.0001**
Any Eating Disorder	0.9%	0.8%	6.8%	**17.09**	**0.0001**
Any Substance Use Disorder	3.4%	3.3%	24.1%	**85.23**	**<0.0001**
Alcohol	2.7%	2.6%	24.1%	**109.90**	**<0.0001**
Illicit Drugs	1.2%	1.2%	10.8%	**29.61**	**<0.0001**
No Disorder	85.2%	85.4%	42.9%	**61.77**	**<0.0001**
Clinical History, lifetime					
Suicidality					
Ideation	14.8%	14.6%	57.2%	**61.77**	**<0.0001**
Plan[b]	34.8%	34.2%	66.6%	**12.81**	**0.0005**
Attempt[b]	31.9%	31.1%	72.5%	**19.79**	**<0.0001**
Service Use, lifetime					
Health Professional	43.0%	42.8%	96.4%	**112.89**	**<0.0001**
Overnight stay	7.8%	7.6%	45.8%	**133.31**	**<0.0001**
# of times, *mean*	1.79	1.71	2.53	**5.72**	**0.018**
Informal Services	7.8%	7.6%	41.3%	**87.97**	**<0.0001**
No Care[c]	56.2%	56.4%	3.5%	**112.72**	**<0.0001**
Service Use, past 12 months					
Overnight stay	0.8%	0.7%	16.4%	**176.87**	**<0.0001**

[a]All percentages are weighted estimates

[b]Only assessed on respondents reporting suicidal ideation

[c]No use of a health professional, informal services or overnight hospital stay

Table 3.

Relative odds of lifetime hotline use

	Model 1 n=15,303				Model 2 n=15,282				Model 3 n=15,177			
	OR	95% CI LL	UL	p-value	OR	95% CI LL	UL	p-value	OR	95% CI LL	UL	p-value
Sociodemographics												
Age, years												
18-34	REF	-	-	-	REF	-	-	-	REF	-	-	-
35-49	2.08	1.32	3.27	0.002	1.78	1.16	2.73	0.009	1.47	0.93	2.31	0.099
50-64	0.92	0.66	1.28	0.609	0.93	0.68	1.26	0.624	0.74	0.53	1.03	0.072
65 and older	0.16	0.06	0.42	<0.001	0.39	0.16	1.00	0.050	0.43	0.15	1.22	0.111
Gender												
Male	REF	-		-	REF	-		-	REF	-		-
Female	1.88	1.49	2.38	<0.001	1.87	1.42	2.45	<0.001	1.62	1.21	2.18	0.001
Race/Ethnicity												
Non-Latino White	REF	-		-	REF	-		-	REF	-		-
Non-Latino Black	0.32	0.21	0.48	<0.001	0.56	0.36	0.87	0.010	0.73	0.48	1.12	0.151
Latino	0.29	0.18	0.47	<0.001	0.52	0.32	0.84	0.008	0.64	0.40	1.03	0.064
Asian	0.21	0.12	0.37	<0.001	0.49	0.28	0.87	0.015	0.84	0.49	1.47	0.547
All Other	1.48	0.83	2.64	0.178	1.05	0.57	1.92	0.886	1.19	0.58	2.43	0.630
Years of Education												
0-11 Years	REF	-		-	REF				REF			
12 Years	1.01	0.59	1.70	0.983	1.29	0.72	2.33	0.388	1.13	0.61	2.09	0.698
13-15 Years	1.36	0.85	2.19	0.197	1.56	0.94	2.61	0.088	1.30	0.78	2.16	0.307
>=16 Years	1.38	0.79	2.43	0.259	1.65	0.91	3.00	0.099	1.32	0.75	2.31	0.329
Household Income												
<US$17000	REF	-		-	REF				REF			
US$17000-44999	1.02	0.67	1.54	0.927	1.04	0.65	1.65	0.869	0.95	0.59	1.53	0.828
US$45000-79999	0.82	0.50	1.36	0.444	0.91	0.54	1.56	0.741	0.82	0.48	1.38	0.443
>=US$80000	0.57	0.34	0.96	0.034	0.72	0.42	1.21	0.212	0.69	0.39	1.20	0.184
Marital Status												

	Model 1 n=15,303				Model 2 n=15,282				Model 3 n=15,177			
	OR	95% CI LL	UL	p-value	OR	95% CI LL	UL	p-value	OR	95% CI LL	UL	p-value
Sociodemographics												
Married/Cohabitating	REF	-	-	-								
Divorced/Separated/Widowed	1.93	1.48	2.52	<0.001	1.52	1.16	2.01	0.003	1.26	0.94	1.70	0.121
Never Married	1.18	0.70	1.97	0.532	1.10	0.64	1.89	0.718	0.99	0.62	1.58	0.959
Employment Status												
Employed	REF	-	-	-								
Unemployed	0.65	0.32	1.32	0.233	0.65	0.32	1.35	0.247	0.62	0.31	1.26	0.183
Not in Work Force	1.26	0.92	1.71	0.144	1.15	0.81	1.64	0.424	1.01	0.71	1.44	0.962
Insurance												
No insurance	REF	-	-	-								
Private insurance	0.95	0.65	1.38	0.774	1.19	0.84	1.69	0.328	1.19	0.83	1.71	0.353
Government/Other	1.72	1.19	2.48	0.004	1.62	1.14	2.30	0.008	1.41	0.97	2.05	0.072
Country Quadrant												
Northeast	REF	-	-	-								
Midwest	0.84	0.53	1.32	0.440	0.82	0.54	1.25	0.348	0.77	0.47	1.27	0.311
South	0.66	0.39	1.11	0.116	0.65	0.39	1.07	0.089	0.68	0.39	1.20	0.182
West	1.02	0.65	1.60	0.938	0.92	0.60	1.41	0.696	0.82	0.49	1.38	0.458
Clinical History, lifetime												
Any Depressive Disorder	-	-	-	-	2.02	1.40	2.89	<0.001	1.64	1.12	2.39	0.011
Any Anxiety Disorder	-	-	-	-	2.06	1.41	3.01	<0.001	1.66	1.16	2.37	0.005
Any Eating Disorder	-	-	-	-	2.22	1.56	3.15	<0.001	2.09	1.46	2.98	<0.001
Any Substance Use Disorder	-	-	-	-	2.07	1.43	2.98	<0.001	1.50	1.06	2.12	0.022
Suicidal Ideation	-	-	-	-	2.87	2.03	4.06	<0.001	2.18	1.51	3.14	<0.001
Service Use, lifetime												
Health Professional	-	-	-	-	-	-	-	-	6.26	3.48	11.26	<0.001
Overnight Stay	-	-	-	-	-	-	-	-	1.35	0.99	1.84	0.056
Informal Services	-	-	-	-	-	-	-	-	2.66	1.78	3.97	<0.001
Adjusted Wald Test for addition of additional variables into the model												
F Statistic	n/a				$F_{(5,161)} = 52.68^{***}$				$F_{(3,163)} = 26.25^{***}$			

		Model 1 n=15,303				Model 2 n=15,282				Model 3 n=15,177		
	OR	95% CI		p-value	OR	95% CI		p-value	OR	95% CI		p-value
		LL	UL			LL	UL			LL	UL	
Sociodemographics												
P-value				p<0.0001				p<0.0001				p<0.0001

Note. OR=odds ratio, CI=confidence interval, LL=lower limit, UL=upper limit

Table 4.

Relative odds of past 12-month hotline use

Sociodemographics	Model 1 n=15,303				Model 2 n=15,282				Model 3 n=15,156			
	OR	95% CI LL	UL	p-value	OR	95% CI LL	UL	p-value	OR	95% CI LL	UL	p-value
Age, years												
18-34	REF	-	-	-	REF	-	-	-	REF	-	-	-
35-49	1.50	0.55	4.08	0.422	1.20	0.45	3.18	0.718	0.85	0.34	2.15	0.737
50-64	1.05	0.23	4.79	0.954	1.24	0.33	4.71	0.752	1.06	0.26	4.22	0.938
65 and older	**0.06**	**0.01**	**0.37**	**0.003**	**0.15**	**0.03**	**0.81**	**0.028**	**0.19**	**0.04**	**0.89**	**0.036**
Gender												
Male	REF	-	-	-	REF	-	-	-	REF	-	-	-
Female	**3.34**	**1.57**	**7.07**	**0.002**	**3.25**	**1.51**	**6.99**	**0.003**	**2.76**	**1.16**	**6.57**	**0.022**
Race/Ethnicity												
Non-Latino White	REF	-	-	-	REF	-	-	-	REF	-	-	-
Non-Latino Black	**0.30**	**0.13**	**0.70**	**0.006**	0.50	0.22	1.14	0.098	0.61	0.27	1.38	0.233
Latino	**0.38**	**0.21**	**0.68**	**0.001**	0.65	0.39	1.11	0.112	0.81	0.48	1.38	0.436
Asian	0.49	0.16	1.49	0.208	1.06	0.31	3.59	0.922	1.61	0.51	5.16	0.417
All Other	**2.64**	**1.27**	**5.47**	**0.009**	1.81	0.73	4.51	0.199	1.51	0.26	8.70	0.645
Years of Education												
0-11 Years	REF	-	-	-	REF	-	-	-	REF	-	-	-
12 Years	0.81	0.30	2.17	0.675	1.14	0.40	3.26	0.804	0.80	0.25	2.58	0.713
13-15 Years	1.59	0.41	6.12	0.496	2.06	0.60	7.07	0.249	1.65	0.52	5.25	0.396
>=16 Years	0.99	0.34	2.88	0.989	1.34	0.44	4.07	0.602	1.03	0.38	2.77	0.960
Household Income												
<US$17000	REF	-	-	-	REF	-	-	-	REF	-	-	-
US$17000-44999	1.62	0.65	4.04	0.296	1.98	0.81	4.84	0.131	1.75	0.71	4.31	0.219
US$45000-79999	1.54	0.58	4.08	0.383	1.87	0.69	5.08	0.217	1.26	0.41	3.83	0.688
>=US$80000	1.11	0.29	4.32	0.877	1.69	0.35	8.26	0.513	1.44	0.26	8.07	0.678
Marital Status												

	Model 1 (n=15,303)				Model 2 (n=15,282)				Model 3 (n=15,156)			
	OR	95% CI LL	UL	p-value	OR	95% CI LL	UL	p-value	OR	95% CI LL	UL	p-value
Sociodemographics												
Married/Cohabitating	REF	-	-	-								
Divorced/Separated/Widowed	4.62	2.42	8.85	<0.001	3.36	1.62	6.95	<0.001	2.84	1.33	6.06	0.007
Never Married	3.61	1.07	12.22	0.039	2.88	0.93	8.89	0.066	2.30	0.72	7.35	0.158
Employment Status												
Employed	REF	-	-	-								
Unemployed	1.66	0.57	4.89	0.354	1.95	0.64	5.91	0.237	1.70	0.51	5.60	0.383
Not in Work Force	2.28	1.36	3.84	0.002	2.07	1.21	3.53	0.008	1.55	0.79	3.04	0.200
Insurance												
No insurance	REF	-	-	-								
Private insurance	0.51	0.20	1.30	0.159	0.66	0.27	1.64	0.373	0.55	0.25	1.21	0.135
Government/Other	1.14	0.56	2.31	0.724	1.12	0.62	2.03	0.710	0.87	0.47	1.60	0.643
Country Quadrant												
Northeast	REF	-	-	-								
Midwest	1.16	0.56	2.37	0.688	1.29	0.59	2.80	0.525	1.17	0.55	2.47	0.685
South	0.63	0.31	1.28	0.198	0.60	0.30	1.23	0.163	0.47	0.22	1.00	0.050
West	0.71	0.40	1.27	0.247	0.62	0.33	1.15	0.131	0.52	0.29	0.94	0.030
Clinical History, past 12-months												
Any Depressive Disorder					3.21	1.82	5.64	<0.001	2.67	1.39	5.13	0.004
Any Anxiety Disorder					3.58	1.59	8.07	0.002	3.27	1.45	7.41	0.005
Any Eating Disorder					1.52	0.39	5.96	0.549	1.67	0.54	5.16	0.368
Any Substance Use Disorder					3.18	1.49	6.76	0.003	2.35	1.04	5.32	0.041
Suicidal Ideation (LT)					1.78	0.85	3.75	0.128	1.41	0.69	2.87	0.340
Service Use												
Health Professional (LT)					-	-	-	-	5.32	1.93	14.68	0.001
Overnight stay (12m)					-	-	-	-	4.59	1.65	12.78	0.004
Informal Services (LT)					-	-	-	-	2.14	1.07	4.31	0.033
Adjusted Wald Test for addition of additional variables into the model												
F Statistic	n/a				F(5,161) = 16.36***				F(3,163) = 8.59***			

		Model 1 n=15,303				Model 2 n=15,282				Model 3 n=15,156		
	OR	95% CI		p-value	OR	95% CI		p-value	OR	95% CI		p-value
		LL	UL			LL	UL			LL	UL	
Sociodemographics												
P-value				p<0.0001				p<0.0001				p<0.0001

Note. OR=odds ratio, CI=confidence interval, LL=lower limit, UL=upper limit, LT=lifetime, 12m=past 12-months