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# Parkinson's family needs and caregiver mental health: A cross-cultural comparison between Mexico and the United States

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**Abstract**.

**BACKGROUND/OBJECTIVE:** Given the growing population of individuals with Parkinson's disease (PD) worldwide and the growing need for family members to take on a caregiving role, it is critical that cross-cultural differences be examined in order to better meet the needs of PD caregivers. The purpose of this study was to examine the connections between the unmet needs and mental health of PD caregivers differentially in Mexico and the United States.

**METHODS:** In Parkinson's clinics at public, academic medical centers, PD caregivers from Mexico ($n = 148$) and the United States ($n = 105$) completed measures of unmet family needs and mental health.

**RESULTS:** Caregivers in the United States had higher unmet needs for emotional support and for a community support network than caregivers in Mexico, although caregivers at the two sites had comparable levels of anxiety and depression. Unmet family needs explained 29.5% of the variance in caregiver anxiety in the United States ($p < 0.001$) but only 5.7% in Mexico ($p = 0.209$). Unmet family needs explained 30.4% of the variance in caregiver depression in the United States ($p < 0.001$) and 14.0% in Mexico ($p = 0.001$). In the United States, unmet needs for emotional support and for instrumental support uniquely predicted caregiver anxiety and depression, and in Mexico only the unmet need for instrumental support was a unique predictor.

**CONCLUSIONS:** PD caregivers in the United States are at increased risk for poor emotional and community support, and these unmet needs channel directly into caregiver anxiety and depression. In Mexico, where caregivers have stronger emotional and community support, caregivers' unmet need for instrumental support generates anxiety and depression. Important targets for PD caregiver interventions may differ between Mexico and the United States.

Keywords: Cross-cultural, Parkinson's caregivers, family needs, mental health

Among neurodegenerative diseases, Parkinson's disease (PD) is the second most prevalent, falling only behind Alzheimer's disease (Hirtz et al., 2007). Although prevalence estimates vary, PD is estimated to affect a total of 630,000 individuals over the age of 45 in the United States (Marras et al., 2018),

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and 83,000–166,000 individuals over the age of 60 in Mexico (Rodríguez-Violante, Villar-Velarde, Valencia-Ramos, & Cervantes-Arriaga, 2011). PD is primarily characterized as a movement disorder, with cardinal symptoms including bradykinesia (i.e., slowness of movement), tremors, limb rigidity, and postural instability (i.e., trouble with balance and falls) later in disease progression (Alves, Forsaa, Pedersen, Dreetz Gjerstad, & Larsen, 2008; Jankovic, 2008). In addition to these motor symptoms, individuals with PD experience non-motor symptoms such as cognitive impairment and dementia, neuropsychiatric disturbances, sleep disturbances, autonomic disturbances, and olfactory dysfunction (Alves et al., 2008). While the etiology of PD is not fully known, investigators usually attribute the development of the disease to a combination of environmental and genetic factors which result in neurobiological changes (Pringsheim, Jette, Frolkis, & Steeves, 2014). Currently, there is no definitive test for PD, which is diagnosed based entirely on clinical symptom clusters. Clinical diagnosis is further complicated, and typically delayed, by lack of initially readily identifiable motor symptoms (DeMaagd & Philip, 2015). However, there is evidence that pathophysiological changes occur during a preclinical phase, commonly resulting in experience various nonmotor symptoms, such as sleep, cognitive, and mood changes before diagnosis. These factors often result in individuals and caregivers managing PD-related symptoms for years with minimal or no medical care. In addition to these diagnostic challenges, the neurodegenerative nature of the disease commonly results in individuals with PD experiencing a progressive loss of functional independence, requiring increasing levels of help of a caregiver over time.

As the number of individuals with PD worldwide continues to grow alongside population growth of older adults, estimates suggest the number of individuals with PD will double from 2005 to 2030 (Dorsey et al., 2007), and the number of individuals in a caregiving role will grow as well. The duties of a PD caregiver vary, but usually include aiding with activities of daily living (e.g., dressing, bathing), coordinating medical care, managing medications, and providing emotional support (Mosley, Moodie, & Dissanayaka, 2017). PD caregivers face unique challenges related to their responsibilities, including social isolation (O'Reilly, Finnan, Allwright, Smith, & Ben-Shlomo, 1996), stigma (Maffoni, Giardini, Pierobon, Ferrazzoli, & Frazzitta, 2017), and burnout (Corallo et al., 2017; Mosley et al., 2017). Given the consequences PD has on caregivers, researchers have begun trying to identify major family needs specific to PD. In a qualitative study, PD caregivers reported having needs for emotional support, health information, and professional support regarding how to manage medications, how to handle falls and psychosis, and information on the course of PD (Boersma et al., 2017). Another study also found health information-related needs of PD caregivers such as managing symptoms and navigating lifestyle changes (e.g., safety, driving), in addition to other needs such as help with planning for the future (e.g., financial, legal), navigating relationship changes (e.g., role changes), and identifying wellness strategies (e.g., exercise, nutrition; Lageman, Mickens, & Cash, 2015).

In addition to finding the most salient needs for PD caregivers, some research has evaluated whether those needs are met. In a study comparing PD caregivers to age-matched controls, researchers discovered that those with the greatest need for health/social service access (e.g., those who are PD caregivers, in addition to individuals with poorer health or a disease) are least likely to have those needs met (Olsson, Clarén, Alvariza, Årestedt, & Hagell, 2016). On the other hand, when needs like emotional support are met through support group attendance and other social outlets, researchers have found relief of PD caregiver burden (Roland, Jenkins, & Johnson, 2010).

Caregivers in general, but particularly PD caregivers, have lower quality of life and poorer mental health than individuals who are not caregivers (Peters, Fitzpatrick, Doll, Playford, & Jenkinson, 2011). Reviews of caregiver burden have identified psychological stresses, including anxiety and depression, to be among the most bothersome issues for PD caregivers (Bhimani, 2014; Mosley et al., 2017). PD caregiver anxiety and depression have been linked to caregiver burden (Caap-Ahlgren & Dehlin, 2002; Grün, Pieri, Vaillant, & Diederich, 2016; Martinez-Martin et al., 2008; Martínez-Martín et al., 2007; Schrag, Hovris, Morley, Quinn, & Jahanshahi, 2006; Zhong, Peppard, Velakoulis, & Evans, 2016), PD caregiver health-related quality of life (Hr-QoL; Carod-Artal, Mesquita, Ziomkowski, & Martinez-Martin, 2013; Martinez-Martin et al., 2008; Schrag et al., 2006), patient Hr-QoL (Schrag et al., 2006), and PD caregiver social isolation (Schrag et al., 2006). Although PD caregiver mental health is often linked to disease severity in the individual with PD (Aarsland, Larsen, Karlsen, Lim, & Tandberg, 1999; Martinez-Martin et al., 2008; Martínez-Martín et al., 2007; Schrag et al., 2006), caregiver stress can be present even in earlier stages of PD and when PD caregivers are reporting positive affect (Lageman et al., 2015). However, it is likely that at least some of the relationship between PD caregiver mental health and disease severity of the individual with PD is due to unmet needs of PD caregivers related to disease severity (e.g., health education on medication management). While a dearth of research has focused on the relationship between caregiver needs and mental health of PD caregivers, caregiver mental health has been linked to ability to access needs in other neurological conditions such as traumatic brain injury (TBI; Doyle et al., 2013; Leibach et al., 2014) and spinal cord injury (SCI; Arango-Lasprilla et al., 2010). Preliminary research suggests that for TBI caregivers in Mexico, and for SCI caregivers in Colombia, unmet family needs are associated with greater caregiver burden and poorer caregiver mental health (Arango-Lasprilla et al., 2010; Doyle et al., 2013; Leibach et al., 2014).

Although some research, as outlined above, has begun to identify the needs and evaluate the mental health of PD caregivers, most of this work has been limited to the United States and Western Europe. There are known cross-cultural differences between the United States and Mexico in caregiving generally which could impact the association between unmet PD caregiver needs and mental health. For instance, in Latin America, the cultural value of *familismo* emphasizes reliance on and obligation to family members (Marín & Marín, 1991) as well as respect for elders (Ruiz & Ransford, 2012) and may influence caregiving roles and expectations within Latin American families (Zea, Quezada, & Belgrave, 1994). *Familismo* could therefore result in either negative (e.g., stress, guilt; Crist, 2002) or positive (e.g., lower caregiver burden; Coon et al., 2004) caregiving outcomes. Additionally, due to the cultural norms of *marianismo* (i.e., submissive, reserved, feminine; Mendez-Luck & Anthony, 2016), the traditional female gender role in Latin America (Gutmann, 1997), and *machismo* (i.e., courageous, brave, authority; Mirande, 1997), a large part of Latino male identity (Villarruel, 1995), male and female caregivers may differ in the types of support they provide (Ruiz & Ransford, 2012). Given the growing population of individuals with PD worldwide and thus the growing need for individuals to take on a caregiving role, it is critical that these cultural differences be examined in order to better meet the needs of PD caregivers. As a result, the purpose of this study is to examine the connections between the unmet needs and mental health of PD caregivers differentially in the United States and Mexico.

## 1. Method

### 1.1. *Participants*

Informal caregivers of individuals with PD (N = 253) were recruited from a specialty PD clinic at a major public university in the United States and a specialty PD clinic at a major public university in Mexico. To be eligible for the study, participants need to be (a) the primary caregiver of an individual seen at one of the clinics who had a physician diagnosis of PD, (b) be over the age of 18, and (c) be fluent in either English (for the United States site) or Spanish (for the Mexico site). Demographic information about sample can be found in Table 1.

### 1.2. *Procedure*

Approval of the protocol was obtained from both institutions' institutional review boards. Caregivers from the two PD clinic sites in the United States and Mexico were recruited via direct contact, flyers, phone, email, and word of mouth. Potential participants were also provided information about the study while they accompanied the patient to a medical appointment. After providing informed consent, caregivers completed questionnaires assessing family needs related to care, their own mental health (anxiety and depression), and demographic information about themselves and the care recipient.

### 1.3. *Measures*

#### 1.3.1. *Family Needs*

The Family Needs Questionnaire (FNQ) was used to assess family adjustment and needs in providing long-term care (Kreutzer & Marwitz, 1989). Participants respond to 37 items delineating unmet needs with either "Yes," "No," or "Partially." This scale has six subscales: Health Information, Emotional Support, Instrumental Support, Professional Support, Community Support Network, and Involvement with Care. In the current study, the subscales demonstrated acceptable to excellent reliability for Health Information ($\alpha = 83$ Mexico; $\alpha = 89$ United States), Emotional Support ($\alpha = 89$ Mexico; $\alpha = 90$ United States), Instrumental Support ($\alpha = 79$ Mexico;

Table 1
*Participant demographics*

| Variables | US (*n* = 105) | Mexico (*n* = 148) |
|---|---|---|
| Caregiver Age, years, mean (*SD*) | 68.73 (8.36) | 53.66 (14.96 |
| Care Recipient Age, years, mean (*SD*) | 71.61 (8.13) | 65.68 (10.78) |
| Hours of Care Per Week, mean (*SD*) | 59.38 (64.56) | 107.39 (61.34) |
| Months as a Caregiver, mean (*SD*) | 46.78 (81.33) | 52.38 (49.22) |
| Months since PD diagnosis, mean (*SD*) | 92.25 (82.84) | 63.22 (60.88) |
| Caregiver Gender, % | | |
| Man | 31.4 | 23.6 |
| Woman | 68.6 | 76.4 |
| Care Recipient Gender, % | | |
| Man | 31.4 | 23.6 |
| Woman | 68.6 | 76.4 |
| Race/Ethnicity, % | | |
| Latino/Hispanic | – | 100.0 |
| White/European (non-Latino) | 92.4 | – |
| Asian/Asian-American/Pacific Islander | 2.9 | – |
| Black/African-American (non-Latino) | 2.9 | – |
| Multi-racial/Multi-ethnic | 1.0 | – |
| Other | 1.0 | – |
| Social Class, % | | |
| Upper | 2.9 | 0.7 |
| Upper-middle | 63.8 | 22.3 |
| Lower-middle | 23.8 | 37.2 |
| Working | 9.5 | 24.3 |
| Lower | – | 15.5 |
| Highest Completed Education Level, % | | |
| Doctorate Degree | 7.6 | – |
| Master's Degree | 21.9 | 2.0 |
| 4-Year College Degree | 33.3 | 16.2 |
| 2-Year/Technical College Degree | 11.4 | 13.5 |
| High School/GED | 25.7 | 5.4 |
| Grade School | – | 58.1 |
| No Formal Education | – | 4.7 |

α = 85 United States), Professional Support (α = 75 Mexico; α = 86 United States), Involved with Care (α = 79 Mexico; α = 78 United States), and Community Support Network (α = 68 Mexico; α = 67 United States).

### *1.3.2. Anxiety*

Caregiver anxiety was assessed using the Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006). This seven-item measure is responded to using a Likert-type scale ranging from 0 (Not at all) to 3 (Nearly every day) with possible scores ranging from 0 to 21. Higher scores correspond to higher anxiety, with 15 to 21 indicating severe anxiety, 10 to 14 moderate severity, 5 to 9 mild severity, and 0 to 4 minimal severity. The GAD-7 has been previously translated and validated in Spanish with excellent internal consistency (α = 92; García-Campayo et al., 2010). In the current study, the GAD-7 demonstrated good internal consistency (α = 88 Mexico; α = 90 United States).

### *1.3.3. Depression*

Caregiver depression was assessed using the Patient Health Questionnare-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001). This nine-item measure is responded to using a Likert-type scale from 0 (Not at all) to 3 (Nearly every day). Higher scores correspond with greater depressive symptomatology, with 20 to 27 indicating severe depressive symptomatology, 15 to 19 moderately severe, 10 to 14 moderate, 5 to 9 mild, and 0 to 4 none. The PHQ-9 has previously been translated and validated in Spanish with good internal consistency (α = 92; Diez-Quevedo et al., 2001; Donlan & Lee, 2010; Wulsin et al., 2002). In the current study, the PHQ-9 demonstrated good internal consistency (α = 81 Mexico; α = 82 United States).

## 2. Results

### *2.1. Correlation matrix*

A correlation matrix was generated to examine the bivariate relationships among the various types of unmet family needs and caregiver mental health, differentially by site (Table 2). The correlation matrix suggested that caregiver depression and anxiety were strongly positively correlated at both sites, and all unmet family needs were positively correlated with each other in the United States. In Mexico, all unmet family needs were positively correlated except for the correlation between the unmet need for instrumental support and for involvement with care which was in the expected direction but not statistically significant. In Mexico, unmet family needs were generally more strongly correlated with depression than anxiety, and in the United States, unmet family needs were correlated with depression and anxiety at approximately similar levels, with some vacillation by the type of unmet family need but most being statistically significant.

### 2.2. Site comparisons

A series of analyses of variance (ANOVAs) compared overall levels of unmet family needs and caregiver mental health by site (Table 3). These comparisons suggested that caregivers in the United States had higher unmet needs for emotional support and for a community support network than caregivers in Mexico. Caregivers at the two sites had comparable levels of depression and anxiety, and the levels of the other unmet needs were statistically similar.

### 2.3. Regressions

A series of simultaneous multiple regressions were run differentially by site in which the predictor variables were the six types of unmet family needs and the criterion variables were caregiver anxiety or depression. In the United States, unmet family needs explained 29.5% of the variance in caregiver anxiety, $F(6, 104) = 6.82$, $p < .001$. Within this regression, unmet needs for emotional support ($\beta = 39$, $p = .010$) and for instrumental support ($\beta = 44$, $p = .001$) were statistically significant unique predictors. All other predictors were not statistically significant (all $p$s $> .171$).

In Mexico, unmet family needs explained 5.7% of the variance in caregiver anxiety, although the regression was not statistically significant, $F(6, 147) = 1.43$, $p = .209$. Within this regression, only the unmet need for instrumental support ($\beta = 29$, $p = .023$) was a statistically significant unique predictor. All other predictors were not statistically significant (all $p$s $> .462$).

In the United States, unmet family needs explained 30.4% of the variance in caregiver depression, $F(6, 104) = 7.12$, $p < .001$. Within this regression, unmet needs for emotional support ($\beta = 44$, $p = .004$), for instrumental support ($\beta = 37$, $p = .005$), and for a community support network ($\beta = -.41$, $p = .003$) were statistically significant unique predictors. All other predictors were not statistically significant (all $p$s $> .621$). It should be noted that the β-weight for the effect of the unmet need for a community support network was in the opposite direction of the correlation coefficient with caregiver depression in the correlation matrix. The reversal in direction was likely due to multicollinearity between this unmet need and the other unmet needs in the regression and should be interpreted as error from a suppressor effect devoid of meaning.

In Mexico, unmet family needs explained 14.0% of the variance in caregiver depression, $F(6, 147) = 3.83$, $p = .001$. Within this regression, only the unmet need for instrumental support ($\beta = 28$, $p = .021$) was a statistically significant unique predictor. All other predictors were not statistically significant (all $p$s $> .504$).

## 3. Discussion

The purpose of this study was to examine the connections between the unmet family needs and mental health of PD caregivers differentially in Mexico and the United States. Caregivers in the United States had higher unmet needs for emotional support and for a community support network than caregivers in Mexico, although caregivers at the two sites had comparable levels of anxiety and depression. Unmet family needs explained 29.5% of the variance in caregiver anxiety in the United States but only 5.7% in Mexico. Unmet family needs explained 30.4% of the variance in caregiver depression in the United States and 14.0% in Mexico. In the United States, unmet needs for emotional support and for instrumental support uniquely predicted caregiver anxiety and depression, and in Mexico only the unmet need for instrumental support was a unique predictor.

The findings about the salience of the unmet needs for emotional and community support among PD caregivers in the United States relative to those in Mexico, both in terms of greater unmet needs and in terms of their unique prediction of caregiver mental health problems, is congruent with previous research. A qualitative study by Boersma et al. (2017) found

Table 2
*Correlations between family needs and caregiver mental health by site*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1 Depression | – | 0.615** | 0.172* | 0.271** | 0.358** | 0.219** | 0.306** | 0.131 |
| 2 Anxiety | 0.733** | – | 0.085 | 0.104 | 0.219** | 0.135 | 0.102 | 0.058 |
| 3 FN Health Information | 0.204* | 0.072 | – | 0.345** | 0.296** | 0.718** | 0.353** | 0.592** |
| 4 FN Emotional Support | 0.431** | 0.444** | 0.362** | – | 0.648** | 0.409** | 0.725** | 0.241** |
| 5 FN Instrumental Support | 0.466** | 0.466** | 0.439** | 0.712** | – | 0.466** | 0.696** | 0.131 |
| 6 FN Professional Support | 0.316** | 0.185 | 0.734** | 0.576** | 0.614** | – | 0.441** | 0.401** |
| 7 FN Community Support Network | 0.195* | 0.268** | 0.399** | 0.761** | 0.628** | 0.565** | – | 0.232** |
| 8 FN Involvement with Care | 0.193* | 0.087 | 0.676** | 0.356** | 0.450** | 0.555** | 0.361** | – |

*Note.* FN = Family Needs. Correlations below the diagonal are from the United States and above the diagonal from Mexico. * = $p < 0.05$; ** = $p < .01$.

Table 3
*Site Comparisons*

| Variable | United States | Mexico | *p*-value | Cohen's *d* |
|---|---|---|---|---|
| Depression | 4.00 (3.84) | 4.25 (4.34) | 0.637 | 0.06 |
| Anxiety | 4.30 (4.29) | 4.41 (4.42) | 0.857 | 0.03 |
| FN Health Information | 12.61 (3.78) | 13.03 (3.69) | 0.376 | 0.11 |
| FN Emotional Support | 14.90 (5.07) | 11.98 (4.57) | 0.000 | 0.60 |
| FN Instrumental Support | 10.48 (3.51) | 9.95 (3.24) | 0.217 | 0.16 |
| FN Professional Support | 8.28 (3.10) | 8.51 (2.72) | 0.539 | 0.08 |
| FN Community Support Network | 8.21 (2.32) | 7.48 (2.41) | 0.017 | 0.31 |
| FN Involvement with Care | 4.12 (1.67) | 4.05 (1.61) | 0.764 | 0.04 |

*Note.* FN = Family Needs. Values for the United States and Mexico columns represent means and (standard deviations).

that PD caregivers in the United States consistently expressed the need for additional emotional support and attention at all stages of the disease. Relatedly, social isolation in PD caregivers from the United Kingdom has been associated with both anxiety and depression (Schrag et al., 2006). By contrast, PD caregivers in Mexico in the current study had less unmet needs for emotional and community support, and neither unmet need uniquely predicted caregiver mental health. This cross-cultural difference may be due to Latino cultural values and strengths including *familismo*, which has been theorized to be buffer of Latino caregiver mental health (Coon et al., 2004). PD caregivers in Mexico may be receiving more emotional support from family members (both nuclear and extended) and their community than those in the United States.

Compared to PD caregivers in the United States, the unmet need for instrumental support was higher for PD caregivers in Mexico and uniquely predicted caregiver mental health problems. Instrumental support assessed by the Family Needs Questionnaire targets tasks of daily living including "help keeping the house" as well as self-care activities such as "get a break from my responsibilities" (Kreutzer & Marwitz, 1989). Due to cultural norms of self-sacrifice rooted in *marianismo*, women PD caregivers in Mexico may not be seeking support in tasks or responsibilities typical for their gender, nor spending time taking care of themselves (Mendez-Luck & Anthony, 2016).

The similar levels of mental health issues in the United States and Mexico found in this study may be an expression of PD caregiver experiences fueled by different yet similarly burdensome unmet family needs. In the United States, PD caregivers may have greater access to respite care and other resources alleviating the tasks of daily living but may not have access to desperately needed emotional and community support. This may be an expression of the prevalent individualist culture of the United States. However, in Mexico, PD caregivers may be receiving emotional support and feel connected to their communities, rooted in the Latinx cultural manifestation of *familismo,* yet do not have the same level of access to respite and in-home care resources as caregivers in the United States.

In the United States, unmet family needs explained 29.5% of the variance in caregiver anxiety and 30.4% in caregiver depression, but the same unmet needs in Mexico explained only 5.7% and 14.0% in caregiver anxiety and depression, respectively. Once again, this cross-cultural difference may be due to the culturally sanctioned nature of caregiving in Latin America (Zea, Quezada, & Belgrave, 1994), such that in Mexico caregiving may be so normalized and ingrained into one's cultural values and unmet needs stemming from caregiving responsibilities may not impact caregiver mental health as much as in the United States. In Mexico, there may also be other factors impacting PD caregiver mental health. For example, previous literature has found clinical aspects of PD presentation including symptom severity and overall disability to impact caregiver mental health (Aarsland, Larsen, Karlsen, Lim, & Tandberg, 1999; Martinez-Martin et al., 2008; Martínez-Martín et al., 2007; Schrag et al., 2006). Future investigations are encouraged to examine the impact of PD symptom severity and disability on caregiver mental health in Latin America, as they may contribute unique variance to explaining mental health above and beyond unmet family needs.

The association between unmet family needs and caregiver mental health has been supported in other neurological caregiving populations in Latin America, including traumatic brain injury (TBI). Doyle et al. (2013) found that unmet family needs explained 24.5% of the variance in TBI caregiver depression in Mexico City, Mexico, with instrumental support as the only unique predictor. Similarly in Guadalajara, Mexico, unmet family needs accounted for 26.5% of the variance in TBI caregiver depression and 33.9% of caregiver anxiety, with health needs and household needs independently associated with both depression and anxiety (Leibach et al., 2014). The findings from the current study of PD caregivers about the importance of unmet instrumental and household needs directly parallels these previous studies on TBI caregivers in Mexico.

### 3.1. Clinical implications

As unmet instrumental needs were paramount for PD caregivers in Mexico in the current study, it may be extremely beneficial if PD clinics increase access to respite care and other in-home aid services for completing daily household tasks. Doing so may meet a critical unmet family need in this region and improve caregiver mental health, and perhaps as a result improve the quality of care that caregivers can provide to individuals with PD. Future clinical intervention studies are encouraged to investigate the potential impact of access to respite care on reported unmet family needs and caregiver mental health in Mexico.

In the United States, PD caregivers may benefit from increased interpersonal and community connection and engagement, which may result in improved mental health. Group-based therapies may be critical in helping PD caregivers in the United States build emotional and community support. For example, mindfulness-based stress reduction group therapy consisting of 8–10 sessions focused on mindfulness skills that improve moment-to-movement awareness of emotions, sensations, and cognitions (Kabat-Zinn, 1982) has been found to improve emotional functioning and quality of life in populations with complex chronic illnesses (Bohlmeijer, Prenger, Taal, & Cuijpers, 2010), including individuals with PD and caregivers (Cash, Ekouevi, Kilbourn, & Lageman, 2016). Also, unmet needs for emotional support for PD caregivers in the United States could be targeted through the implementation of cognitive behavioral therapy (CBT), which has been found to reduce caregiver strain and burden (Secker & Brown, 2005).

### 3.2. Limitations and future directions

Although this study is one of the first to investigate and compare the connections between unmet family needs and PD caregiver mental health in the United States and Mexico, these findings should be interpreted within the context of several limitations. First, participants were recruited from academic medical centers in both the United States and Mexico, limiting the generalizability. The education levels and socioeconomic statuses of the United States sample were higher than that of the general United States population, with 29.5% of the caregivers attaining graduate degrees and 66.7% within the upper-middle to upper classes. Additionally, 92.4% of the sample in the United States identified as White/European (non-Latino). Conversely, only 2% of the caregivers in Mexico had received a graduate degree and only 23% were within the upper-middle to upper classes. Future investigations are encouraged to collect data from a diverse sample of participants including race/ethnicity (Black/African-American, Asian/Asian-American/Pacific Islander, and Native American), socioeconomic statuses, and education levels in the United States in order to include more highly comparable samples. Second, the current study is cross-sectional, and as a result causality cannot be proven. Although unmet family needs can increase caregiver mental health problems, caregivers with poor mental health may also be more likely to appraise family needs as unmet. Future research should use longitudinal cross-lagged panel designs to more thoroughly tease apart causality in the relationships between these sets of variables. Third, the current study only collected data from one city in one country in Latin American, Guadalajara, Mexico, limiting the generalizability to other areas of Mexico and to other Latin American countries. Future investigations are encouraged to collect data from multiple sites in the United States and Latin America to better understand cultural differences in unmet needs that may be connected to PD caregiver mental health. Lastly, the Family Needs Questionnaire used in the current study does not inquire about unmet financial needs, which may have important connections to the mental health of PD caregivers, particularly considering the commercialization of healthcare in the United States and high levels of poverty in Mexico. Future investigations should include measures of unmet financial needs.

## 4. Conclusion

The current study investigated the connections between unmet family needs and the mental health of PD caregiver differentially in the United States and Mexico. Comparable levels of anxiety and depression in PD caregivers emerged at both sites, although PD caregivers in the United States reported a greater unmet need for emotional and community support whereas PD caregivers in Mexico reported a greater unmet need for instrumental support. These same variables channeled differentially into caregiver mental health problems at each of the sites. Differences in the type of unmet family needs between the United States and Mexico may be an expression of caregiving as a culturally sanctioned activity and family- and community-based cultural values. Interventions targeting PD caregiver mental health in the United States may benefit from the implementation of empirically supported individual and group therapies targeting the improvement of community support and reduction of emotional distress. In Mexico, PD caregivers' mental health may benefit from increased access to respite care services targeting the need for instrumental support. Culturally tailored services for PD caregivers may serve to improve caregiver mental health and as a result the quality of care they are able to provide for individuals with PD.

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## Conflict of interest

The authors report no declarations of interest.

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