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Cumulative Trauma Among Mayas Living in Southeast Florida

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Abstract Mayas, having experienced genocide, exile, and severe poverty, are at high risk for the consequences of cumulative trauma that continually resurfaces through current fear of an uncertain future. Little is known about the mental health and alcohol use status of this population. This correlational study explored t/he relationship of cumulative trauma as it relates to social determinants of health (years in the United States, education, health insurance status, marital status, and employment), psychological health (depression symptoms), and health behaviors (alcohol use) of 102 Guatemalan Mayas living in Southeast Florida. The results of this study indicated that, as specific social determinants of health and cumulative trauma increased, depression symptoms (particularly among women) and the risk for harmful alcohol use (particularly among men) increased. Identifying risk factors at an early stage before serious disease or problems are manifest provides room for early screening leading to early identification, early treatment, and better outcomes.

Keywords Maya · Alcohol · Depression · Cumulative trauma · Guatemala · Hispanic · Indigenous population of Guatemala

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Introduction

In 2010, the United States experienced growth of the Guatemalan population (180 %), which outpaced that of Mexicans, Cubans, and Puerto Ricans (54, 44, and 36 %, respectively) [1]. There is every indication that the flood of Guatemalan expatriates will continue to rise. Guatemalan Mayas who have experienced genocide, exile, and severe poverty are at high risk for manifestation of the multiple consequences of cumulative trauma that continually resurfaces through current fear of an uncertain future. Exiled groups like the Mayas have multilayered trauma they have to cope with, including a history of genocide and forced loss, as an undercurrent to the ongoing trauma of severe poverty and settling into a new social hierarchy and culture [2, 3]. In recent years, the understanding of trauma has evolved from physical and psychological trauma to include cumulative trauma, which has been defined as "a sequence of similar and or dissimilar traumas across the life span" [4]. A traumatic event in the new DSM-5 is now inclusive of, but not limited to, direct experiences, medical incidents that qualify as traumatic, witnessed events, and indirect exposure, such as trans-generational trauma [5]. In effect, cumulative trauma is now recognized in the new DSM-5.

The toxic combination of social, psychological, environmental, cultural, physiological, and biological stressors Mayas face daily places them at higher risk for mental and physical disorders leading to disability and health burdens [6–8]. Yet, the adult Mayan population's health status is frequently ignored, as they are generally classified as members of the Hispanic population, discounting their unique culture, values, and healthcare needs [9]. In diverse and multicultural environments, health care providers must implement solutions that will bridge cultural and mental health disparities. Therefore, the cumulative

biopsychosocial and cultural stressor patterns leading to mental disorders in unique populations deserves to be studied separately to avoid incorrect assumptions and inappropriate generalization. To date, no studies have been conducted exploring the potential risks of cumulative trauma dose, that is, prolonged stress exposure combined with simultaneous exposure to trauma over the course of a lifetime, as it relates to the mental status of adult Mayas. This study bridges that gap. The purpose of this study has been to explore the relationship of cumulative trauma as it relates to social determinants of health, depression symptoms, and alcohol use of the Guatemalan Mayas living in Southeast Florida.

Mayan History

For many centuries, the Mayas lived in a world of uncertainty within their native country of Guatelmala in fear of violence and genocide by Spaniards who forced them to abandon their land and culture [10–12]. More recently, from 1960 to 1996, tens of thousands of Mayan lives were lost in the Guatemalan Civil War [11, 13], during which indigenous Mayas were victims of both the Guatemalan army and the guerrilla paramilitary [3, 13]. The ensuing fear and perception of danger forced hundreds of thousands of Mayan people into exile [12–14]. Armed only with their culture and traditions, many Mayas fled northward through Mexico, where persecution continued, to the United States in an ongoing pursuit of safety [12, 13]. Since it was not their country of first exile, great numbers of Mayas have been forced to live in the United States undocumented and under tremendous stress [10]. Like other immigrants, Mayas are challenged to address migration issues such as instability, poverty and a deluge of social factors [15, 16]. The accumulation of these historical events and the undermining of culture have made adjustment to the United States even more difficult and traumatic, increasing the risk of mental illness and alcohol use [17].

Cumulative Trauma Studies

The effects of immigration stress in addition to trauma were recorded in a study that included Somali adolescent refugees (11–20 years old), with results indicating that cumulative trauma correlated with PTSD and depression symptoms. In this study, trauma was the primary predictor of PTSD, but post-resettlement stressors, acculturative stressors, and perceived discrimination further contributed to severity of PTSD and depression [18]. Omidy [19] measured cumulative trauma among a group of 290 Native Americans and identified that secondary trauma, survival trauma, personal identity trauma, and collective identity trauma were the most frequent traumas experienced among this group of Native Americans. This study suggested that individuals may engage in unhealthy behaviors such as binge eating to avoid or deal with trauma throughout their lifespans.

When compared to specific subgroups within the larger Hispanic umbrella, Central American ethnic groups with similar history, such as the Mayas, have been shown to have higher levels of conflict, perceived stress, and lower self-esteem [20]. Low self-esteem can play a vital health role-compromising for any individual, but especially for unique ethnic groups, like the Mayas, whose coping abilities may have been diminished by cumulative trauma making them more vulnerable to physical and mental disorders.

These results indicate that populations with previous traumas and current multiple stressors are at a particularly high risk for mental and physical health issues that contribute to disparities. Knowledge of cumulative trauma and its effects are necessary for the development and utilization of appropriate intervention and assessment tools, which will assist in halting multigenerational mental illness among Mayas.

Theoretical and Conceptual Framework

Central to this study has been an implicit commitment and devotion to the Mayan population who, based on their lived traumatic experience, may exhibit hesitancy to trust others as caring persons. Therefore, the conceptual model for this study intertwined Boykin and Schoenhofer's [21] nursing as caring theory with the social determinants of health model [6]. If scientists and health care providers are to improve the wellbeing of all people, they will have to ensure that their framework includes aspects of the nursing as caring theory fundamentals, including trust, to examine factors influencing the health status of vulnerable and ethnically diverse populations who may be skeptical of the healthcare system [22]. It is through caring that health professionals have been able to assist those who are most fearful and vulnerable to make meaning of suffering and to sustain a sense of hope [23]. Caring is defined as actions that evoke sharing of mutual and intimate insights that help the other grow [24]. It is this focus that allows nursing as caring theory to be transformed into practice by permitting intimate relationships to guide the identification of that which matters most to the day-to-day life of patients [25]. This commitment allows the health professional to be able to investigate and understand the social needs of diverse communities to guide them to wellbeing.

The social determinants of health model is grounded on the overarching concept that social structure influences wellbeing, mortality, and morbidity via three possible pathways: material factors, psychosocial, and behavioral pathways [6]. By overlapping the nursing as caring and social determinants of health models, the researcher has

been able to explore the cumulative influence of social determinants on the mental health wellbeing of adult Mayas. Understanding these factors in the specific domain of the Mayas may help to facilitate the delivery of culturally appropriate care.

Method

A correlational research design was utilized for this study. The G*Power 3 computer software (Version 3.1.3) was used to calculate the required sample size [26]. Based on a formulation of 80 % power, an effect size of 0.15 ($R^2 = 0.13$), five predictors, and a significance level of 0.05 for a two-tailed test, a sample of 92 subjects was deemed sufficient to address research questions.

Participants

The inclusion criteria for this study were individuals living in an urban community in Southeast Florida who: (1) self-identified as Guatemala Mayan, (2) were between the ages of 18 and 70, (3) who spoke Spanish or English, and (4) who were interested in participating in the research study.

Ethical Consideration

The approval to conduct this study was granted by the Institutional Review Board committee of Florida Atlantic University.

Data Collection

Participants for this study were recruited from three locales within Southeast Florida: a community-based diabetes clinic and two community centers. No flyers were used for recruitment; because the literacy of this population is low, only face-to-face interaction was used for recruitment. Recruitment and data collection took place in Spanish only and involved one visit with each individual lasting 30–45 min. Three Mayan community members and leaders assisted with the selection of research tools which were reviewed for language appropriateness such as wording usage unique to this population. Wording changes were made once agreed upon by at least two of the three Mayan community members. Some of the word changes included changing "solia" (used to) to "queria" (wanted), and "patron" (boss; person in charge) to "forma" (form; boss). Each participant signed a consent form prior to data collection. A demographic tool was used to collect data on social determinants of health. Participants whose scores indicated more than minimal depression on the Beck Depression Inventory-II (BDI-II) and those whose scores

indicated high risk on the ASSIST alcohol subscale were referred to the appropriate local healthcare facilities. The researcher helped participants to make an initial appointment. Participants were compensated with a $10 store gift card per interview.

Measures

Social determinants of health variables included age, gender, highest level of education completed, marital status (Married, separated, divorced, living with someone), years in the United States, languages spoken (English, Spanish, Other; see Table 1 for list of other languages spoken by study participants), and health insurance (yes, no) [4]. The demographic survey also assessed employment status (unemployed, day labor, part-time, full-time), and monthly income ($0; <$100; $100.01–$200; $200.01–$300; $300.01–$500; >$500).

The Cumulative Trauma Scale short form (32 items) is based on the taxonomy of trauma theoretical model [27]. It measures trauma type using 12 different types of trauma subscales (see Table 2), trauma occurrence, trauma frequency, and trauma appraisal. In this study, trauma appraisal was omitted. The scale yielded a Cronbach's alpha of ($\alpha = .85$) with the adults in this study, which compares to ($\alpha = .88$) in a study involving a group of Native American [19].

The Beck Depression Inventory II (BDI-II) enables measurement of the presence and severity of depression symptoms within the past week [28]. The questions present psychological and physical symptomology of depression with the inventory of 21 questions. The BDI-II yielded a Cronbach's alpha of $\alpha = .93$ for college students. Wilson-VanVoorhis and Blumentritt [29] examined depression symptoms among a group of 131 Mexican–American youth aged 13–19. This sample yielded an internal consistency of the BDI-II of .90.

The World Health Organization [30] developed the Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) which identifies current dependency, lifetime use, and risk of substance use. It covers tobacco, alcohol, cannabis, cocaine, amphetamine-type stimulants,

Table 1 Frequencies and percentages for Mayan languages spoken by survey participants (n = 102)

Mayan language	n	%
Spanish only	37	36.3
Awakatek	2	2.0
Kaqchikel	3	2.9
Mam	13	12.7
Popti	15	14.7
Q'anjob'al	11	10.8
Quiche	17	16.7
Tzutujil	4	3.9

Table 2 Cumulative trauma scale sample topics

Type of traumatic experience	Topic
Collective identity	Genocide, slavery, and discrimination
Historical/discrimination	History of being oppressed, discriminated against
Poverty	Experienced being part of poor family
Survival	Life-threatening accident
Achievement	Unexpectedly fired, or failed or dropped out of school
Secondary	Witnessed violence
Gender discrimination	Discriminated against because of gender
Uprootedness	Forced to move from favorite town, village, or country.
Personal identity	Violation of self/autonomy
Sexual abuse	Sexually abused or raped or involved in unwanted sex
Physical abuse	Physically abused or beaten up
Cumulative stress	Nervous breakdown due to small but recurrent stressors
Torture	Jailed and/or tortured
Attachment	Abandonment
Divorce/remarriage stress	Remarried
Cumulative trauma	Combination of similar and dissimilar traumas

inhalants, sedatives, hallucinogens, opioids, and other drugs. This study only used the alcohol subscale (seven questions). The combined Cronbach's alpha of all of the domains was .80. The Cronbach's alpha for the alcohol domain was 0.84.

Data Analysis

This bivariate correlation study used SPSS to complete reliability analyses for each scale to determine internal consistency for this unique Mayan population. Means, standard deviations, and frequencies were used to report dichotomous and nominal variables. Correlations and an alpha = .05 were used for statistical significance to test the first-order relationships between the key independent and dependent variables. This technique is the most appropriate when one is interested in assessing the strength and directionality of first-order relationships [31].

Multiple linear regression (MLR) is used in analyzing the variance when predicting the criterion variable from the predictor variables, while controlling for covarying variables to test the possible alternative explanations for the alternative hypotheses [32]. Multiple linear regression was selected for this study because it is more flexible than traditional analysis of variance and covariance.

Results

Sample Characteristics

Data were collected from a sample of 102 adults. Of the total sample, 61.8 % (n = 63) were males and 38.2 %

(n = 39) were females. Participants ranged in age from 18–69, with the mean age of 35.6 years (SD = 11.3). The majority of the sample (72.5 %) reported being in the United States six or more years with a mean of 9.3 years (SD = 5.6). The mean for formal years of education was 5.5 years (SD = 4.4) with 72.5 % of participants having six or fewer years of formal education (see Table 3 for comparison of mean sample characteristics by gender and total sample). Almost all (97.1 %) of the participants had no health insurance. The majority (86.2 %) of respondents were single, separated, or cohabiting, whereas only 10.8 % reported being married. More than half (59.8 %) of the sample were unemployed or employed as day laborers; one-third (32.4 %) reported having full-time jobs; and 7.8 % had part-time jobs. The majority (61.8 %) of the participants reported a weekly income ranging from $200 to $500 per week. Only 3.9 % earned more than $500 per week, while 34.3 % made less than $200 per week (see Table 4 for gender comparison of insurance, marital status, employment, and income). As a group, the five social

Table 3 Mean for descriptive data of Mayan survey participants by gender

Variables	Females (n = 39)		Males (n = 63)		Total Sample (n = 102)	
	M	SD	M	SD	M	SD
Age	36.6	9.1	34.9	12.5	35.6	11.3
BMI	28.8	5.0	27.6	3.7	28.1	4.3
Waist	36.5	4.3	35.8	3.9	36.1	4.0
Years in the US	10.5	6.1	8.6	5.2	9.3	5.6
Years of education	4.5	4.6	6.1	4.1	5.5	4.4

Table 4 Gender-specific distribution of insurance, marital status, employment, and income of Mayan survey participants

Characteristic	Females (n = 39)		Males (n = 63)		Total Sample (n = 102)	
	n	%	n	%	n	%
Health insurance						
Yes	2	5.1	1	1.6	3	2.9
No	37	94.9	62	98.4	99	97.1
Marital status						
Married	7	17.9	4	6.3	11	10.8
Separated	9	23.1	21	33.3	30	29.4
Divorced	2	5.1	0	0.0	2	2.0
Cohabiting	15	38.5	9	14.3	24	23.5
Single	6	15.4	28	44.4	34	33.3
Widowed	0	0.0	1	1.6	1	1.0
Current employment						
Unemployed	16	41.0	6	9.5	22	21.6
Day labor	14	35.9	25	39.7	39	38.2
Part-time	4	10.3	4	6.3	8	7.8
Full-time	5	12.8	28	44.4	33	32.4
Weekly income						
$0.00–$100	20	51.3	7	11.1	27	26.5
$100.01–$200	6	15.4	2	3.2	8	7.8
$200.01–$300	6	15.4	27	42.9	33	32.4
$300.01–$500	6	15.4	24	38.1	30	29.4
> $500	1	2.6	3	4.8	4	3.9

Table 5 Mean for trauma occurrence and frequency (CTS), depression (BDI II), and alcohol use (ASSIST) scales by gender

Scale	Females			Males			Total sample		
	M	SD	n	M	SD	n	M	SD	n
Trauma occurrence	15.2	4.24	39	14.6	5.03	63	14.82	4.73	102
Trauma frequency	38.6	14.62	39	36.3	17.46	63	37.19	16.42	102
Depression score	16.8	7.59	39	12.5	7.97	63	14.07	8.06	102
Alcohol use score	3.41	5.75	39	14.4	8.7	63	10.19	9.36	102

CTS Cumulative trauma scale, *BDI-II* Beck depression inventory-II, *ASSIST* Alcohol, smoking, and substance Involvement screening test

determinants of health predictors (years in the US, education, health insurance status, marital status, and employment) were significant for predicting alcohol use. There was a positive, weak, and statistically significant correlation between trauma occurrence and alcohol risk level, indicating that higher trauma occurrence was related to higher alcohol risk level (see Table 5).

Cumulative Trauma

The overall sample showed exposure to high rates of diverse forms of trauma. The mean overall cumulative trauma occurrence for this sample was 14.8 events, with all participants experiencing at least four traumatic events. The average trauma frequency was 37.2, with a minimum of four and a maximum of 88 incidents. Females' trauma occurrence (15.2) and frequency (38.6) were higher than males' trauma occurrence (14.6) and frequency (36.3; see Table 5 for details of trauma occurrence and frequency). Data analysis revealed that the marital status of separated was a significant predictor of trauma occurrence ($t = 2.78$, $p = 0.01$ and trauma frequency ($t = 2.60$, $p = 0.01$). This study showed that as cumulative trauma increased so did depression symptoms and alcohol use among adult Guatemalan Mayas living in Southeast Florida, with women being more susceptible to depression, and men being more susceptible to alcohol use.

Depression Symptoms

Depression symptoms levels were based on the total scores in the BDI-II, which are grouped as follows: 0–13:

minimal; 14–19: mild; 20–28: moderate; and 29–63: severe [28]. The BDI-II depression symptom mean score for this sample was 14.1. Females had a higher mean score than males (16.8 and 12.5, respectively; see Table 5 for more details on depression scores by gender). The average number of depression symptoms reported by participants was 1.82; however, this average was slightly higher among females than males (2.2 and 1.6, respectively). There was a positive, moderate, and statistically significant increase in the BDI-II depression scores with increased incidence of trauma occurrence and trauma frequency. Ordinal regression revealed that higher formal education decreased depression symptoms, and day-labor employment status increased depression symptoms.

Alcohol Use

The total score for the alcohol subscale of the ASSIST ranges from 0–37 and can be translated into risk level and type of intervention needed as follows: 0–10: low health risk and no intervention needed; 11–26: moderate risk and brief intervention recommended; and 27+: high risk and more intensive treatment advised [33]. The mean alcohol score for this sample was 10.2. Females mean score of alcohol use was much lower than males mean score of alcohol use (3.4 and 14.4, respectively; see Table 5, for mean alcohol use by gender). Half (50.0 %) reported trying and failing to control, cut down, or stop using alcohol (Table 6).

Table 6 Trauma occurrence and frequency by gender

Trauma occurrence	Trauma frequency					
	Females		Males		Total Sample	
	n	%	n	%	n	%
Collective identity	39	100	63	100	102	100
Historical/discrimination	39	100	59	93.7	98	96.1
Poverty	39	100	62	98.4	101	99.0
Survival	37	94.9	61	96.8	98	96.1
Achievement	36	92.3	60	95.2	96	94.1
Secondary	36	92.3	60	95.2	96	94.1
Gender discrimination	35	89.7	45	71.4	80	78.5
Uprootedness	34	87.2	46	73.0	80	78.4
Personal identity	29	74.4	44	69.8	73	71.7
Sexual abuse	9	23.1	10	15.9	19	18.7
Physical abuse	17	43.6	17	27.0	34	33.3
Cumulative stress	29	74.4	39	61.9	68	66.7
Torture	14	35.9	29	46.0	43	42.2
Attachment	6	15.4		2.7	4	3.7

No relationships or significant correlations were noted between trauma frequency and alcohol risk level or alcohol use score. The only social determinant of health variables that predicted alcohol use were employment status of day laborer and marital status of separated.

Discussion

This study assessed the relationship between the social determinants of health (education, health insurance status, marital status, employment, and years in the United States), cumulative trauma dose, alcohol use, and depression symptoms among adult Mayas. Analyses supported that this population sample has experienced high levels of trauma dose. The average person in this study had sustained a minimum of 14 different types of trauma, and had endured more than 37 repeated exposures to traumatic events—one individual reported 88 exposures to trauma. Social determinants of health, particularly the marital status of being separated from loved ones, accounted for 16 % of cumulative trauma variance in this study, suggesting that social factors do have a bearing upon the trauma this population has experienced. In the case of the Mayas, the sample showed mild signs of depression symptoms with some gender differences; males scored within the lowest possible level, indicating no depression to minimal depression, whereas females showed signs of mild depression symptoms. This is consistent with the few studies that included Mayas living in Mexico [34, 35], in which depression was linked to being a woman, experiencing 13 traumatic events, having 6–12 children, and being widowed. In these studies by Sabin, Cardozo et al. [34] and Sabin, Sabin et al. [35], women were more likely than men to suffer from mental illness such as depression, supporting the findings in this study.

Based on the results of this study, females were very low risk, whereas males were at moderate risk for problems related to alcohol use requiring brief intervention to improve health outcomes. Social determinants of health explained 22 % of the variance in alcohol use, with employment status and separated marital status being most highly related to the alcohol use score. Possibly the differences in trauma and social factors experienced between males and females could be related to cultural and social expectations for coping with daily stressors. For example, among this population, success is often measured in terms of ability to make money; consequently, alcohol-drinking patterns typically do not interfere with work [36]. Kanteres et al. [37] found that, whereas this population drinks heavily, it is not necessarily a daily activity; instead, they are more likely to indulge in binge drinking [36, 38]. The results of this study indicated that, as social determinants of

health and cumulative trauma increase, there was an according increase in the risk for harmful and hazardous alcohol use score among men, and depression symptoms among women.

The concept of cumulative trauma dose and trauma profile calls for a comprehensive assessment of both collective and individual experiences. This finding of high cumulative trauma dose among the Mayan population can be considered a call for action and demonstrates a need for early culturally sensitive trauma assessment.

New Contributions to the Literature

This study is the first to report cumulative trauma level among Mayas living in the United States. It provides foundational insight into the Mayan population, including heightened awareness regarding some of the social factors that influence everyday life, areas that have had little prior research. It assessed mental health and alcohol use among a very diverse, specific immigrant population.

Disparity in mental health occurs when assessing a complex phenomenon such as trauma through the lens of the clinician instead of through the lens of the patient. Many immigrants feel they are "caught between two histories and two worlds" [2]. It is valuable for care givers to seek understanding of the cultural experiences from the motherland together with the current experiences of the new land.

This study contributes to the conversation concerning inclusion of all forms of trauma in a multi-global assessment that considers social, environmental, physical, and mental experiences. A holistic approach to care for diverse cultural groups' perception and expression of trauma will facilitate meaningful opportunities for developing interventions for clients, groups, and communities that have had diverse life experiences. It paves the way for the perception of possible links between trauma and culture. This study provides a foundation for a proactive response by caregivers by demonstrating a link between trauma and culture within this sample of Mayas.

Limitations

This study also has some limitations. First, it examined only Mayan immigrants and only those Mayans from Guatemala. It could be possible that trauma among Mayas who are born in the United States or who lived in other countries is experienced differently. Second, the present study used tools never used among this population before. Third, this study used quantitative tools; this population may have responded more accurately to qualitative tools which might have enhanced the sharing of lived experiences.

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