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## **Prevalence of Common and Severe Mental Health Disorders in rural Mexico and Preliminary Results of a Mental Health Program Evaluation - Chiapas, Mexico, 2017-2018**

Authors: Mackenzie Zendt; Monica Swahn, Ph.D., MPH; Fatima Rodriguez, MD

**Purpose:** An estimated 75-85% of people with common and severe mental health disorders living in low- and middle-income countries do not have access to the treatment they need, despite the fact that effective treatments exist and can be successfully delivered in primary care settings. In the rural Sierra Madre Mountain region of Chiapas, Mexico, the rate of depression is almost twice the rate of the national average for Mexico. Rates of other mental health disorders in this region are not reported, but are likely high.

**Methods:** This study aims to report the prevalence of common and severe mental health disorders in the Sierra Madre Mountain region of Chiapas, Mexico, as well as the demographics and clinical characteristics of mental health patients. This is done by examining the medical records of mental health patients who visited a primary care clinic operated by Compañeros En Salud (CES) between 2017 and 2018. This study also provides preliminary results of health improvement for patients being treated through CES's mental health program, measured by change in score on the Patient Health Questionnaire-9.

**Results:** Of the 12,718 unique patients who attended CES-operated clinics during the two-year study period, 856 (6.7%) had a mental health disorder. The majority had depression (54%), followed by anxiety (32%), psychosis (6% for schizophrenia, 2% for other types of psychosis), substance use disorder (2%) and bipolar disorder (1%). The ratio of men to women was one to four, and three-fourths of patients were between the ages of 19-49. Regarding patient health improvement, the average fall in PHQ-9 scores for all patients was 2.86 (CI: 1.75, 3.96) ( $p < 0.0001$ ). Thirty-five percent of patients fell into full remission and an additional 22% fell into partial remission. The only significant indicator of fall in PHQ-9 score was number of clinic visits ( $p = 0.0005$ ).

**Conclusion:** Compared to global and Mexico-specific rates of mental health, patients with mental health disorders in the rural Sierra are more frequently women and in their early to middle-ages. Patient health outcomes provides encouraging evidence of the positive effect of the mental health program, though there is a need to standardize follow-up with patients and data collection methods.

PREVALENCE OF COMMON AND SEVERE MENTAL HEALTH DISORDERS IN RURAL  
MEXICO AND PRELIMINARY RESULTS OF A MENTAL HEALTH PROGRAM  
EVALUATION - CHIAPAS, MEXICO, 2017-2018

by

MACKENZIE ZENDT

B.A., ELON UNIVERSITY

A Thesis Submitted to the Graduate Faculty  
of Georgia State University in Partial Fulfillment  
of the  
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MASTER OF PUBLIC HEALTH

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30303

APPROVAL PAGE

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## Author's Statement Page

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## **Literature Review**

### ***I. Mental Health in Low- and Middle-Income Countries***

Mental, neurological, and substance use disorders are common in all regions of the world, across all age levels, and in all communities. In recent decades, there has been growing acknowledgement of the increasing prevalence and impact of mental health disorder within global health priorities. The attention is necessary, as one in four people will develop a mental or behavioral disorder in their lifetime, and mental illnesses currently account for 32.4% of global years lived with disability and 14% of global disability-adjusted life years (DALYs)<sup>1, 2, 3</sup>.

Depression, the most common mental disorder, has been estimated to contribute to 40.5% of DALYs by 2020, making it the second leading cause of burden of disease worldwide<sup>4</sup>.

Poverty is an important indicator of overall health, including mental health<sup>5</sup>, and has been identified by the World Health Organization (WHO) as a primary risk factor for depression<sup>6</sup>. While individual-level factors are more important than contextual factors as determinants of depression, depression has been shown to increase as economic development decreases<sup>7</sup>. A systematic review of research on the relationship between poverty and common mental disorders in low- and middle-income countries (LMICs) found low education, food insecurity, housing insecurity, low social class, low socio-economic status, and financial stress were all consistently and strongly associated with common mental disorders<sup>8</sup>.

Tied in to the factor of poverty, living in a rural area can also make a person more prone to develop a common or severe mental health disorder. It is well-documented that low-income individuals experience higher rates of mental health problems than individuals in higher earnings brackets<sup>9</sup>, and that people living in rural households are more likely to earn less than urban households, even when both adults are working<sup>10</sup>. In addition to the factor of rural poverty as a



determinant of depression, rural living has been associated with stigmatized attitudes toward mental health care and reduced willingness to seek help<sup>11</sup>, fewer visits to a mental health specialist, and lower concordance with guidelines on treatment<sup>12</sup>. While the worldwide percentage of people living in rural areas is decreasing, 44.7% of the global population still lives in an area classified as rural<sup>13</sup>. Therefore, rural as a contributing risk to mental health disorders should be addressed.

Despite the high burden of mental health disorders worldwide, lack of access to quality mental healthcare remains a challenge. This is particularly true for people in low- and middle-income countries, where an estimated 75-85% of affected people do not have access to the treatment they need, and in rural areas, where people are less likely to have access to any healthcare, especially for mental health<sup>3,14</sup>. Most patients with mental health disorders in LMICs and rural areas are seen by general practitioners in primary health care settings. Effective treatments for many common and severe mental health disorders do exist and can be successfully delivered in primary care settings<sup>15</sup>, though research shows many people are not adequately treated<sup>3,16</sup>.

In response to the large treatment gap for mental health, the WHO created the Mental Health Action Plan 2013–2020, a plan to “provide comprehensive, integrated and responsive mental health and social care services in community-based settings” around the world. The plan sets specific goals for global mental health work, including one to increase service coverage for severe mental disorders (including moderate and severe depression) by 20% by 2020<sup>17</sup>. As part of the Mental Health Action Plan, the WHO developed the Mental Health Gap Action Programme (mhGAP) which provides resources and structure to low- and middle-income countries to enable them to scale up mental health services. This includes trainings for non-

specialist healthcare workers in the diagnosis and treatment of patients with mental, neurological and substance use disorders<sup>3</sup>. This concept of “task-sharing”, or the shifting of care from specialist (i.e. psychiatrists, psychiatric nurses, psychologists) to generalist providers, nurses, and community health workers is one of WHO’s proposed solutions to the need for more mental healthcare in low-resource areas, and has been shown to be effective, although task-sharing programs have only been implemented in recent decades<sup>3,18</sup>. Treatment packages similar to mhGAP have been developed by other groups to address common mental health conditions in low-income regions<sup>15,19</sup>, and most follow the WHO’s recommendation to include mental health within the primary healthcare setting.

## ***II. Health in Mexico***

Mexico is classified as an upper middle-income country by the World Bank, but income disparities between and within Mexican states are some of the biggest in the world. This disparity is visible in the state of Chiapas, the southernmost state in Mexico, which has a poverty rate of 76%. This is almost four times higher than the rate of 20% in Nuevo Leon, the state with the lowest poverty rate in Mexico. While the GDP per capita of 43,539 USD for people living in Mexico City reflects that of the state of France, the per capita rate of 7,249 USD in Chiapas is more similar to countries in south Asia and sub-Saharan Africa<sup>20</sup>.

In conjunction with the disparity in income between Mexican states, large differences also exist regarding health and well-being. People living in Chiapas have less access to healthcare, education, and other social services. As a result, Chiapans are in poor health. Chiapas ranks among the worst-off states in Mexico for life expectancy at birth and maternal mortality rate<sup>20</sup>.

While Mexico has a universal healthcare policy, access to affordable healthcare for many people living in poor, rural areas of Mexico is not a reality. The proportion of uninsured is about 45% in the wealthier, northern states in Mexico, but hovers around 80% in the poorer and more rural states like Chiapas, Guerrero, and Oaxaca<sup>21</sup>. For the uninsured, the Mexican Secretary of Health runs a public health care system. However, the system does not have the resources to provide quality healthcare to many of the people it aims to serve. In rural Mexico, government-run health clinics are often under- or understaffed, lack appropriate medication, or are closed altogether. A study conducted in rural Michoacan found local health clinics to be crowded, understaffed, and regularly lack necessary medical supplies<sup>22</sup>. Lack of access to quality healthcare causes injury and death to people living in rural, poor regions. A study on pregnancy risk in Chiapas cited lack of access to quality care as the primary modifiable risk factor for mortality disparities in rural Mexico<sup>23</sup>. Lack of access to effective healthcare has even caused social revolution in Mexico. The Zapatistas, a group of indigenous peasants that formed a movement to overthrow the Mexican government in Chiapas in 1994, cited early death from treatable diseases and continual neglect from all levels of government regarding healthcare as one of the principal reasons of their rebellion<sup>24</sup>.

### ***III. Mental Health in Chiapas***

Chiapas, the southernmost state of Mexico, has a population of 5.2 million, and ranks among the highest states for rates of people living in poverty, in rural areas, and areas classified as marginalized<sup>20,25,26</sup>. It also has one of the highest rates of people reliant on government-sponsored health insurance<sup>21,27</sup>, and the lowest level of effective health coverage in the country<sup>28</sup>.

A study of health inequality in Mexico by Juarez-Ramirez (2014) identifies families living in poverty, unemployed persons, people living in rural regions, and adolescent mothers as vulnerable populations with elevated risks of mental health disorders<sup>29</sup>. Many people in Chiapas fall into one (if not multiple) of these vulnerable population groups. This elevates their risk of experiencing a mental health condition in their lifetime, a risk that is already one in four for Mexicans<sup>30</sup>.

The prevalence of depression in rural Chiapas has been estimated at 7.9%<sup>31</sup>, almost twice as high as the global prevalence of major depression of 4.4%<sup>6,32</sup> and the national prevalence in Mexico of 4.0 to 4.5%<sup>33</sup>. Prevalence rates of anxiety, psychosis, and other mental health disorders in rural Chiapas are unknown, though likely higher than in more urban and wealthier areas of Mexico.

Despite the high mental health risk for many people living in Chiapas, there are inadequate resources to provide mental health care in the region. In addition to understaffed and under-resourced government health clinics, the state of Chiapas and its rural communities face a severe shortage of human resources for mental healthcare. Like many low- and middle- income countries, most of Mexico's mental healthcare specialists are concentrated in urban areas. To serve Chiapas' population of 5.2 million, there are an estimated 210 psychologists and 4 psychiatrists<sup>34</sup>. Heinze (2019) reports the rate of 0.55 psychiatrists for every 100,000 people in Chiapas, the second-lowest rate in the country. This rate differs drastically from the national rate of 3.68 psychiatrists for every 100,000 inhabitants and the rate of 22.06/100,000 in urban Mexico City<sup>35</sup>.

To address the mental healthcare situation, in 2015 the Mexican Secretary of Health published the "Programa de Acción Específico de Atención en Salud Mental 2013-2018"

(Specific Action Plan in Mental Health 2013-2018), a plan with defined objectives to improve mental health services throughout the country. One of the plan's main directives was to integrate mental health into the general health services network<sup>36</sup>, reflective of WHO's Mental Health Action Plan. In 2016, the state of Chiapas formed a State Council of Mental Health, in order to support the "prevention, promotion, external consultations, hospitalization, rehabilitation, and social reintegration of the individual, [in order to] to mitigate the social determinants that affect health". These published guidelines of the institution require it to support and provide effective mental healthcare coverage to the 122 municipalities in the state of Chiapas<sup>34</sup>. These government-led efforts are encouraging and suggest awareness of the current lack of resources and attention given to mental health in Chiapas.

#### ***IV. Mental Health Service Delivery***

Interviews with international mental health experts and leaders in 2007 identified four main challenges in mental health service delivery: (1) public health other than mental health takes priority in securing funding, (2) mental health services are complex and confined to central geographical areas, (3) mental health care in primary care settings is difficult to implement, and (4) there are low numbers and few types of workers that are trained and supervised in mental health care<sup>37</sup>. These challenges arise in the majority of literature on global mental health<sup>8</sup>.

Despite these challenges, in the last three decades, mental health programs have been developed to provide quality healthcare around the world. Some have been implemented in low-resource, rural, or marginalized areas. Most of these programs place service delivery within the local primary healthcare system, though it should be noted that many times they are jointly funded through the government and an external source like a non-profit organization, university,

or grant. An evaluation of eight mental health programs around the world emphasizes the feasibility of implementing mental health into the primary healthcare system and provides ideas and recommendations for adapting programs to local contexts. In addition to the main goal of improving patient health outcomes, many of these programs in this evaluation have been shown to be affordable to patients, cost-effective to society, and promote the respect of human rights<sup>15</sup>.

Despite the existence of a variety of mental health programs, a large treatment gap remains between those who require mental healthcare services and those who receive them. An article titled “Scaling Up for the Bottom Billion” highlights the reality that poverty is the driving force that prevents many of the world’s citizens from receiving care<sup>19</sup>. In Mexico, where 46.2% of the population lives in poverty and 10.4% lives in extreme poverty<sup>36</sup>, a study conducted in 2005 measured that only 20% of the people living with mental health disorders received treatment<sup>30</sup>. This percent is likely much lower in rural, marginalized areas of Chiapas.

Globally, widespread integration and scale-up of mental health in primary care has not been realized, especially in rural areas<sup>38</sup>. This could in part be due to the lack of program evaluation data regarding the outcomes of community-based mental health services. While there is some effort to evaluate interventions for the treatment and prevention of mental health disorders, only 11% of studies have evaluated mental health programs in low- and middle-income countries. Out of these studies, about three-fourths of them are evaluating treatments for schizophrenia<sup>39</sup>. While this is important, program evaluation is also necessary to validate the efficacy of programs related to depression and other common mental health disorders. There is an overarching need for systematic evaluation of mental health programs in the real world, in order to provide evidence for the feasibility and effectiveness of mental healthcare programs when integrated into primary care settings in low-income and middle-income countries<sup>39</sup>.

## *V. Literature Gaps*

While people in rural Chiapas likely experience mental health disorders at higher rates than in more affluent, urban parts of Mexico, prevalence rates of most common and severe mental health disorders are non-existent. Identification and characterization of common and severe mental health disorders is an important first step in order to design and implement programs to serve patients. Regarding mental health program implementation, there are few studies that evaluate effectiveness of programs in low- and middle-income countries. These much-needed programs should be evaluated in order to best serve patients and encourage integration and scale-up of mental health services.

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Mackenzie Zendt<sup>1</sup>; Monica Swahn<sup>1</sup>, Ph.D., MPH; Fatima Rodriguez<sup>2</sup>, MD

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## **Introduction**

Mental, neurological, and substance use disorders are common in all regions of the world, across all age levels, and in all communities. One in four people will develop a mental or behavioral disorder in their lifetime; disorders that contribute to 14% of the global burden of disease and 32.4% of global years lived with disability<sup>1,2,3</sup>. Various studies have shown the link between poverty and overall health<sup>4</sup>, as well as between poverty and common mental health disorders in low-and middle-income countries (LMICs)<sup>5</sup>.

In recent decades there has been increased attention given to the high burden of mental health disorders in low- and middle-income (LMIC) countries. It has been estimated that 75-85% of people in LMICs with mental health disorders do not receive the care they need<sup>5,6,7</sup>. This is particularly true for people living in poverty and in rural areas<sup>8</sup>. In response to this treatment gap, the World Health Organization created the Mental Health Action Plan 2013-2020, a plan to “provide comprehensive, integrated and responsive mental health and social care services in community-based settings” around the world<sup>9</sup>. One facet of this overarching global plan is the Mental Health Gap Action Programme, which provides resources and structure to low- and middle-income countries to enable them to scale up mental health services within the primary healthcare system<sup>10</sup>. Based on this and other guidance, programs have been developed to provide mental healthcare in complex, diverse, and low-resource settings<sup>11</sup>.

While Mexico is ranked as an upper middle-income country, though large disparities between and within Mexican states exist. The state of Chiapas, in southern Mexico, has a poverty rate of 76%, and high rates of people living in rural and marginalized areas<sup>12</sup>. Alongside the high poverty rate, people living in Chiapas have less access to healthcare, education, and other social services<sup>12</sup>.

In the realm of mental health, Chiapans fare worse than their counterparts in other parts of Mexico. The prevalence of depression in rural Chiapas has been estimated at 7.9%, almost double the national average<sup>13</sup>. Prevalence rates of anxiety, psychosis, and other mental health disorders in rural Chiapas are unknown but are estimated to be high as a result of poverty, marginalization, and lack of healthcare resources in the region.

While all Mexicans theoretically have access to government-sponsored universal healthcare, for much of Mexico this is not a reality. In poor, rural, and remote parts of Mexico, including Chiapas, government-owned health clinics are often underfunded, understaffed, or not operational. To support the local health system and provide care to marginalized communities in Chiapas, a non-profit organization called Compañeros En Salud Mexico (CES) began in 2011<sup>14</sup>. CES is an affiliate of the international nongovernmental organization Partners In Health (PIH), and works in the Sierra Madre region (the Sierra) of Chiapas to provide primary healthcare to poor, rural communities. CES staffs and resources government clinics in the Sierra to provide primary health care to eleven rural communities. Doctors working in CES-operated clinics are jointly employed through the government's social service year program and the NGO<sup>15</sup>. The organization utilizes an accompaniment model of healthcare, in which doctors live in the rural communities they serve, and house visits are a common method of primary care and follow-up.

In 2012, at the request of several communities, CES began a mental health program. Mental health services are provided within the primary healthcare system, and doctors focus on the diagnosis, treatment, and ongoing management of common and severe mental health disorders. In addition to these tasks, doctors are responsible for recording information related to the monitoring and improvement of the mental health patients being treated at their clinic. A small cohort of community health workers also works to visit patients with severe mental health

disorders in their homes on a routine basis, but there is not a current method of measuring the effectiveness of these services.

The mental health patients seen at CES-operated clinics in the rural Sierra provide important prevalence and descriptive information about the burden of mental health disorders in this region, and other rural parts of Mexico. Reporting this information enables healthcare providers and the government to adequately build and resource services for this population. As with all healthcare programs, it is important for CES to routinely monitor process and program indicators in order to measure and evaluate success. Monitoring and evaluation also allows for the adaptation, refining, and evolution of the program to best fit patient needs.

The aim of this study is to report the mental health burden in the rural Sierra, Chiapas, Mexico, and the characteristics of the population seeking mental healthcare. It also reports preliminary findings from an evaluation of patients attending clinics operated by Compañeros En Salud for a mental health disorder.

## **Methods**

### *Setting*

The southwestern state of Chiapas is one of the poorest and most marginalized states in Mexico, with 51% of the population residing in rural areas and 75% living below the poverty line<sup>12,17,18</sup>. Within Chiapas, people living in rural communities in the Sierra Madre Mountains (the Sierra) face especially difficult living circumstances. In the predominantly coffee-farming communities, 46% of homes lack sewage, 30% lack running water, and 15% lack electricity<sup>18</sup>. The area relies heavily on income from agricultural production, an industry that has been negatively influenced in the past three decades by strong external forces including international



trade agreements and climate change<sup>19,20,21</sup>. Poverty and financial stress are common, and people have little economic or educational opportunity. Compounding poverty in the region is the lack of transportation and communication infrastructure, which further cut off the already geographically isolated region.

While the country of Mexico embraces universal healthcare and the Secretary of Health runs a public health insurance for the poor, many people living in rural areas of Mexico still experience a lack of healthcare. Government-run clinics in rural areas are often understaffed and lack necessary medications and resources<sup>22</sup>. In 2013, Lozano et al reported that Chiapas had the lowest level of effective health coverage in the country<sup>23</sup>.

### *Compañeros En Salud*

Compañeros en Salud México (CES), an affiliate of the international nongovernmental organization Partners In Health (PIH), works in the Sierra Madre region of Chiapas to provide primary healthcare to poor, rural communities. CES staffs and resources government clinics in eleven communities in the Sierra. Since 2012, CES has implemented a mental health program to address the high prevalence of depression, anxiety, schizophrenia, and other severe mental health disorders in the region<sup>14</sup>. The community-based mental health program consists of efforts to train primary healthcare providers on the diagnosis, treatment, and ongoing management of both common and severe mental health disorders, resource rural health clinics with appropriate medication, track monthly progress of patients with mental health disorders, and connect patients with community health workers who follow-up with them in their homes.

### *Study design*

To report prevalence data and evaluate patient health outcomes, a cross-sectional, retrospective study was conducted using data from electronic medical record (EMR) system used by Compañeros En Salud-supported clinics in the health jurisdictions of Villaflores and Motozintla. IRB approval was given by Georgia State University to use the de-identified patient information. An in-country research committee also provided guidance.

Electronic medical records were screened for patients who attended one of the eleven CES-supported clinics between January 1, 2017 to December 31, 2018 and had any diagnosis of a mental health disorder. Type of mental health disorders was reported, along with baseline characteristics like gender, age, and number of clinic visits, and first and last PHQ-9 score during the two-year period.

### *Measures*

CES doctors utilize an electronic medical record system to record general patient information and relevant clinical progress. Doctors use the Patient Health Questionnaire-9 (PHQ-9) to assess probable mental health patients and monitor their health. The PHQ-9 is a nine-question tool developed by Kroenke (2001) to diagnose depression, assess its severity, and monitor response to treatment over time, and has been proved to be a short, effective way to both detect depression and monitor response to treatment<sup>24,25</sup>. In 2017, the Spanish version of the PHQ-9 tool was validated as an accurate method to diagnose depression in rural Chiapas<sup>26</sup>.

### *Data Analysis*

Descriptive statistics were performed to explore demographics and clinical characteristics of the study population. Percentages of patients who fell into remission (a PHQ-9 score of less

than five) and partial remission (a PHQ-9 score of less than 10) during the study period were calculated. These cutoffs, established by Kroenke (2001) and validated by McMillan (2010), are used widely to indicate full and partial remission, respectively<sup>24,27</sup>. A paired t-test was conducted to determine the change from first to last patient PHQ-9 score. PHQ-9 score was categorized into seven groups: no change; high, moderate, and low decrease in PHQ-9 score; and high, moderate, and low increase in PHQ-9 score; and chi-squared tests were run to determine the effect of age, gender, and number of clinic visits in regard to change in PHQ-9 score. Analyses were computed in SAS 9.4 (SAS Institute, Cary, NC, USA) and Microsoft Excel.

## **Results**

### *Clinical Characteristics*

Of the over 12,718 unique patients who attended CES-operated clinics between January 1, 2017 and December 31, 2018, 856 (6.7%) had a mental health disorder. Of the mental health patients, the majority visited for depression (54%), followed by anxiety (32%), psychosis (6% for schizophrenia, 2% for other types of psychosis), substance use disorder (2%) and bipolar disorder (1%). Thirty-six patients visited for other mental health disorders, including post-traumatic stress disorder, obsessive compulsive disorder, and eating disorders. Overall, patients at CES-operated clinics are treated for twenty-two mental health conditions.

Demographically, there were four women for every one man that visited a clinic for a mental health disorder (women, 75%; men, 25%). While people from four to 99 years old visited clinics for mental health problems, the most common age group reporting disorders were young and early middle-aged adults, with 28% of patients between the ages of 30-39, 26% between 19

and 29, and 18% between 40 and 49. Combined, about three-fourths of patients were between the ages of 19 and 49.

Although the majority of patients with a mental health diagnosis are encouraged to visit the clinic monthly for psychotherapy appointments with the physician, 36% of patients only visited a clinic once in the two-year study period. These patients were counted as lost to follow-up and were excluded from measures of patient health outcomes. In the two-year period, 35% of patients visited between two and five times, and 29% visited more than five times. Thus, the modal patient for this study is a woman diagnosed with depression, between the ages of 19 and 49, who has attended the clinic between one and five times.

### *Patient Health Outcomes*

CES doctors utilize the Patient Health Questionnaire-9 as a tool to diagnose, assess severity, and quantify improvement of mental health disorders. To measure improvement, a doctor must record a patient's PHQ-9 score at least two times. Ideally, the score is taken at baseline to diagnose the illness, and again after six months of treatment.

Of the 856 patients who reported to the clinic with a mental health disorder during the two-year study period, 546 (64%) visited more than one time. Of the group with more than one clinic visit, 238 patients had their PHQ-9 score recorded more than once during the study period. A paired t-test showed an average fall of 2.86 (C.I.: 1.75, 3.96) ( $p < 0.0001$ ) between first and last PHQ-9 score recorded for these 238 patients, although the time interval between each test was not standardized. There was high variation between communities regarding change in PHQ-9 scores; one community reported an average decrease of 9.5 points, and several reported no significant average change.

Of the clinical characteristics, clinic attendance was the only significant variable influencing fall in PHQ-9 score ( $p=0.0005$ ). Patients who attended the clinic more than five times saw their scores fall by an average of 4.47, about three times as high as patients who only attended the clinic between two and five times, whose scores fell by an average of 1.37. In other words, patients who visited the clinic more than five times had 2.15 (1.37, 3.38) times the odds of having their PHQ9 drop than patients who only visited 2-5 times. Age did not significantly impact fall in PHQ-9 score ( $p=0.7470$ ), nor did gender ( $p=0.7561$ ).

Additionally, 21% of patients fell into full remission representing no/mild depression ( $\text{PHQ-9}<5$ ) and an additional 17% fell into partial remission, representing mild depression ( $\text{PHQ-9}$  between 5 and 9).

## **Discussion**

The majority of literature on mental health disorders in Chiapas is focused on patients in the capital city of Tuxtla Gutierrez. Apart from Elliott (2019)'s study on the prevalence of depression in the Sierra, there is no other available data on rates of mental health disorders in this rural area<sup>13</sup>. This study contributes to a broader picture of the mental health burden in rural Chiapas by adding prevalence reports of anxiety, schizophrenia, and other mental health disorders. It also evaluates a novel mental health program being implemented in the region and reports preliminary information on patient health improvements over time.

The total presence of 22 distinct disorders among the 12,718 patients treated in CES-operated clinics provides a picture of the complex and varied mental health needs of the communities in the rural Sierra. However, overall prevalence rates of mental health disorders in the rural Sierra are not higher than national averages. The prevalence of depression of 4.0%

reported in this study is lower than the rate of 7.9% recorded in 2014 for people in rural Chiapas<sup>13</sup>, and the same as the estimated prevalence for the country<sup>28</sup>. This study's rate of anxiety, 2.3%, is lower than the reported national prevalence of 6.6% for anxiety<sup>29</sup>. The 59 patients with schizophrenia in this study contribute to a prevalence rate of 0.5% of the population seen at CES clinics, lower than the national prevalence rate of 1.05%<sup>30</sup>. Although rates of these mental health disorders are not significantly higher than national averages, this could be due to underreporting. As the services provided for mental health are still relatively new to the eleven communities where CES works, increasing awareness of mental health disorders could result in increased clinic attendance for mental health attention.

Demographically, the patients in this study somewhat reflect the general characteristics of mental health patients globally and in Mexico. Regarding gender, global ratios of depression in women to men hover around 1.5:1 to 2:1<sup>31,32</sup>. Slightly more dramatic rates have been observed in Mexico; with the rate of depression 2.5 times higher for women than men for the country<sup>21</sup> and in the Sierra<sup>13</sup>. This study reports the ratio of women to men as 4:1 for all mental health issues, and 7:1 for depression. The gender gap in this study is partially related to the high percentage of women in the study, and the general pattern of higher clinic attendance by women than men. Still, other studies of rural adults in Mexico reflect similar large gender disparities in patients with depression<sup>28,33</sup>. Gender differences in mental health and depression in the Sierra could come as a result of women in the Sierra's common role as homemakers and young mothers, which isolates them from positive social interaction<sup>17</sup>. Although studies show Mexican men in rural areas are more likely to have depression than their urban counterparts, many do not seek care through the health clinics<sup>28</sup>. In the rural Sierra, the gender disparity could partially be a result of the healthcare seeking behavior by men, who may not seek care because of the need to work

during the day, stigma against men reporting problems having to do with emotions, and other cultural norms. Low utilization of mental healthcare by men has been reported in other studies on Mexican men, and is reflected globally<sup>13,31,34</sup>. Since depression is the main cause of disability for women in Mexico, and ninth for men<sup>17</sup>, mental health programs in rural Mexico should be aware of the high prevalence of depression in women, as well as the barriers preventing men from seeking mental healthcare.

Regarding age, global WHO estimates report depression to be more common in older adults, peaking around ages 60-64. However, our study reflects the highest burden of mental health disorders to be among young and middle-aged adults, with people from 19 to 49 representing 72% of patients with depression. Feelings of hopelessness, depression, and other more severe mental health disorders in middle-aged people in the Sierra could be a result of the stress associated with earning money and providing for the family, contributing to the correlation between hardship and depression, and the lack of opportunities for educational and occupational advancement<sup>5,35</sup>.

Similar to this study, other studies of novel mental health programs in rural areas report high rates of patients that are lost to follow-up<sup>36,37</sup>. A study by Salinas (2011) of healthcare-seeking behavior in Mexico found that people living in rural areas were significantly less likely to have visited a doctor than their urban counterparts, a trend likely linked to presence of health care coverage<sup>22</sup>. While clinics in the Sierra are run for free by the government and *Compañeros En Salud*, it is likely that financial and economic factors still play a role in clinic attendance. For example, a long walk to the clinic would reduce the amount of time spent working. In the poor, agriculturally-based region, losing half or a full day of labor is not viable. Other structural factors

like distance from the clinic and lack of transportation play a role in high loss to follow up after one clinic visit.

Regarding patient health outcomes, this study reports a statistically significant change in the mean PHQ-9 score of patients upon their first and most recent visit. However, the average fall of 2.86 (1.75, 3.96) does not meet the fall of five or greater that reflects a clinically relevant change in depression status<sup>25</sup>, and is lower than scores reported with similar sized cohorts in Uganda and Nepal. The reason for this low average likely has much to do with data collection and quality, and the lack of strict reporting by clinic doctors. This issue is expanded upon as part of the limitations of this study.

Despite the relatively low change in PHQ-9 score, this study still provides encouraging evidence of patient improvement within the mental health program. The positive correlation between increased clinic attendance and increased improvement in PHQ-9 score indicates patients improve with more sessions of treatment or months on medication. Furthermore, measurements that 21% of patients fell into full remission and an additional 17% fell into partial remission indicate the effectiveness of the program for many patients who may have presented with mild and moderate depression. These results indicate a need to pay increased attention to patients who begin the program with a PHQ-9 score indicating severe depression.

### **Strengths and Limitations**

Compañeros En Salud enables primary health clinics in the Sierra to provide mental health services to a population that has never received treatment that is effective, well-resourced, or continuous. The main strength of this evaluation is the complex, real world setting in which Compañeros En Salud implements mental healthcare for the poor. As the tools used to measure



and assess patient health outcomes, mainly the PHQ-9, were validated for accuracy in rural Chiapas, the results of this evaluation reflect patient reality as best as possible. Similarly, this mental healthcare program can be adapted to meet the needs of other resource-poor rural areas in Mexico and around the world.

However, several limitations exist in regard to data collection and quality. The patient health data reported in this study was collected by CES physicians as part of routine patient visits; it was not collected with the intention to be used for data analysis regarding patient health improvement over time. Therefore, we experience challenges related to missing or incomplete data, data collected at various times, and significant loss to follow-up of mental health patients. For example, of the 856 unique mental health patients who attended a clinic during the two-year study period, 310 only attended once and were counted lost to follow up. It could be these patients did not return because their symptoms were mild or temporary, or it could be they were so severe the patients were not able to return. Either way, loss to follow-up removed more than one-third (36.2%) of patients. Of the 546 who attended a clinic more than once, only 238 (43.5%) were asked the PHQ-9 score more than once, allowing us to calculate change in score over time. Even among these patients with two scores, the PHQ-9 assessment was not conducted at standardized intervals. Patients receive a baseline PHQ-9 score upon diagnosis, and ideally would receive a second score at six months of treatment. However, the reality is that many times CES doctors neglect or forget to ask the PHQ-9 as a part of follow-up in treatment. High patient load is the largest factor constraining a doctor's ability to spend more time gathering this quantitative piece of patient improvement data.

Lastly, when looking to evaluate the program based on health outcomes of the patients who received treatment, we did not create a comparison group. However, in an area with little to

no access to mental health care of any kind, it was not appropriate to assign some patients to a control group and withhold available treatment. As a result, we use patient scores upon diagnosis, the “before” group, to serve as a control, since the vast majority of the population was receiving no treatment at the time of diagnosis.

Combined, the missing and convenience-based data in this study make it difficult to make claims on the effectiveness of the program for all mental health patients served by CES clinics. Still, the patient health outcomes presented in this study can be interpreted as a positive preliminary assessment of the structure and methodology of the program. Improvements and next steps can be drawn from both the results of the evaluation and the limitations related to data collection.

## **Implications**

The prevalence rates and preliminary patient health outcome data presented in this study all provide practical next steps for mental healthcare delivery in the Sierra. First, the prevalence rates of depression, anxiety, and more severe and complex mental illnesses all reinforce the need for mental healthcare service delivery in rural communities. The CES mental health program, which began in 2012 from community requests, is a needed and utilized service in the ten communities in which it operates. It is likely that service utilization will only increase in the coming years, as communities continue to recognize mental health disorders as treatable illnesses and report to clinics. As a result of the need experienced in these rural communities, this and similar mental health programs should be adequately resourced and expanded to new communities, if possible. In Mexico, where 80% of public funding for mental health goes

towards psychiatric hospitals, funding community-based mental health programs would require policy and organizational change<sup>38</sup>.

Regarding patient health outcomes, this study brings to light the large burden carried by the doctor in local health clinics. In addition to seeing patients, the one doctor working at the local clinic is responsible for all data collection related to patient monitoring and evaluation. This responsibility is often neglected in the face of the more pressing task of attending patients, and leads to the high percentage of missing evaluation data in this study. To unburden primary healthcare providers, community health workers can be employed to continue ongoing contact with patients, including tasks like asking the PHQ-9 on a monthly or routine basis. This strategy, known as “task-sharing” or “task-shifting”, takes some reporting and follow-up tasks off primary care providers and allows them to spend more focused time with patients<sup>39</sup>. In some cases, community health workers also lead group interpersonal therapy sessions for patients with depression or other mental health disorders<sup>40</sup>. Community health workers trained in mental health service delivery have been shown to be effective in improving patient health outcomes<sup>41,42</sup>. Having community health workers conduct the PHQ-9 would also improve data quality and enhance the program’s ability to monitor and evaluate patient improvement.

As the state of Chiapas looks to expand the mental health services it delivers to its five million citizens<sup>21</sup>, it will be important to design services appropriate to the populations most at risk. This study suggests that prevention and treatment strategies should be community-based, and aimed at early- and middle-aged adults, and specifically women. With the high rate of loss to follow up seen among patients in this study, mental health programs in rural areas should include methods for following up with patients in their home, and even active case finding. Active case

finding could also specifically target men, who likely experience mental health disorders at higher than the reported rate but are not seeking care.

Overall, resourcing pre-existing government clinics, especially when enhanced by the efforts of an NGO or university, promotes the delivery of continuous, organized healthcare and is well-received by communities. As the Sierra is one of the most marginalized and geographically isolated areas in Chiapas, it is likely that implementation of this model in other communities in Chiapas could be structurally easier. Other regions of Chiapas likely have similar prevalence rates of mental health disorders but are enabled by more government commitment and investment from the regional healthcare system than communities in the Sierra.

## **Conclusions**

Because common and severe mental health disorders are prevalent in rural Chiapas, Mexico, concerted efforts to strengthen and scale-up effective mental healthcare in this region are important. The CES mental health program provides a model for implementing mental healthcare into the primary care system in rural and low-resource areas in Chiapas. Despite limitations with collecting and measuring data around patient health outcomes, this study provides encouraging preliminary evidence that delivering mental health services within primary care in rural areas is utilized by communities and effective to patients.

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