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Whether medically unexplained or not, three or more concurrent somatic symptoms predict psychopathology and service use in community populations

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Abstract

Objectives—To examine the frequency of somatic symptoms in a community population of various ethnic backgrounds and to identify correlates of these symptoms such as psychopathology, use of services and personal distress.

Methods—Using a 14 symptom inventory with interviewer probes for somatic symptoms, we determined the presence of general physical symptoms (GPS) in a sample of 4864 White, Latino and Asian US community respondents. Medically "edited" verbatim interview responses were used to decide whether or not physical symptoms would qualify as medically unexplained physical symptoms (MUPS). We then assessed the association between GPS and MUPS and psychiatric disorders, psychological distress, and use of services, in both unadjusted and multivariate regression analyses.

Results—One-third (33.6%) of the respondents reported at least one GPS and 11.1% reported at least one MUPS within the last year. 10.7% of respondents had 3 or more GPS and 1.5% had 3 or more MUPS. 3 or more GPS and MUPS were positively associated with depressive, anxiety and substance use disorders, service use and psychological distress in unadjusted comparisons. In multivariate regressions, GPS persisted as a significant predictor, but there was no significant independent effect of MUPS, after controlling for GPS and other covariates.

Conclusions—Regardless of the presence or absence of medical explanations, physical symptoms are an important component of common mental disorders such as depression and anxiety and predict service use in community populations. These results suggest that three or more current GPS can be used to designate a "case" and that detailed probes and procedures aimed at determining whether or not physical symptoms are medically unexplained may not be necessary for classification purposes.

INTRODUCTION

Physical symptoms and complaints are a common manifestation of psychological distress worldwide and mental disorders such as depression and anxiety often present with physical symptoms [1,2,3–8]. The somatic presentations of mental disorders may vary from country to country and take new forms and shapes as cultures evolve and medical paradigms shift [9]. Typically, these somatic presentations have a tendency to remain medically unexplained, become chronic and disabling and lead to seeking medical attention particularly in primary care settings [3,10–13].

Previous research on somatic symptoms highlighted the value of a dimensional approach. The ECA study results had shown that DSM-III category of somatization disorder was very restrictive and this led to suggestions for using lower somatic symptom thresholds to facilitate the study of somatic presentations of mental disorders in clinical and community populations [14]. This dimensional (in contrast to a categorical) approach allowed the examination of different severity thresholds, such as “full” and “abridged somatization” disorder [15]. The presence of high levels of symptoms (e.g., five or more) was suggested as a reasonable threshold to designate “cases” in clinical and epidemiological studies [15,16].

The issue of whether somatic symptoms have or do not have a medical explanation is complex and has constrained additional research on these symptoms. Traditionally, a system of probing to rule out “medical explanations” for the somatic symptoms had been required by measuring instruments and diagnostic systems. Previous studies such as the ECA [14] did labor through the assessment and probing of long lists of somatic symptoms in search of medical explanations. This increased interviewing time, assessment complexity, and costs, and may have been the reason that led other large scale epidemiological studies (e.g., NCS, NSRAD) to omit the assessment of somatoform symptoms. As a result, opportunities for understanding somatic symptoms in community samples were missed.

The requirement of a medical explanation for presenting somatic symptoms has been less relevant in studies utilizing clinical samples. Both the WHO study [2,8] and a US study in primary care [17] showed that regardless of medical explanations, as number of presenting somatic symptoms increased, so did the odds that the person would also meet criteria for common psychiatric disorders such as depression and anxiety. However, these observations have not been replicated in epidemiological studies using non-clinical samples. In addition, research on somatic symptoms has been complicated by reliability concerns regarding the report of lifetime somatic symptoms. For example, only a fraction of “lifetime” somatic symptoms reported at time one were also reported at time two in a longitudinal study [2,18]. This supports the reliance on current (within the previous year) rather than lifetime somatic symptoms. Moreover, there has long been an active debate concerning somatic symptoms and their relationship to gender, ethnicity or socioeconomic background. Clinical and epidemiological studies in the US have shown a tendency for Latino or non-Caucasian groups to present with more somatic symptoms [19,20], but international studies have produced mixed results [21,22]. Debate has also focused on the role of gender, income and education, with a higher frequency of somatoform syndromes being generally reported among women and those from low educational and socio economic backgrounds [1].

The current study sought to build on previous research by examining somatic symptoms as part of the National Latino and Asian American Study (NLAAS) a study that examined an ethnically diverse, nationally-representative sample of the general population. The NLAAS incorporated a list of key somatic symptoms and focused on the assessment of current symptoms (present during the last year), rather than lifetime somatic symptoms. It included probes to explore whether symptoms were severe, led to seeking medical care and if so,

respondent was asked about the physician's diagnosis/explanation for the symptoms. In this paper we will examine somatic symptoms with and without medical explanations and assess their correlates and predictive value.

METHODS

Sample and Data

Data comes from the National Latino and Asian-American Study (NLAAS), a nationally representative survey of Latino and Asian English- and Spanish-speaking adults (age 18 or older) in the non-institutionalized population of the coterminous United States (described in more detail elsewhere)[23,24]. Survey data included rates of mental disorders and substance abuse, service use, and sociodemographic characteristics. The University of Michigan Survey Research Center collected data for the NLAAS via in-person household interviews or telephone, if requested from May 2002 to November 2003. The interviews were conducted in English, Spanish, Chinese, Tagalog and Vietnamese, based on the respondents' language preferences. In total, 27,026 sample housing units were screened for eligible adults, and 4,864 interviews were completed with eligible respondents. In this study, we use a small sample of Whites (n=215) that were collected using the NLAAS instrument for racial/ethnic group comparisons bringing the total sample size to 4,864. The final weighted response rate for the NLAAS study was 73.2% for the full sample, 75.5% for the Latino sample, and 65.6% for the Asian sample. Latino respondents (N=2,554) consisted of four ethnic subgroups: Mexican, Puerto Rican, Cuban, and other Latino (mainly from the Dominican Republic, Colombia, El Salvador, Ecuador, Guatemala, Honduras, Peru, and Nicaragua). Asians respondents (N=2,095) consisted of four ethnic subgroups: Vietnamese, Filipino, Chinese and other Asians.

Physical Symptoms

In order to identify physical symptoms, respondents were asked if they had experienced any symptom(s) out of a list of fourteen physical symptoms on a “frequent or severe” basis. This list of symptoms was derived from previous studies led by the senior author (JIE) that had shown that these symptoms were common and were associated with psychopathology and disability in clinical and epidemiological studies (14,15,25,26). The symptoms elicited were 1-stomach/belly pain, 2-diarrhea, 3-loose bowels or constipation, 4-pain in arms, legs, joints, 5-chest pain, 6- feel heart pound or race, 6-shortness of breath or trouble breathing, 7-back pain, 8-nausea, gas, indigestion, 9- pains or problems related to menstruation, 10-pain or problems during sex, 11-dizziness, 12-fainting or passing out spells, 13-trouble swallowing or lump in throat and 14-numbness or tingling in body or extremities. For the somatic symptom to be counted as present, the respondent had to rate that it caused significant disruption in daily life and led to medical visits. Respondents' descriptions about each symptom and the “diagnoses” offered to them by their provider were entered verbatim in the interview forms next to each symptom. At a later time, two physicians (JIE, ED) independently reviewed the verbatim responses to decide whether or not the symptom was likely to be medically explained or unexplained. This physician-review procedure is consistent with the methodology utilized in cross-national studies of somatization [2]. It is also an enhanced methodology for assessing the presence of a medical explanation for somatic symptoms, as the CIDI is typically administered by a lay interviewer and medical explanations are determined via algorithms. For example, in the case of a somatic symptom such as chest pain, responses to the query “what did the doctor say your chest pain was due to” were systematically reviewed by the two physicians. If responses were “the doctor took an ECG and found an abnormality” or “the doctor said was due to heart disease” the symptom was coded as medically explained or “0”. On the other hand, if the responses were “the doctor said it was anxiety”; “he said it may be related to stress” or “he said nothing”, the symptom was coded as medically unexplained or “1”. When there was doubt or ambiguous responses, the symptom was recorded as “possibly”

medically unexplained and coded "2". The two physicians agreed in about 80% of the cases. Only those symptoms for which there was full agreement between the two physician reviewers (coded "1" or "2" by both) were deemed "medically unexplained" for the purpose of these analyses.

Dependent Variables

Six dependent variables were used in our analyses. Four related to psychopathology including current (within the last year) DSM-IV depressive, anxiety, and substance disorders, and scores in the K-10 psychological distress scale [27]. The two service use variables included in the analyses were any last year mental health service use (formal and informal mental health sectors) and any last year use of general health services for mental health reasons. Prevalence of anxiety, depressive and substance use disorders was estimated using the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI) Version 3.0 (CIDI 3.0) [28] a fully structured diagnostic instrument based on criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders, Version 4 (DSM-IV). The Kessler Psychological Distress Scale (K-10) asks respondents ten questions about how frequently they experienced symptoms of psychological distress (e.g., feeling so sad that nothing could cheer you up) during the last 30 days. The scale has a range between 10 and 50, with higher scores indicating greater psychological distress, and has been shown to be strongly associated with anxiety and affective disorders [29]. An indicator of any last year generalist health visits was created based on whether a respondent reported receiving services (at least one visit) from a general practitioner, other medical doctor, nurse, occupational therapist, or other health professional for a mental health problem. We considered a respondent to have had any last year mental health services use if they had received formal or informal mental health services for a mental health problem.

Covariates

For the multivariate regression analyses (see below), we adjusted for race/ethnicity, demographic and socioeconomic status variables, and chronic medical conditions. Racial/ethnic groups were White, Latino, and Asian and this was determined using questions from the 2000 Census. Demographic variables were: age (18–34, 35–49, 50–64, 65+), gender, and marital status (married, never married, widowed, divorced or separated). Socioeconomic variables were education (less than HS, high school graduate, some college, college graduate), household income ($0–$14,999, $15,000–$34,999, $35,000–$74,999, and $75,000+), employment (employed, out of labor force, or unemployed). We also adjusted for having reported any chronic physical condition (diabetes, hypertension, cancer, heart disease, etc.).

Statistical Analyses

First, we present two tables that provide an unadjusted description of our data. In Table 1, we describe the race/ethnicity, age, sex, sociodemographic characteristics, and the presence of a chronic medical condition by individuals with less than or greater than or equal to 3 physical symptoms. In Table 2, we present unadjusted tabulations of the rates of any depressive disorder, any anxiety disorder, and any mental health service use by number of GPS and number of MUPS, providing a snapshot of how rates change with increases in both GPS and MUPS. In Table 3, we describe results of multivariate regressions to determine the independent effect of GPS and MUPS on current (within one year) depressive, anxiety, and substance use disorders; current (within last year) use of the general medicine and mental health sectors adjusting for the covariates described above as well as ethnic background. To allow for comparison to previous studies, we also conducted a sensitivity analysis increasing the threshold of number of GPS and MUPS from 3 to 5 to determine how these criteria performed in predicting psychopathology and service use. These analyses also adjusted for the covariates described above. In Table 4, we present results of a multivariate linear regression to determine the

independent effect of GPS and MUPS on scores on the K-10 physical distress scale, adjusting for the above described covariates. Standard errors for all four analyses were estimated using Stata 10 software (Citation: StataCorp. 2008. Stata Statistical Software Release 10.0. College Station, TX: Stata Corporation) which accounts for the survey sampling design, and significance tests were performed using design-adjusted Wald tests.

RESULTS

Of a total of 4864 respondents, 1649 (33.6%) reported the presence of at least one frequent and severe GPS and 507 (11.8%) reported the presence of at least one frequent and severe MUPS leading to a medical visit during the previous year. 526 (10.7%) respondents reported 3 or more frequent/severe GPS and 66 (1.5%) respondents reported 3 or more frequent/severe MUPS during the same period. An analysis of individual symptoms (not shown) showed that the most frequent GPS were back pain (11.9%), pain in arms, legs, joints (11.0%), stomach pain (9.0%), menstrual pain (7.2%) and diarrhea (6.6%). Also, the most common MUPS were stomach pain (2.6%), diarrhea (2.2%), heart pounding/racing (2.1%), menstrual pain (1.9%) and shortness of breath (1.6%). The association between GPS and MUPS was 0.60.

Table 1 presents the characteristics of the total sample and compares individuals with less than 3 physical symptoms to individuals with greater than or equal to 3 physical symptoms. Using chi-square tests of significance, we found significant differences among the racial/ethnic groups in number of GPS reported. In addition, differences in having 3 or more physical symptoms were found by age, gender, marital status, employment status, and among those with any chronic physical condition.

Table 2 provides a descriptive table of GPS and MUPS and their relation to past year rates of depressive, anxiety disorders and use of services. This table allows for a qualitative look at the rates associated with GPS and MUPS. Increases in rates from left to right are indicative of GPS association with psychopathology/service use, while increases from top to bottom are indicative of the level of prediction that MUPS add to GPS. For both GPS and MUPS, the predominant trend was that as number of somatic symptoms increased so did the prevalence of psychopathology and use of mental health services during the past year. Relative to GPS, MUPS symptoms seem to add some predictive value for psychopathology and service use, as rates were highest among those with large numbers of MUPS and GPS. The relationship between number of somatic symptoms and psychopathology was particularly salient for anxiety disorders.

Table 3 shows that after adjustment for age, gender, ethnicity, SES variables, and chronic physical conditions, individuals with 3 or more GPS had significantly greater odds of having any last year depressive disorder (OR=2.57), any last year anxiety disorder (OR=3.60), any last year substance use disorder (OR=3.27), any last year generalist treatment for a mental health problem (OR=3.70), and any last year mental health service use (OR=2.94). After adjusting for GPS, the independent contribution of having 3 or more MUPS was not significantly associated with diagnosis of psychiatric disorder. Having 5 or more somatic symptoms was relatively rare (GPS 4.2% and MUPS 0.4%), but because this level had been suggested as a cut-off in previous studies, we conducted sensitivity analyses using 5+ GPS and 5+MUPS. This produced identical results for diagnoses of depression, anxiety and service use variables. Contrary to findings from the 3+ GPS analysis, no significant association was found between 5 or more GPS and substance use disorders and a negative association was found between levels of MUPS and service use.

When we examined the effect of ethnic background in the five regression models, we found that Asians were significantly less likely than Whites to meet criteria for a current anxiety

disorder and substance use disorder, and were less likely to use generalist service. Both Asians and Latinos reported significantly less use of mental health services for mental health problems than Whites. Summing up results from other covariates in the regression models, we found that individuals who were older, married, employed, and without any chronic physical health disorder had significantly reduced odds of having a mental disorder during the past year compared to subjects who were younger, unmarried, unemployed and who reported a chronic physical health condition. In addition, females were less likely than males were to meet criteria for a current substance abuse disorder and individuals who were older, unmarried, unemployed, out of the labor force, and who reported having a chronic physical health condition, had significantly higher odds for using mental health services during the previous year.

Table 4 shows that number of GPS was positively associated with psychological distress as measured by the K10 scale, after adjustment for age, gender, ethnicity, SES variables, and any chronic physical condition. In the same analysis, we found no significant independent association of number of MPS after adjustment for GPS and other covariates.

DISCUSSION

To our knowledge, this study is the first large scale epidemiological survey in the US in over a decade to systematically assess somatic symptoms, elicit only current physical symptoms that cause disruption in daily life and examine their association with common psychopathological entities and use of services. The data in this paper confirm that physical symptoms are commonly reported by a racially and ethnically diverse sample of community respondents. Thus, despite the fact that we elicited only 14 symptoms (compared with the longer lists of symptoms included in previous instruments such as the DIS), required the somatic symptoms to be severe, cause disruption in daily life, lead to physician visits and be present within 12 months, we found a relatively high prevalence of GPS in these community respondents. This strongly supports the observation of many previous studies in the US and abroad that have shown that somatic symptoms represent a common expression of psychopathology and predict disability and service use [8,11,30,31]. Seeking an optimal level to determine “caseness”, we evaluated both a three and a five somatic symptom threshold. The five symptom threshold had been previously suggested by previous studies that assessed lifetime somatic symptoms [15,16]. In this study, we found a strong association of both the 3 + and the 5 + somatic symptom thresholds with depression, anxiety disorders and use of services, However, the strong association found between the 3+ symptom threshold and substance use disorders did not hold in the case of the 5+ symptom threshold. Previous research had also shown a positive association between somatization and substance abuse in a community sample [32]. The lack of an association when using 5+ GPS in this instance may be due to the low N's and the relatively low prevalence of substance use disorder among Asian and Latino populations particularly those born outside the United States [33,34]. As expected, the prevalence of MUPS was found to be much lower than that of GPS. Overall, both GPS and MUPS were associated with high levels of psychopathology, psychological distress and service use. However, MUPS were not independently associated with psychopathology, after adjustment for GPS and other covariates, whether 3+ physical symptoms or 5+ physical symptoms are used as a cutoff point. Given these findings, we propose the use of 3+ current GPS for designating a “case” in clinical and epidemiological studies.

Past research had consistently pointed out that in the case of somatic symptoms, the medically explained/unexplained dichotomy is difficult to unravel. Several investigators have suggested that it may be unnecessary to go through all the probes and procedures to rule out medical explanations given the stepwise association between somatic symptoms and common mental disorders such as anxiety and depression in primary care [2,16,31]. Data from our study provided mixed results for the utility of MUPS as predictors of “caseness”. While MUPS added

some value to the prediction of psychopathology and service use, they did not significantly add to the predictive value of GPS. With the caveat that our sample sizes of individuals with large numbers of MUPS get very small to detect significant differences, our data appear to support the recommendations of the above studies. The association of 3+ GPS to common psychiatric disorders such as depression and anxiety and the relevance of these somatic symptoms as “presenting symptoms” particularly in primary care settings is a strong argument to advocate their inclusion within the diagnostic criteria for these disorders.

As we move towards DSM-V, given the limitation of DSM-IV somatoform diagnoses, there is a need to examine these categories critically and consider new options. The DSM-V committee is currently revising DSM-IV's somatoform categories and considering new options such as a dimensional measure [35]. We hope that data from this study may be useful particularly for the purpose of a dimensional approach to somatic symptoms. Indeed, the list of somatic symptoms we tested is almost identical to that of the Physician's Health Questionnaire (PHQ-15) [36]. For example, 12 of our 14 symptoms are identical to 12 of the 15 symptoms of the PHQ-15. The only differences are that they (PHQ-15) used “sleeping trouble”, “headaches” and “fatigue”, while we used “trouble swallowing/lump in throat” and “numbness and tingling in body or extremities”.

This study has a number of limitations. First, although a cross-sectional study helps us understand some aspects of somatic symptoms and psychopathology, identifying causality is best assessed using a longitudinal approach. Thus, some of the observed associations could reflect reverse causation. For example, respondents with depressive and anxiety disorders might have a lower threshold for physical illness and over report somatic complaints. Also, there is a circularity in that participants onlyscore symptoms if they have sought medical visits, and the observation that peoplewith many bodily symptoms use more health services. Second, it is difficult to disentangle the effect of variables that are only proxies for certain important factors, such as chronic physical conditions, that might not be adequately established due to the limited interaction with the healthcare system. Third, the NLAAS was neither designed nor powered to formally test for subgroup differences in the association between GPS, MUPS and psychopathology. Future studies may benefit from the inclusion of larger samples designed to formally test for any differences in these patterns. Fourth, we did not systematically assess DSM-IV somatoform disorders, since that portion of the CIDI was not included in the major survey. However, in agreement with other reports, when we use high levels of MUPS as a cut–off (e.g., five or more symptoms), we seem to get a reasonable proxy measure for the more severe forms of somatization, yielding a prevalence of about 0.4 % which is comparable to prevalence estimates in previous studies [34].

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Table 1

Sociodemographic Statistics by number of general physical symptoms (<3 >=3) in NLAAS (n=4864)

	Total Population		Physical Symptoms < 3		Physical Symptoms >= 3		Test
	n	%	n	%	n	%	
Racial/ethnicity category							
White	215	17.5%	180	16.5%	35	26.5%**	
Latinos	2554	60.7%	2210	60.8%	344	59.1%	
Asians	2095	21.8%	1948	22.7%	147	14.4%	
Age category							
18–34 years	1924	43.2%	1807	45.8%	117	21.7%***	
35–49 years	1606	30.7%	1434	30.5%	172	32.2%	
50–64 years	912	15.8%	766	14.8%	146	24.7%	
65 years or more	422	10.2%	331	8.9%	91	21.4%	
Gender							
Male	2230	50.0%	2069	52.2%	161	32.2%***	
Female	2634	50.0%	2269	47.8%	365	67.8%	
Marital Status							
Married	2777	54.5%	2536	55.3%	241	48.2%***	
Never married	1238	28.5%	1128	29.5%	110	20.2%	
Widowed, divorced, or separated	849	17.0%	674	15.3%	175	31.6%	
Education							
11 or less	1329	31.7%	1145	31.5%	184	33.3%	
12	1052	22.1%	951	22.8%	101	16.9%	
13–15	1878	34.8%	1689	34.7%	189	35.3%	
16 or more	605	11.4%	553	11.0%	52	14.5%	
Household Income							
$0–$14,999	1117	23.2%	954	22.7%	163	28.0%	
$15,000–$34,999	1024	22.2%	912	22.7%	112	18.2%	
$35,000–$74,999	1316	27.0%	1184	26.8%	132	29.0%	
$75,000+	1407	27.5%	1288	27.8%	119	24.8%	
Employment							

	Total Population		Physical Symptoms < 3		Physical Symptoms >= 3		Test
	n	%	n	%	n	%	
Employed	3099	64.0%	2856	66.0%	243	47.7%***	
Unemployment	338	6.6%	304	6.6%	34	6.6%	
Out of Labor Force	1427	29.3%	1178	27.4%	249	45.7%	
Chronic Condition							
No	1694	36.5%	1679	40.4%	15	4.0%***	
Any	3170	63.5%	2659	59.6%	511	96.0%	
				mean		mean	
Psychological Distress (K10: 10–50)	4858	13.81	4332	13.35	526	17.64***	
Number of Medical Unexplained Physical Symptoms(MUPS)				column %		column %	
<3	4798	98.5%	4338	100.0%	460	86.2%***	
>=3	66	1.5%	0	0.0%	66	13.8%	
<5	4848	99.6%	4338	100.0%	510	96.3%***	
>=5	16	0.4%	0	0.0%	16	3.7%	

*P<5%

**P<1%

***P<0.1%

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TABLE 2

Number of bodily symptoms (GPS and psychopathology).

Last year rate of any depressive disorder						
	#GPS					
#MUPS	**0**	**1**	**2**	**3**	**4**	**5+**
0	4.8%	6.3%	15.3%	14.3%	17.9%	19.4%
1		6.9%	18.6%	17.1%	9.9%	18.6%
2			25.6%	19.7%	12.1%	21.7%
3				13.1%	42.4%	41.6%
4					30.2%	39.8%
5+						26.1%

Last year rate of any anxiety disorder						
	#GPS					
#MUPS	**0**	**1**	**2**	**3**	**4**	**5+**
0	6.0%	9.8%	11.8%	13.5%	30.7%	18.8%
1		8.5%	22.6%	33.1%	36.1%	10.3%
2			15.7%	19.7%	84.0%	50.8%
3				27.5%	26.8%	42.0%
4					48.0%	40.6%
5+						45.0%

Last year rate of any service use						
	#GPS					
#MUPS	**0**	**1**	**2**	**3**	**4**	**5+**
0	7.5%	14.1%	20.2%	16.3%	28.2%	38.8%
1		16.6%	27.5%	34.1%	37.0%	39.9%
2			22.6%	22.5%	69.2%	41.6%
3				35.9%	11.3%	28.9%
4					48.0%	66.1%
5+						12.0%

GPS - General Physical Symptoms. A list of 14 physical symptoms previously shown to be associated with mental disorders

MUPS - Medically unexplained physical symptoms. A subset of GPS that were not medically explained after physician review

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Table 3

Odds ratios from logistic regression of past year psychopathology on having >=3 GPS and >=3 MUPS

	for any depressive disorder		for any anxiety disorder		for any substance disorder		12 month Generalist service		12 month Any Mental Health Service Use	
	Odds	**95% CI**	**Odds**	**95% CI**	**Odds**	**95% CI**	**Odds**	**95% CI**	**Odds**	**95% CI**
GPS>=3	2.57***	1.84 – 3.58	3.60***	2.49 – 520	3.27**	1.56 – 6.84	3.70***	2.17 – 6.31	2.94***	1.94 – 4.45
MUPS<=3	1.94	0.84 – 4.51	1.35	0.54 – 3.37	0.54	0.12 – 2.35	0.95	0.35 – 2.56	0.61	0.24 – 1.56
Race										
White	1.00		1.00		1.00		1.00		1.00	
Latinos	1.60	0.99 – 2.60	0.66	0.39 – 1.14	0.54	0.26 – 1.13	0.56	0.29 – 1.08	0.61*	0.38 – 0.97
Asians	1.03	0.62 – 1.71	0.55*	0.33 – 0.91	0.32*	0.13 – 0.80	0.44**	0.24 – 0.79	0.45***	0.31 – 0.66
Age										
18–34	1.00		1.00		1.00		1.00		1.00	
35–49	0.81	0.56 – 1.16	0.88	0.60 – 1.31	1.05	0.63 – 1.75	1.64*	1.10 – 2.44	1.60*	1.10 – 2.32
50–64	0.44**	0.26 – 0.74	0.72	0.47 – 1.12	0.32	0.06 – 1.63	1.00	0.58 – 1.69	1.03	0.57 – 1.87
65 or more	0.28***	0.15 – 0.55	0.26***	0.13 – 0.52	0.19	0.03 – 1.12	0.52	0.23 – 1.15	0.48	0.15 – 1.51
Female	1.16	0.87 – 1.53	1.20	0.87 – 1.64	0.24***	0.12 – 0.51	1.78***	1.28 – 2.47	1.52*	1.07 – 2.16
Marital Status										
Married	1.00		1.00		1.00		1.00		1.00	
Never married	1.70**	1.22 – 2.35	1.51*	1.01 – 2.25	3.87***	2.27 – 6.60	0.98	0.62 – 1.55	1.63	1.00 – 2.68
Widowed, divorced, or separated	2.41***	1.70 – 3.40	1.47	1.00 – 2.17	2.20*	1.11 – 4.38	2.09**	1.35 – 3.24	2.04***	1.39 – 3.00
Education										
11 or less	1.00		1.00		1.00		1.00		1.00	
12	1.04	0.73 – 1.50	1.24	0.88 – 1.75	0.93	0.51 – 1.70	1.18	0.79 – 1.78	1.18	0.82 – 1.71
13–15	0.86	0.59 – 1.24	0.79	0.55 – 1.13	0.84	0.42 – 1.69	1.37	0.97 – 1.96	1.28	0.91 – 1.80
16 or more	0.84	0.46 – 1.55	0.72	0.40 – 1.30	0.57	0.10 – 3.10	0.64	0.30 – 1.33	1.41	0.73 – 2.74
Income										
$0–14,999	1.00		1.00		1.00		1.00		1.00	
$15,000–34,999	0.87	0.57 – 1.32	1.19	0.77 – 1.82	1.42	0.67 – 3.03	1.23	0.81 – 1.86	0.94	0.66 – 1.36
$35,000–74,999	0.82	0.55 – 1.24	1.02	0.67 – 1.57	2.00	0.99 – 4.05	1.45	0.92 – 2.29	0.95	0.61 – 1.46

	for any depressive disorder		for any anxiety disorder		for any substance disorder		12 month Generalist service		12 month Any Mental Health Service Use	
	Odds	**95% CI**	**Odds**	**95% CI**	**Odds**	**95% CI**	**Odds**	**95% CI**	**Odds**	**95% CI**
$75,000 or more	1.07	0.68 – 1.67	1.16	0.69 – 1.97	1.23	0.45 – 3.41	1.39	0.86 – 2.25	0.96	0.59 – 1.54
Employment										
Employed	1.00		1.00		1.00		1.00		1.00	
Out of labor force	1.72	0.91 – 3.27	1.29	0.80 – 2.09	2.10	0.98 – 4.47	2.08*	1.01 – 4.27	1.95**	1.27 – 2.98
Unemployed	1.49*	1.03 – 2.17	1.69**	1.23 – 2.33	1.38	0.69 – 2.78	1.87**	1.25 – 2.80	1.47	0.93 – 2.31
Any Chronic Physical Conditions	2.98***	1.80 – 4.94	2.45***	1.47 – 4.08	1.38	0.78 – 2.43	2.22**	1.29 – 3.83	2.17***	1.41 – 3.34

GPS - General Physical Symptoms. A list of 14 physical symptoms previously shown to be associated with mental disorders

MUPS - Medically unexplained physical symptoms. A subset of GPS that were not medically explained after physician review.

* P<5%

** P<1%

*** P<0.1%

TABLE 4

Linear Regression of Psychological Distress on number of GPS and number of MUPS

	All	
	Coef.	**95% CI**
Number of GPS	0.74***	0.53 – 0.96
Number of MUPS	0.46	−0.20 – 1.11
Race		
White	0.00	
Latinos	0.91**	0.27 – 1.55
Asians	1.09***	0.53 – 1.65
Age		
18–34	0.00	
35–49	0.07	−0.31 – 0.46
50–64	−0.60*	−1.10 – −0.10
65 or more	−1.57***	−2.38 – −0.77
Female	0.46**	0.13 – 0.79
Marital Status		
Married	0.00	
Never married	0.62**	0.19 – 1.05
Widowed, divorced, or separated	0.88***	0.47 – 1.28
Education		
11 or less	0.00	
12	−0.50	−1.09 – 0.08
13–15	−0.66	−1.33 – 0.01
16 or more	−1.00	−2.04 – 0.04
Income		
$0–14,999	0.00	
$15,000–34,999	−0.37	−1.15 – 0.41
$35,000–74,999	−0.72*	−1.33 – −0.12
$75,000 or more	−0.68	−1.44 – 0.07
Employment		
Employed	0.00	
Out of labor force	1.65**	0.61 – 2.68
Unemployed	0.90**	0.31 – 1.48
Any Chronic Physical		
Conditions	1.57***	1.12 – 2.03
Constant	11.58***	10.62 – 12.54

GPS - General Physical Symptoms.

MUPS - Medically unexplained physical symptoms.

*
P<5%

**
P<1%

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P<0.1%