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Comparison of Major Depressive Disorder and Subthreshold Depression among Older Adults in Community Long-Term Care

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Abstract

Objectives—This study extends existing knowledge regarding the continuum between major depression (MD) and subthreshold depression (SD) by examining differences in symptomology and associative factors for a subpopulation of older adults with functional disability.

Method—Our sample consisted of clients age 60 and above entering public community long term care derived from the baseline survey of a longitudinal study (315 non-depressed, 74 MD, and 221 SD). We used the Diagnostic Interview Schedule to establish diagnoses of MD, the Center for Epidemiological Studies Depression Scale (CES-D) to assess SD, and other self-report measures to explore potential associative factors of demographics, comorbidity, social support, and stressors.

Results—No differences in CES-D identified symptoms occurred between the two groups. MD and SD were both associated with lower education, poorer social support, more severe medical conditions, and higher stress when compared to non-depressed older adults. Younger age, and being female were associated solely with MD; whereas, worse perceived health and more trouble affording food were associated solely with SD. The only associative factor significantly different between MD and SD was age. Those with MD were more likely to be younger than those with SD.

Conclusion—Our findings of symptom profiles and associative factors lend support to the continuum notion of depression. Identification of only older adults within the community long-term care service system who meet criteria for MD would leave many older adults, who also face multiple comorbidities, high levels of stress and social isolation, and substantial depressive symptoms undiagnosed and untreated.

Keywords

depressive symptoms; diagnosis; homecare; functional impairment

Introduction

Researchers have long identified an epidemiological dilemma regarding late life depression —while diagnosis is relatively rare, depressive symptomatology is frequent and debilitating

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(Reynolds, Haley, & Kolzlenko, 2008). Among community dwelling older adults, 1–3% have a major depressive disorder (MD) but 10–15% have subthreshold depression (SD) (Gum, King-Kallimanis, & Kohn, 2009; Xavier et al., 2002). The seriousness of geriatric depression is further underscored by the fact that the mental health service system is expected to face a crisis of increasing demand from older adults due to the projected growth in their absolute number and relative percentage over the next generations (Gum et al., 2009). Updating and extending our knowledge regarding the continuum of depressive disorders and their associative factors is essential.

The term SD is used to describe a wide variety of depressive conditions and terms that do not meet diagnostic criteria for MD or dysthymia (American Psychiatric Association [APA], 2000) such as subthreshold, subclinical, minor, mild, and subsyndromal depression (Hybels, Blazer, & Pieper, 2001). Moreover, varying criteria are evident for SD. Spitzer, Endicott, and Robins's (1978) diagnostic research criteria of symptom profiles, durations, and levels of impairment are used in some studies, while other researchers define SD and minor depression in terms of a count of depressive symptoms present that is fewer than those required for diagnostic criteria for MD or evident by non-diagnostic depression screening tools (Feldman, Robbins, & Jaffe, 1998).

Looking at low-income older adults served by public community long-term care (CLTC) is important because both MD and SD are more prevalent among subpopulations of older adults with functional disability and medical comorbidity. Among older adults in primary medical care settings, 17–35% evidence depressive symptoms (Alexopoulos, Katz, Reynolds, & Ross, 2001), and 5–32% meet criteria for MD (McCusker et al., 2005). About 20% of older adults served by home health agencies evidence depression symptoms and another 14% have MD (Bruce et al., 2002). Among older adults receiving public CLTC services, 18 percent exhibit depression symptoms and an additional 7% meet criteria for MD (Morrow-Howell et al., 2008). Thus, substantial epidemiological data indicate that SD is more prevalent than MD and at varying rates among subpopulations of older adults. Thus, this study presents a comparison of MD and SD for a particularly vulnerable population—low-income older adults with functional impairments who are receiving public CLTC services.

Comparing Major Depression and Subthreshold Depression

Extensive research has detailed how MD and SD compare in terms of symptom profiles, associative factors, and subsequent consequences. This broad literature base will be reviewed to provide the basis for this study's exploration into how symptom profiles and associative factors compare for the subpopulation of older adults receiving CLTC.

One approach to analyzing the similarities and dissimilarities between MD and SD is to examine their relative symptom profiles (Hybels et al., 2001; McCusker et al., 2005). When depressive symptoms were compared between MD and SD among older adults, some studies showed the higher prevalence of most depressive symptoms for MD compared to SD (Spalletta, Ripa, & Caltagirone, 2005). The relative frequency of endorsing suicidal thoughts among older adults with MD suggested this symptom may be a unique distinguishing factor for MD (Spalletta et al., 2005). However, this distinction between MD and SD may be minimally informative given the explicit role of these depressive symptoms in the DSM criteria for MD. In contrast, researchers found that symptom profiles between MD and SD were similar when using other non-diagnostic measures of depression (Hybels et al., 2001). Hybels and colleagues (2001) found that those with SD had similar symptom profiles and similar rank order of the relative frequencies for the symptoms when compared to those with MD; however, older adults with SD had lower frequencies for CES-D symptoms and fewer symptoms overall compared to MD.

Traditionally, MD has been viewed as a unique disorder, with distinct characteristics from SD (APA, 2000). But more recent research has focused on the notion that SD and MD differ by degree, rather than by type (McCusker et al., 2005). Researchers have assessed this continuum of depression by examining how associative factors vary between MD and SD. Many factors were associated with both MD and SD among older adults, including female gender (Cuijpers, Beekman, Smit, & Deeg, 2006), being unmarried (Hybels et al., 2001), perceived low social support (Hybels et al., 2001; McCusker et al., 2005), impairment in physical functioning (Hybels et al., 2001; Solomon, Haaga, & Arnow, 2001), cognitive impairment (Hybels et al., 2001), poorer self-rated health (Hybels et al., 2001), medical or physical comorbidity (Cuijpers et al., 2006; Hybels et al., 2001; Solomon et al., 2001), psychiatric comorbidity (Solomon et al., 2001), use of psychotropic medications (Hybels et al., 2001), negative life events (Cuijpers et al., 2006), and disability days (Hybels et al., 2001).

Research also indicates the possibility of distinct associative factors, such as evidence of MD's relationship having less locus of control and having family or personal history with MD and as SD's relationship with being unmarried, living in an urban environment, having poor health and reporting less social support (Beekman et al., 1997). Yet, this research did not directly compare whether associative factors of MD and SD may differ. When research did compare MD and SD directly, no significant differences were found except for history of depression (Spalletta et al., 2005).

Regardless of these various definitions and associative factors for SD, there is some consensus that SD is associated with several negative consequences (Solomon et al., 2001). SD is strongly related to worse morbidity (Hybels et al., 2001; Lyness et al., 2007), poor long-term prognosis (Cuijpers et al., 2006), and increased service utilization such as receipt of disability or welfare benefits (Judd et al., 1994) and increased service burden (Johnson et al., 1992). Lyness and colleagues (2007) indicated that older adults with SD were as impaired as older adults with MD for several functional and medical measures. Thus, SD, due to its high prevalence and negative consequences, constitutes a serious clinical and public health problem. The comparisons of SD and MD should be explored for the subpopulation of older adults in public CLTC, who are poor and have functional limitations.

In this study, we extend upon this extensive literature base to address the following three questions among people receiving public CLTC: 1) What symptom factors are common to and unique to SD and MD? 2) What associative factors are associated with SD and MD among older adults when compared to non-depressed older adults? 3) When comparing associative factors for SD and MD, what are the similar and distinct factors for these conditions? From the literature on factors associated with depression, we identified variables to test in relation to depression. These include: demographic factors, such as age, gender, race, education, rural/urban residence, marital status, and living arrangements; comorbidity factors, namely chronic medical conditions, functional impairments, perceived health and psychiatric medications; social support factors; and stressors, including economic stress, negative life events, and perceived stress. From the literature on whether MD and SD differ in degree or type, we shaped our methods of analysis.

Our study is unique because we assessed the continuum of depression in a sample of low-income, functionally impaired older adults in the CLTC setting while samples of previous studies predominantly consisted of older adults in community or medical care setting. Resolving whether MD and SD represent different types of depression is important for both theoretical and applied reasons, including improved ability to identify those who may not reach criteria for MD but nonetheless suffer debilitating depression symptoms and associated morbidity (Solomon et al., 2001).

Methods

Study Setting

The study was conducted in the public CLTC system, which is provided by every U.S. state to help low-income people with chronic conditions stay in the community by providing in-home and community-based services such as nursing, case management, and personal care (General Accounting Office, 1995; Summer, 2007). We collaborated with a Midwest state's Medicaid Home and Community-Based Service Waiver program and collected data from selected service areas across the State that represented a large urban area, several smaller cities, and small towns and rural areas.

Recruitment Procedures

We extracted this cross-sectional data from a single baseline wave of a longitudinal study of depression among older clients entering public CLTC from October 2000 to May 2003 (Morrow-Howell et al., 2008). CLTC case managers approached all eligible clients to ask their permission for the researchers to contact them. Eligibility criteria for the study included: 1) 60 years old or older; 2) qualified for public CLTC by virtue of their income and functional level of need; 3) their own guardian; 4) able to speak English sufficiently enough to complete interviews (which were not translated to other languages); and 5) new CLTC clients with a new case record opened at the time of referral to the study.

Of the 2,736 eligible clients approached, 65.35% (n=1,788) assented contact by the researchers. Of those, 1,508 individuals (84.34%) agreed to participate in the study. During the initial contact, researchers excluded 338 individuals who were determined ineligible or could not be located, and those who screened positive for cognitive impairment per the Short Portable Mental Status Questionnaire (SPMSQ; scores 5 or greater) (Pheiffer, 1975). As a result, 1,170 clients completed depression screening (see the Measures section for the detailed procedure) and 295 were classified as depressed (either MD or SD) and completed the baseline interview. Among those who were screened as non-depressed, 315 clients were randomly selected and also completed the baseline interview. Thus, the final sample size was 610 for this study. Study protocols were approved by the Washington University Committee on Human Subjects (#E99-201).

Interview Measures

Data were mainly collected through telephone interviews, while about 10% of the interviews required face-to-face interviews due to sensory impairment or other conditions that prevented telephone communication.

Depression status and symptom profiles—First, we used the computerized screening version of the Diagnostic Interview Schedule (DIS) (Robins, Helzer, Croughan, & Ratchliff, 1981) to classify individuals with MD (n=74). The DIS is a well-established instrument for yielding DSM diagnosis through lay interviewers and has been used widely over the telephone (Wells, Burnam, Leake, & Robins, 1988).

Second, we used the modified Center for Epidemiologic Studies Depression Scale (CES-D) (Blazer, Burchett, Service, & George, 1991) to classify individuals without MD as either having SD (n=221). Even though the definition of SD is debated (Cohen, Magai, Yaffee, & Walcott-Brown, 2005), a substantial precedent exists for using the CES-D score to indicate a clinically significant mood disorder (Blazer & Hughes, 1991). We used the version of CES-D modified for telephone interviews, adopted from the Duke Depression Evaluation Schedule (Krishnan, Hays, Tupler, George, & Blazer, 1995). This modified CES-D contains the 20 items from the original CES-D but only with yes/no response options. Previous

studies have shown that a score of 9 or greater on the modified CES-D indicates clinically significant depression (Blazer & Hughes, 1991). Third, among those who were classified as non-depressed, a random sample was drawn as a comparison group (n=315). In this process, only those with scores less than 5 on the modified CES-D and with no life-time history of depression were selected to obtain a group with minimal within group variation on depression severity to allow for comparisons.

Associative factors—Age, race (white/non-white), gender, education (highest grade), marital status (married/not married), living arrangements (living alone/living with others), and residential areas (urban/rural), were assessed in telephone interviews. The U.S. Census Bureau's classification of the Metropolitan Statistical Areas (MSAs) was used in defining urban areas (U.S. Census Bureau, 2008).

Social support was assessed with the 11-item Duke Social Support Index (Koenig et al., 1993). As for comorbidity factors, according to the Duke Depression Evaluation Schedule (DDES) medical conditions scale (Krishnan, et al., 1995), the number of functional impairments across seven activities of daily living (e.g., toileting and bathing) and nine instrumental activities of daily living (e.g., shopping and traveling) was assessed during telephone interviews, as well as the severity of 14 chronic medical conditions (e.g., diabetes, hypertension, arthritis, and stroke). Perceived self-rated health was also included as a comorbidity. Stressors include economic stress represented by having trouble of affording food, the number of negative life events during the past year with the Duke Life Event Scale (Blazer, Hughes, & George, 1987), and perceived stress during the past six months using the DDES. Income was not included as a variable, given that the sample consisted of low-income clients of a public Medicaid CLTC service system.

Statistical Analyses

In order to examine whether MD is distinct from SD, several descriptive tests were conducted based on the literature review of the empirical studies. First, to explore symptom profiles of SD and MD, the frequencies of all 20 CES-D items were calculated for non-depressed, SD, and MD group participants. We compared the frequencies between SD and MD using Chi-square tests after excluding non-depressed participants, similar to Hybels and colleagues (2001). As we performed multiple comparisons, we reduced the significant level to $p < .0025$ (i.e., $.05/20$). In addition, we ranked the CES-D items by the frequency of the respondents endorsing each symptom. In order to test whether rank patterns are different between people with SD and MD, we calculated Spearman correlation coefficient of ranks between SD and MD groups (Flett, Vredenburg, & Krames, 1997). We also compared CES-D scores between individuals with SD and MD using t-tests, similar to previous research (Liu et al., 1997). In an effort to discriminate if a specific symptom on CES-D differs between SD and MD, backward logistic regression analysis with a two level dependent variable (SD vs. MD) was conducted ($p < .05$) (Heun, Kockler, & Papassotiropoulos, 2000). To identify and compare the associated factors with depression status, three separate logistic regression models were conducted: MD versus no depression, SD versus no depression, and MD versus SD. To avoid inflated type I error of multiple comparisons, we reduced the significant level to $p < .017$ ($.05/3$) in three separate logistic regression.

All variables had fewer than 15% missing values. For missing data, we conducted the multiple random imputation method to generate five independent datasets without missing data, using SAS 9.1 proc MI procedure. For descriptive analyses, we used only the first imputed dataset to make interpretations much simpler and easier. For multivariate analyses, we combined the results of the five imputed datasets, using SAS 9.1 proc MIANALYZE procedure.

Results

Sample Description

A sample description of the total sample and by the comparison groups of non-depressed, MD, and SD is provided in Table 1. Overall for the majority of study participants were female (76.23%), white (72.62%), and not married (76.07%). Over half were living in rural areas (57.05%), and living alone (53.93%). The average age of study participants was 72.64 years (SD: 8.07 years), with a range from 60 to 104 years old. The mean of the highest grade in school completed was 9.52 years (SD: 3.05 years), with a range from no years of school completed to over 17 years of school completed. The mean of the 11-item Duke Social Support Index was 26.76 (SD: 3.76, range: 13–33). The severity of medical conditions scored 9.44 on average (SD: 5.18, range: 0–31), and study participants showed 8.38 functional impairments out of 16 areas (SD: 3.91). Participants perceived their overall health as moderate (M: 3.12, SD: 1.25, range: 0–5). More than one third of the participants (37.05%) had trouble affording the food and they had 1.30 negative life events during the past year (SD: 1.36, range: 0–8). They perceived their stress during the past six months as moderate (M: 4.91, SD: 3.13, range: 1–10).

Symptom Profiles

As shown in Table 2, comparison of CES-D symptom profiles between SD and MD yields no evidence of specific item differences between the two groups. Chi-square tests indicate that no specific symptom differs between the two groups when a significance level is decreased at .0025 to avoid inflated type I error in multiple comparisons. The most common symptom is “felt depression” for both SD (90.05%) and MD (89.19%) and the second is the same for both groups (“felt everything I did was an effort”). SD and MD are similar in terms of ranks of CES-D items by the frequency of respondents reporting that symptom. Spearman correlation coefficient of ranks between SD and MD (spearman $r=.972$, $p<.001$) indicates that a strong association of ranks for CES-D symptoms between SD and MD exists (not shown in table). We did not find MD to have a greater number of CES-D reported symptoms than SD; T-tests show that the mean of CES-D scores between SD and MD does not differ (mean of SD=11.61, mean of MD=11.58, $t[93.8]=.07$, $p=.946$) as shown in Table 2.

To see whether a specific symptom discriminates between SD and MD, we ran the logistic regression (backward elimination analysis) with a two level variable (SD vs. MD) regressed on twenty CES-D symptoms, using the first imputed dataset. The results of the logistic regression reveals that there is a difference ($p=.030$) of only one symptom of fear (item 10) between SD and MD (not shown in table). SD group endorses a symptom of fear more frequently than MD group.

Associative Factors

In the separate logistic regression analyses, the associative factors of SD and MD are shown in Table 3. First, comparisons were drawn between participants with MD and the non-depressed group. Those with MD are more likely than non-depressed participants to be younger, be female, have lower education, have poorer social support, have more severe medical conditions, and report more severe stress in the past six months. Similarly, participants with SD are more likely than non-depressed participants to have lower education, to have poorer social support, to have more severe chronic medical conditions, to perceive their health worse, to have greater difficulty of affording food, and to report greater stress in the past six months.

In sum, the following factors were found to be significantly associated with both types of depression when compared with people without depression: Education, social support,

severity of medical conditions, and perceived stress. Age and gender are associated with MD but not to SD while the perceived health and trouble of affording food are associated with SD but no MD.

We also ran logistic regression analysis for MD compared to SD, and the results reveals that only age is statistically significant as shown in Table 3. Those with MD are likely to be younger than those with SD.

Discussion

This research replicates and extends upon a wealth of literature that responds to the theoretical and practical question of defining clinically significant depression. With our exploration of major depression and subthreshold depression in the subpopulation of low-income older adults receiving public CLTC, we furthered the support for the notion of a continuum of depression conditions based on our analyses of both symptom profiles and associative factors.

Expectedly, symptom profiles of non-depressed participants are quite different from participants with either SD or MD. Likewise, SD and MD were similar in terms of ranks of CES-D items by the frequency of respondents reporting that symptom, which is consistent with previous studies (Hybels et al., 2001; McCusker et al., 2005). The only statistically significant difference between MD and SD on CES-D items occurred with older adults with SD reporting more frequently having “felt fearful” than the older adults with MD. This finding is the only symptom-related factor that may distinguish MD from SD, and it may be indicative of the potential co-occurring symptoms of anxiety with SD, which would warrant further investigation, as recommended by other researchers (Mohlman et al., 2010).

The associative factors exhibited similar distinctions between older adults with MD and the non-depressed older adults and between older adults with SD and the non-depressed older adults. Like other literature, age was not associated with SD when controlling for other comorbid medical and functional factors, consistent with the findings of Hybels and colleagues (2001). Distinct from the Hybels and colleagues findings is the result that women in CLTC did have a higher risk of having MD when compared to the non-depressed group, yet gender was not significantly related to having SD when compared to the non-depressed. This dissimilarity may be attributable to difference between our sample receiving public CLTC and a community sample of Hybels and colleagues or it may be attributed to differential relationships along the continuum of depression by gender and income. Future investigation on this topic is needed. Our findings are consistent with stress models (Pearlin, Mullan, Semple, & Skaff, 1990) in that perceived stress and trouble affording food were significantly associated with depression. Findings also suggest that those with poor social support are at significant risk for depression, which is similar to prior research linking loneliness with late life depression (Barg, Huss-Ashmore, Wittlink, Murray, Bogner, & Gallo, 2006).

While some findings in different study settings are not consistent with our findings, the trend across studies is to provide empirical support for a continuum of depression in the subpopulation of older adults receiving public CLTC. The difference in associative factors found in our study could be attributed to public CLTC setting in which clients have low-incomes and high functional impairments. Our findings are particularly important for their relevance to CLTC since it is a growing service sector due to population aging, to the societal value of maintaining independent living, and to the increasing public policies and service programs that promote community living over institutional care (Doty, 2010). All CLTC systems offer assessment, service referral and linkages, and case management. Thus,

they fit the Institute of Medicine's definition of a setting for integrated care: their providers give first-contact care, conduct comprehensive assessments tapping the family and community context, and act as "gatekeepers" for the health, mental health, and psychosocial needs of frail older adults who coordinate referrals to specialty care (President's New Freedom Commission, USDHHS, 2003). Results of this study could inform screening criteria for depression in CLTC by demonstrating that a continuum of depressive disorders are related to deleterious associative factors—and that a range of prevention and intervention efforts may be beneficial.

Given its substantial prevalence in CLTC, SD needs to be identified and addressed. Identification of only older adults who meet criteria for MD would leave many older adults with substantial depressive symptoms undiagnosed and untreated. Thus, while research to advance the theoretical understandings of SD and MD is needed, especially considering the revisions underway to the Diagnostic Statistical Manual 5th Edition (Ayuso-Mateos, Nuevo, Verdes, Naidoo, & Chatterji, 2010), the wealth of empirical support for the continuum of depression does have clinical implications already. By looking at depression as a continuum, non-mental health service settings, such as CLTC, can use evidence to establish treatment protocols based on symptom profiles and associative factors. Clinical implications may include decisions around what associative factors to consider when identifying at-risk groups (e.g., medical and functional comorbidities, stress, and limited social support). Also, this research can clarify how degree of symptoms identified by standardized depression screening tools may inform the triaging of watchful waiting interventions, prevention efforts, and integrated mental health services in community-based settings (Frederick et al., 2007). This triaging of intensity of clinical intervention is important for resource constrained, non-mental health settings that face competing demands when trying to respond to depression (Morrow-Howell et al., 2008).

A few limitations should be considered with this study. First, although a variety of statistical tests were run to test whether MD is qualitatively different from SD, we could not run some important statistical tests because of the unavailability of our data. Thus, we were unable to explore how MD and SD differ in causal factors, prognosis, future incidence of episodes of major depression, or mental health service utilization, as was done in other research (Flett et al., 1997). Also, testing psychometric continuity via taxometric analysis is not possible in this study because the full range of depressive symptoms was not covered due to persons with CES-D scores ranging from 5 to 8 are not included in our sample.

A second limitation presents a caution about the representativeness of our sample. In spite of agency support for the study, case managers did not approach every potentially eligible client due to large caseloads, exacerbated by fiscal stress on the agency during the study period, spotty case manager resistance to study protocols, and perception by case managers that some clients could not participate in study protocols due to severe illness or very stressful circumstances. Although we requested anonymous data on clients not approached, these records were incomplete. State records lead us to estimate that 7,392 clients would have been eligible for the study, although case managers approached only 37.01% of eligible clients. State data indicated that the clients referred to the study were younger and were more likely to be African American than all clients eligible for the study during this timeframe (Morrow-Howell et al., 2008).

In conclusion, our findings lend support to the continuum notion of depression; that is, the idea that the symptoms and characteristics between SD and MD may differ in degree along a continuum. Identification of only older adults who meet criteria for MD would leave many older adults with substantial depressive symptoms undiagnosed and untreated. Our findings also confirm the significant role of stress, comorbidity, and social isolation in late-life

depression for both SD and MD. Findings may inform the identification of older adults suffering MD and significant depression symptomatology in diverse systems of community care, which are increasingly becoming settings for evidence-based depression prevention and intervention programs (Frederick et al, 2007). Finally, by understanding these similarities between MD and SD among CLTC clients, we can better advocate for financing depression interventions that match treatment intensity to clinical needs and outcomes (Unützer, Shoenbaum, Druss, & Katon, 2006). Reimbursement for depression care interventions may need to respond to the full continuum of depression and to demands for allocating mental health service interventions by depression severity.

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Table 1
Sample Description of Older Adults Receiving Public Community Long-Term Care by Depression Status

	Total (n = 610)	Non-Depressed (n = 315)	MD (n=74)	SD (n=221)	χ^2/F statistic ^c	p
Demographics						
Mean age (SD)	72.64 (8.07)	73.89 (7.72)	67.91 (7.14)	72.43 (8.22)	F(2; 607)=17.59	<.0001 ***
% Female	76.23	74.60	82.43	76.47	$\chi^2(2)=2.04$	.361
% non-white	27.38	27.94	22.97	28.95	$\chi^2(2)=8.23$	.663
Mean education (SD)	9.52 (3.05)	9.97 (3.00)	9.49(3.11)	8.88 (3.00)	F(2; 607)=8.62	.0002 ***
% Rural	57.05	58.10	52.70	57.01	$\chi^2(2)=7.11$	.701
% Married	23.93	26.03	14.86	23.98	$\chi^2(2)=4.105$	.128
% Living alone	53.93	52.70	60.81	53.39	$\chi^2(2)=1.628$	.443
Social Support						
Mean Duke Social Support Index ^a (SD)	26.76 (3.76)	28.03 (2.88)	24.32 (4.65)	25.76 (3.86)	F(2; 607)=47.74	<.0001 ***
Health						
Mean severity of medical conditions ^a (SD)	9.44 (5.18)	7.62 (4.30)	12.22 (4.97)	11.12 (5.43)	F(2; 607)=48.25	<.0001 ***
Mean functional impairments ^a (SD)	8.38 (3.91)	7.36 (3.92)	9.92 (3.18)	9.31 (3.71)	F(2; 607)=24.49	<.0001 ***
Mean perceived health ^b (SD)	3.12 (1.25)	2.64 (1.18)	3.59 (0.92)	3.63 (1.19)	F(2; 607)=55.02	<.0001 ***
Stressors						
% Trouble affording food	37.05	27.62	52.70	45.25	$\chi^2(2)=26.156$	<.0001 ***
Mean negative life events ^a (SD)	1.30 (1.36)	0.93 (1.10)	1.99 (1.67)	1.59 (1.42)	F(2; 607)=28.72	<.0001 ***
Mean perceived stress ^a (SD)	4.91 (3.13)	3.50 (2.63)	7.34 (2.57)	6.10 (2.99)	F(2; 607)=90.23	<.0001 ***

Note.

^a Higher score indicates more (i.e., social support, severity of medication conditions, functional impairments, negative life events, or perceived stress).

^b Perceived health was rated on a scale with *excellent* = 0 to *very bad* = 5;

^c *** comparison among the three groups, $p < .001$, ** $p < .01$, * $p < .05$

Table 2

Proportion of Participants Reporting CES-D Items by Depression Status (n=610)

Scale item		Non-Depressed		Rank	MD	Rank	SD	Rank	χ^2/t statistic ^a	p
Item 1	Bothered by things that don't usually bother me	% yes	14.29	5	67.57	9	64.71	9	$\chi^2(1)=.201$	.654
Item 2	Did not feel like eating; appetite poor	% yes	22.86	4	62.16	10	61.09	10	$\chi^2(1)=.027$	.869
Item 3	Felt I could not shake off the blues even with help	% yes	5.40	12	71.62	8	75.11	6	$\chi^2(1)=.35$	.552
Item 4	Felt I was just as good as other people	% no	4.76	14	17.57	20	18.10	20	$\chi^2(1)=.011$	.918
Item 5	Had trouble keeping my mind on what I was doing	% yes	12.70	6	79.73	4	70.59	8	$\chi^2(1)=2.344$	.126
Item 6	Felt depressed	% yes	7.30	10	89.19	1	90.05	1	$\chi^2(1)=.045$	.833
Item 7	Felt everything I did was an effort	% yes	37.46	1	87.84	2	89.14	2	$\chi^2(1)=.095$	.758
Item 8	Felt hopeful about the future	% no	12.06	7	37.84	16	34.84	17	$\chi^2(1)=.217$	.641
Item 9	Thought my life had been a failure	% yes	1.59	19	41.89	14	40.72	15	$\chi^2(1)=.031$	.860
Item 10	Felt fearful	% yes	4.76	14	37.84	16	52.49	13	$\chi^2(1)=4.763$	.029
Item 11	Sleep was restless	% yes	31.43	2	77.03	6	80.09	4	$\chi^2(1)=.317$	.573
Item 12	Was happy	% no	5.40	12	60.81	11	58.37	11	$\chi^2(1)=.136$	.712
Item 13	Seemed I talked less than usual	% yes	7.62	9	52.70	12	57.47	12	$\chi^2(1)=.511$	.475
Item 14	Felt lonely	% yes	11.75	8	79.73	4	78.28	5	$\chi^2(1)=.069$	.792
Item 15	People were unfriendly	% yes	3.49	17	20.27	19	20.81	19	$\chi^2(1)=.010$	.920
Item 16	Enjoyed life	% no	3.17	18	39.19	15	38.01	16	$\chi^2(1)=.033$	.857
Item 17	Had crying spells	% yes	3.81	16	52.70	12	49.32	14	$\chi^2(1)=.254$	.615
Item 18	Felt sad	% yes	7.30	10	83.78	3	86.88	3	$\chi^2(1)=.444$	.505
Item 19	Felt people disliked me	% yes	0.95	20	31.08	18	26.24	18	$\chi^2(1)=.651$	.420
Item 20	Could not get going	% yes	25.71	3	72.97	7	72.40	7	$\chi^2(1)=.009$	.924
Total	CES-D Score (0–20)	mean	2.22		11.58		11.61		$t(93.8)=.07$	.946

Note:

^aComparison between MD and SD groups

Table 3

Results of Logistic Regression Models Testing Associative factors to MD and SD

Associative factors	MD (ref. Non-Depressed)			SD (ref. Non-Depressed)			MD (ref. SD)		
	β	SE	p	β	SE	p	β	SE	p
Intercept	5.1941	3.0285	.087	1.6469	1.7401	.345	4.1262	2.150	.055
Demographics									
Age	-.0782	.0289	.007 **	-.0022	.0150	.881	-.0753	.0221	.0007 ***
Gender (female=1; male=0)	1.4827	.5891	.012 *	.3277	.2779	.238	.3460	.3827	.366
Race (white=1; non-white=0)	-.3291	.5021	.512	-.4226	.2891	.144	.4266	.3725	.252
Education	-.1826	.0687	.008 **	-.1486	.0393	.0002 ***	.0015	.0529	.977
Residential area (urban=1; rural=0)	-.2988	.4528	.509	-.2031	.2691	.450	.0920	.3489	.792
Marital status (married=1; else=0)	-.6489	.4911	.186	-.2503	.2716	.357	-.5863	.4041	.147
Social support									
Duke Social Support Index	-.2109	.0709	.006 **	-.1689	.0455	.0009 ***	-.0526	.0362	.146
Comorbidity									
Severity of medical conditions	.1239	.0460	.007 **	.0671	.0261	.010 *	.0204	.0297	.493
Functional impairments	.1170	.0629	.066	.0589	.0364	.110	.0567	.0470	.229
Perceived health	.2560	.2019	.205	.5353	.1092	<.0001 ***	-.2364	.1428	.098
Stressors									
Trouble of affording food	.6547	.4137	.114	.6751	.2391	.005 **	.0129	.2963	.965
Negative life events	.3550	.1569	.025	.1834	.0942	.052	.0715	.1050	.496
Perceived stress	.3330	.0868	.0008 ***	.2292	.0462	<.0001 ***	.1153	.0584	.049
Fit statistics ^a	-2logL=190.372			-2logL=494.534			-2logL=294.002		
Likelihood ratio test ^b	$\chi^2(13)=188.171$ ***			$\chi^2(13)=231.949$ ***			$\chi^2(13)=38.324$ ***		

Note.

^aFit statistics and likelihood ratio tests were based on the result of the first imputed data and parameter estimates came from the combined results of the five imputed datasets.^b***p<.001, **p<.01, *p<.017