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Prevalence, clinical and psychosocial variables of depression, anxiety and suicidality in geriatric tertiary care settings

Nahathai Wongpakaran[a,*], Tinakon Wongpakaran[a], Peerasak Lerttrakarnnon[a], Surin Jiraniramai[a], Thanitha Sirirak[b], Sawitri Assanangkornchai[b], Unchulee Taemeeyapradit[c], Nopporn Tantirangsee[c], Surang Lertkachatarn[d], Suwanna Arunpongpaisal[e], Pimolpun Kuntawong[a]

[a] Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand
[b] Faculty of Medicine, Prince of Songkla University, Songkhla, Thailand
[c] Songkhla Rajanagarindra Psychiatric Hospital, Songkhla, Thailand
[d] Prasat Neurological Institute, Bangkok, Thailand
[e] Faculty of Medicine, Khon Kaen Univerity, Khon Kaen, Thailand

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ABSTRACT

Objective: The study investigated the prevalence of depressive and anxiety disorders and suicide risk in geriatric outpatients in tertiary care hospitals.

Materials and methods: An observational, cross-sectional study was conducted with 803 participants aged 60 and above attending geriatric outpatient clinics in tertiary care hospitals in Thailand. Participants were assessed using DSM-IV-TR criteria to calculate the prevalence of deressive and anxiety disorders, and their suicide risk. Montreal Cognitive Assessment (MoCA), Perceived Stress Scale (PSS), Multidimensional Scale of Perceived Social Support, Core Symptom Index (CSI), 15-item Geriatric Depression Scale (GDS-15), Neuroticism Inventory (NI) and the Revised Experience of Close Relationships Questionnaire (ECR-R) were administered. Quality of life was assessed using the EuroQoL (EQ-5D).

Results: The prevalence rate for depressive disorders was 23.7%, anxiety disorders was 6.4%, and current suicide risk was 20.4%. PSS, MSPSS, GDS, CSI, and NI scores were significantly higher in all clinical disorders and a suicide group compared with nonclinical subjects. MoCA and ECR-R did not differentiate between clinical disorder and nonclinical samples. Comparing all four outcomes, the EQ-5D differed most in the mixed depressive-anxiety disorder and nonclinical groups ($t = 12.20$, $p < .001$).

Conclusion: The present findings revealed a high prevalence of depression, anxiety and suicidality among elderly patients attending tertiary care hospitals. Perceived stress, perceived social support, and neuroticism scores were significantly higher in this group. Role of sociodemographic, clinical and psychosocial variables as risk factors for these clinical disorders should be further examined.

1. Introduction

Depressive disorders, anxiety disorders and suicidal risk (DAS) are common and important comorbid conditions for elderly. They impact not only on an individual's quality of life but also contribute to caregiver burden. Late-life depression is a risk to compromised physical health and disability leading to a strained healthcare system. (Han, 2002; Lee et al., 2012; Lenze et al., 2001) Although depression is common among the elderly, estimating its prevalence is rather difficult. Factors associated with this challenge include the determined age for 'elderly', eg, ≥ 60 or 65 years old, as well as characteristics of the studied population, site of the study, screening tools and diagnostic criteria used and research design and method, eg, what variables to be included).

The prevalence of depressive disorders has been found to increase by age. One Australian study, using the age of 60 and older found the prevalence ranged from 1% to 34.4% (David C. Steffens et al., 2009). The prevalence of depression and depressive symptoms conducted

* Corresponding author at: Geriatric Psychiatry Unit, Department of Psychiatry, Faculty of Medicine, Chiang Mai University, 110 Intawaroros Rd., Tambon Sriphum, Amphoe Muang, Chiang Mai, 50200, Thailand.
E-mail address: nahathai.wongpakaran@cmu.ac.th (N. Wongpakaran).

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among adults aged 65 years old and higher was estimated between 0.9% and 42%; when clinical cases were identified, prevalence ranged between 7.2% and 49.0% (Djernes, 2006).

A systemic review and meta-analysis conducted among the elderly aged 75 years old or higher found a prevalence of 4.6% to 9.3% for major depression and 4.5% to 37.4% for depressive disorders- the pooled prevalence was 17.1 for depressive disorder. Likewise, a prevalence was found from 20% to 25% and about 30% to 50% among individuals aged 85 years and older and among individuals aged 90 years and older, respectively (Leach, 2012; Luppa et al., 2012). In Thailand, a study of prevalence of late-life depression using standardized clinical interviews has rarely been reported. One study of the prevalence among Thai elderly was conducted, using Patient Health Questionnaire-9 as a screening tool revealing a prevalence of 5.9% for depressive disorders (Wongpoom et al., 2011).

Anxiety disorders among the elderly are notably less common than among younger adults although it has a prevalence about 1 to 28% (Bryant et al., 2008). Studies in the US found a prevalence rate of 1 to 28% for generalized anxiety disorder (GAD)(Lenze, 2003) while only 2.8% was reported GAD among the general population (Gonçalves et al., 2011). However, anxiety disorders are usually comorbid with depressive disorders, and GAD was reportedly the most common anxiety disorder (Salzman, 2004). In Thailand, we have observed anxiety disorders at long term care facilities (N. Wongpakaran and Wongpakaran, 2012). As noted previously, prevalence rates can vary even though the rate of anxiety disorders seems to be lower than depressive disorders. Factors associated with a low incidence of anxiety disorders may be related to misinterpreted physical symptoms representing anxiety disorders as some kind of physical illness (Andreescu et al., 2007). Moreover, screening tools to diagnose anxiety disorders were mostly developed for younger adults and may be unsuitable for use with the elderly.

For suicide risk among the elderly, the prevalence also varied. In the past 50 years, the suicide rate around the world did not decrease, on the contrary, research has revealed that elderly have plans for suicide and have attempted suicide more than younger people (Demirçin et al., 2011).

In Thailand, the average reported suicide rate is 7.9 per 100,000 from 1998 to 2003(Lotrakul, 2006). However, we lack data specific to the elderly group. A report concerning suicide among the elderly in a long term care setting found one third of the residents had considered suicide according to the suicidality module of the International Neuropsychiatric Interview-MINI, even though the level of risk was low (N. Wongpakaran and Wongpakaran, 2012). Risk factors associated with suicide included physical illness, functional impairment, social ties and their disruption. In addition, personality risk factors included rigidity, anxiety and obsession (Conwell et al., 2002) as well as neuroticism (McCann, 2010). Moreover, loss of a significant person, anxiety symptoms, anxiety disorders and social isolation were common risk factors for suicide (Ciulla et al., 2014; Turvey et al., 2002; Voshaar et al., 2015; Wahlin et al., 2015). Although cognitive impairment was found to be related to suicide risk, it has not been reported among the elderly (Lara et al., 2015).

Thailand, like many countries, is now considered an 'aging society', and elderly issues are huge and challenging. Although research has been carried out using multidisplinary approaches on mental health problems, clinically standardized diagnostic methods concerning the main problems related to DAS risk are still greatly needed. In addition, studies on psychosocial risk variables associated with depression, anxiety and suicide are important and worth conducting because these factors may differ according to societal and cultural contexts. Hence, the aim of the present study was to explore the prevalence of DAS as well as baseline clinical and psychosocial characteristics among older adults attending tertiary care hospitals.

2. Material and methods

2.1. Participants and and procedures

The DAS project was a multicentered, prospective cohort study conducted in four tertiary care hospitals across Thailand between January 2012 and April 2013. Participants were enrolled from the geriatric departments of four tertiary hospitals. The enrollment criteria required participants to present a new case of either of three disorders, age 60 years or more, have the ability to communicate orally in Thai, volunteered to participate in the study and must have had at least one of the following symptoms: dysphoric mood, feelings of boredom, sleep problems, eating problems, fatigue, memory problems or unexplained somatic symptoms. The exclusion criteria included having any physical illness that significantly affected the interview or completing of questionnaires, ie, dyspnea or disorientation, severe substance addiction, language barriers or inability to complete the questionnaires. In addition, having a history of schizophrenia or bipolar disorder or schizoaffective disorder were also exclusion criteria. Sample size determination for proportion was applied in this study. According to related reports, the prevalence rate of depressive disorders was 25% ($p = 0.25$); α was set at 0.0, and margin of error (e) was 3%. Using these required parameters yielded an estimated sample size of 800. Consecutive sampling was used until the desired sample size had been recruited.

Enrolled participants were interviewed by trained research assistant nurses to diagnose DAS using the Mini-Neuropsychiatric Interview for DSM-IV-TR (Kittirattanapaiboon and Khamwongpin, 2004). To diagnose dysthymia, the dysthymic module of the SCID-I was administered instead due to a low interrater reliability coefficient of the dysthymia module of the Thai version of the MINI. All participants were also examined for brief cognitive function. Along with interviews, eligible participants were asked to complete self-reported questionnaires, whereas their caregivers were asked to evaluate relationships and experiencing burden in caring for their respective patients.

This study was approved by independent institutional review boards at all four sites. Written consent forms were obtained from the subjects before they participated.

2.2. Instruments

2.2.1. Mini-international neuropsychiatric interview

The International Neuropsychiatric Interview (M.I.N.I., 5.0.0) (Sheehan et al., 1998) is a semi-structured interview used to diagnose psychiatric disorders according to the DSM-IV. For depressive disorders, the kappa ranges between 0.27 and 0.87 in the Thai version. Suicide was assessed using Module C of the M.I.N.I. to determine the risk of suicide, categorized as either "at risk" or "without risk". The severity of suicide was also described by degree of suicide risk (low, moderate or high) (Kittirattanapaiboon and Khamwongpin, 2004).

2.2.2. Structured clinical interview for DSM-IV diagnosis axis I disorders (SCID-I/P)

The SCID-I/P was added to evaluate dysthymia only due to the low reliability of the Thai MINI of the dysthymic module. The inter-rater reliability among raters was close to 1.0 before using. SCID I show a reliability from 0.35 to 0.81(First et al., 2002).

2.2.3. Montreal Cognitive Assessment (MoCA)

The MoCA (Nasreddine et al., 2005) evaluates 11 domains of cognitive function, and is used to measure mild cognitive impairment (MCI) encompassing a total score of 30. The Thai version uses a cut-off score of 25. The Cronbach's alpha coefficient is 0.74, with sensitivity and specificity of 0.70 and 0.95 for MCI respectively (Hemrungrojn, 2011).

2.2.4. Hamilton Depression Rating Scale -7(HAMD7)

The severity of depression was assessed using the Hamilton Depression Rating Scale -7(HAMD7) (McIntyre et al., 2005), a 7-item, 4-level rating scale assessing the severity of depressive symptoms ranging from 1(most severe) to 4 (normal). GRID version) was used.

2.2.5. Psychosocial tools

Self-reported measurements were used to evaluate symptoms perceived by the participants. These included the Thai version of **Geriatric Depression Scale (GDS)** (N. Wongpakaran and Wongpakaran, 2012) – a 15-item, true-false type assessment of depressive symptoms among the elderly, the **Core Symptom Index (CSI)**(N. Wongpakaran and Wongpakaran, 2012), a measurement screening for anxiety, depression, and somatization tested in an elderly population demonstrating sound psychometric properties, the Thai version of **EuroQoL-5 Dimension (EQ-5D)** – a five-item standardized quality of life questionnaire assessing mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Both the EQ-5D descriptive system and visual analog scale (EQ VAS) ranging from 0 (worst imaginable health state) to 100 (best imaginable health state) were administered (The EuroQol Group, 1990; Tongsiri, 2009). The psychosocial measurement tools used in this research included a Thai version of **Multi-dimensional Scale of Perceived Social Support (MSPSS)**, a 12-item, 7-level Likert scale self-reporting tool measuring the extent to which a participant perceives social support from three sources: significant others, family members and friends, (T. Wongpakaran et al., 2017; Zimet et al., 1990) and **Perceived Stress Scale (PSS)**, a 10-item, 5-level Likert scale self-reporting tool evaluating the extent to which a participant perceives stress (Cohen et al., 1983; N. Wongpakaran and Wongpakaran, 2010). For personality trait, two measurements used were the **Neuroticism Inventory (NI)** (Tinakon Wongpakaran and Wongpakaran, 2013) and the revised **Experience of Close Relationships Questionnaire (ECR-R)**(T. Wongpakaran et al., 2011). NI was a 26-item, 4-level Likert scale self-reporting inventory measuring the extent to which a participant possesses traits of neuroticism. To investigate close relationship experiences, the ECR-R-18 that measures the attachment anxiety and attachment avoidance was used. All measurements demonstrated good reliability and validity.

2.3. Statistical analysis

A descriptive analysis of variables was used to determine prevalence rates with 95% confidence interval. Sociodemographic, clinical and psychosocial variables were reported as mean and standard deviation, frequency and percentage. Relationships among variables were calculated using Pearson's correlation, Spearman's correlation, and t-test. Clinical and psychosocial variables were analyzed for each outcome separately, ie, depressive, anxiety and mixed depressive-anxiety disorders and suicide risk. Statistical significance was established at a level of 0.05. IBM SPSS, Version 22 was used for all analyses.

3. Results

Among 1514 participants who enrolled, only 106 (7%) refused the invitation. A total sample of 803 (57%) was eligible and interviewed to diagnose DAS using the trained research assistant nurses. Along with the interviews, 794 eligible participants (98.9%) completed the self-reported questionnaires.

Table 1 shows that most participants were female (70%), aged 69 years old on average, had 6 years of education, and lived with their spouse. Most were poor with annual incomes of 1800 USD. Regarding DSM-IV clinical diagnoses, 23.66% (95%CI = 20.72%–26.61%) received a diagnosis of depressive disorder; most were major depressive disorder (MDD) (17%). For anxiety disorders, the prevalence rate was 6.4% (95%CI = 4.6%–8.1%); the most prevalent anxiety disorders was generalized anxiety disorder (GAD), 3%. Among them, 30.0% (95%CI

Table 1
Demographic data of respondent patients (n = 803).

Characteristics	N (%)
Age, Mean ± SD (min-max)	69.24 ± 6.88 (60-89)
Sex	
Male	239 (30)
Female	557 (70)
Education (Years of study), Mean ± SD	6.63 ± 4.9
Marital status	
Single	29 (3.61)
Live together	509 (63.39)
Divorced widow	36 (4.48)
Widowed spouse	228 (28.39)
Income (USD/month)*	
< 143	469 (59.4)
143-285	110 (13.9)
286-572	114 (14.4)
> 572	96 (12.2)
History of illness	
Alcoholism or abuse	9 (1.2)
Suicide attempt	11 (1.7)
Other psychiatric diseases	55 (8.7)
Family history	
Alcohol or other substance abuse	21 (2.6)
Bipolar disorder	0 (0)
Cognitive disorders	5 (0.6)
Depressive disorders	18 (2.2)
Other disorders (schizophrenia, autism, anxiety disorder)	23 (2.9)
DSM-IV clinical disorder	
Depressive disorder	
Major depressive disorder	138 (17.19)
Dysthymia	40 (4.98)
Double depression	12 (1.49)
Total	190 (23.66)
Anxiety disorder (any AD)	51(6.4)
Generalized anxiety disorder	24(3.0)
Panic disorder (current)	15 (1.87)
Panic disorder (life-time)	14 (1.74)
Agoraphobia	14 (1.74)
Social phobia	3 (0.37)
Posttraumatic stress disorder (PTSD)	7 (0.87)
Obsessive-compulsive disorder	6 (0.75)
Mixed depressive-anxiety disorder	241(30.0)
Others	
Hypomanic (past)	18(16.5)
Hypomanic (current)	10(9.2)
Alcohol abuse and dependence	9 (1.12)
Substance abuse and dependence	3(0.37)
Current suicidal risk	
Yes	180 (22.6)
No	617 (77.4)
Degree of current suicide risk (n = 180)	
-Low (score 1-5)	154 (85.6)
-Moderate (score 6-9)	7 (3.8)
-High (score ≥ 10)	19 (10.6)
Previous suicidal attempt (lifetime)	30 (3.8)
Current suicidal risk item	
-Better die or want to die	164 (20.5)
-Want to hurt oneself	26 (3.3)
-Suicidal ideation	25(3.1)
-Suicidal plan	15(1.9)
-Suicidal attempt	8 (1)
MoCA, mean(SD), median, min-max	16.12(5.2),16, 0-28
Psychosocial variable, Mean ± SD	
GDS	4.71 ± 3.43
PSS	11.44 ± 7.19
CSI	28.29 ± 8.31
ECR-R (avoidance)	3.74 ± 1.16
ECR-R (anxiety)	2.12 ± 1.89
MSPSS	58.29 ± 16.54
EQ-5D index value	0.799 ± 0.17
EQ-5D visual analog scale	80.00 ± 18.30
NI Mean ± SD	43.43 ± 12.72

SD = standard deviation, CSI = Core Symptom Index, PSS = Perceived Stress Scale, ECR-R = Revised Experience of Close Relationship Questionnaire, MSPSS = Multidimensional Scale of Perceived Social Support, EQ-5D = EuroQoL-5 dimension, NI = Neuroticism Inventory, * 1 USD = 35 THB.

= 26.8%–33.2%) had comorbid depressive and anxiety disorders including posttraumatic stress disorder and obsessive-compulsive disorder. The subjects reported current suicidal risk at 20.4% (95%CI = 17.7%– 23.2%), but most were mild form (19.3%).

Regarding chief complaints, memory problem was the most common (65.03%), followed by sleep problems (64.23%), fatigue (32.32%), feeling bored (29.80%), feeling sad (24.50%), poor appetite (21.21%) and unexplained somatic complaint (12.37%).

Table 2 shows the differences of the scores among psychosocial variables between clinical and nonclinical groups. Only ECR-R (both anxiety and avoidance) exhibited no difference among all groups ($p > .05$). For depressive disorders, all variables were significantly higher in the depressive than in the nondepressive groups (all $ps < .01$).

4. Discussion

The prevalence of depressive disorders was in line with what had been reported in other countries, and was, as expected, higher than one related Thai study using self-reported PHQ-9 as a screening tool. Our results were close to the prevalence rate previously reported in a long term care facility (24%) (N. Wongpakaran and Wongpakaran, 2012). This may have been because the long term care setting in Thailand is more similar to residential care rather than a nursing home, in which a high prevalence of depressive disorders was usually found (Blazer, 2013).

Our results were also supported by Forlani et al's (Forlani et al., 2014) study that found the prevalence of depressive disorders was 25.1% in communities, using the Tenth Revision criteria of International Classification of Diseases. The higher rate found in the community in this study may have stemmed from the different measurements used. In Chen et al's study, the revised Cambridge Examination for Mental Disorders of Elderly Persons (CAMDEX) (Roth et al., 1999) was applied. This measure may have included more participants with memory problems or Alzheimer's disease than those of the present study. Compared with a previous multicentered study across Thailand using similar method and tools but conducted in adult (THAISAD), the elderly sample showed a lower proportion of MDD among all depressive disorders (72.65 in the present finding vs. 88.8% in a related sample of adults), which was consistent with other related studies that the rate may be influenced because older adults' subthreshold depression was twice as prevalent as major depression (C.-T. Lee et al., 2016; Meeks et al., 2011).

A high prevalence of anxiety disorders was observed in this study (6.4%) compared with that in the study of Prina et al, (Prina et al., 2011) conducted using a large sample size in many countries, where the distribution rate ranged from 0.2% to 2.3%. For The present study found depressive disorders combined with anxiety disorders (5.1%) were higher than those of Prina et al's study. Moreover, Braam et al. (2014) observed anxiety symptoms at 67% for those with subthreshold depression and at 87% for those with depressive disorders. However, as in Prina et al's study, Braam et al's used the Geriatric Mental State Examination and Automated Geriatric Examination for Computer Assisted Taxonomy to diagnose depressive and anxiety disorders. The difference between measurements used in this study and related studies could have contributed to the different rates reported.

The current study found a prevalence of 22.4% regarding suicide risk, although it was mostly low risk. The present study's finding was higher that one study in Brazil using the same measurement of MINI (Ciulla et al., 2014). This high prevalence rate may have resulted from being conducted in a tertiary mental care hospital, which tended to exhibit more severe cases than those in community or general hospitals. In addition, related research has shown that the elderly were more likely to accept and report suicidal thoughts than younger people (Bertolote and Fleischmann, 2002).

Compared with a study among adults with depressive disorders, depressed elderly subjects reported less perceived stress but more perceived social support. Older adults of this sample also experienced a higher quality of life using the same EQ-5D both on index score and visual analog scale than younger adults in our previous study (0.799(SD,0.17) vs. .511(SD,0.23) and 80.00% (SD, 18.30) vs. 50.62% (SD,23.05), respectively) (T. Wongpakaran et al., 2014). This information may reflect the positive aspect of psychosocial factors impacting these elderly with depressive disorder.

Comparing clinical and psychosocial variables on all clinical disorders/conditions, neuroticism was related to all clinical disorders/conditions, especially depressive disorders. This was consistent with findings regarding relationships among the elderly. Not only is neuroticism related to developing depressive disorders but also to remission after treatment (D. C. Steffens et al., 2017; Weber et al., 2013; N. Wongpakaran et al., 2012).

Those elderly with depressive disorders clearly demonstrated a higher score on the PSS than groups without depressive disorders, which was consistent with related reports (Chao, 2014; Wiegner et al., 2015) including Zannas et al. (2012). Some investigators have considered perceived stress as an external risk factor for anxiety disorders among the elderly as it relates to physical illness, disability, spouse discomfort etc. In addition, perceived stress is a long term predictor of anxiety disorders (Tampi and Tampi, 2014). Despite that significant relationship, we believe, to the best of our knowledge that this was supported by the research conducted in Thailand.

Perceived social support is deemed a vital variable for mental health especially depressive, anxiety disorders, and suicide (Ng et al., 2015; Xu and Wei, 2013). We found that low perceived social support was a risk factor of depressive disorders among elderly. This was consistent with a long term research project conducted in the Netherlands, (Fichtner and Hirschmüller, 1985) reporting that people lacking mental support were likely to develop depressive disorders. The same results were observed in Brazil in that depressive disorders were associated with being alone and experiencing a lack of perceived social support (Alexandrino-Silva et al., 2011).

It was observed that social support mediated variables influencing depressive and anxiety disorders after treatment, affected depressive disorders more than anxiety disorders(Dour et al., 2014). This result could have led to clinical implications of raising social support in preventing both depressive and anxiety disorders.

In terms of symptoms reported by patients, as expected, depressive or anxiety disorders were related to CSI and GDS scores. GDS was not associated with anxiety disorders implying that these elderly with anxiety disorders tended to have pure anxiety symptoms, unrelated to depression.

Suicide risk was associated with GDS score. This reflected that suicidal thoughts or plans may be related to the depression experienced by patients rather than depressive disorders diagnosed by clinicians. This population group may be categorized as presenting subsyndromal depressive disorders, adjustment disorders or minor depression (Liu and Chiu, 2009). A self-reported GDS may be helpful in screening for these dangerous conditions, despite the fact the GDS contained no item directly addressing suicidality.

In contrast to related studies, none of attachment anxiety or attachment avoidance cases was related to any of the clinical disorders and suicide risk (Conradi et al., 2018). However, they did relate to depression reported by patients (using GDS and CSI depression). We assumed that self-reported depression was more likely to correlate better than clinician rated depression. In addition, the association would be difficult to detect because the correlation was relatively low.

Table 2
Mean and SD of psychosocial factors according to each disorder.

Variables	Depressive			Anxiety			Mixed Anxiety-dep			Suicidal risk		
MoCA	Yes (n = 190)	No(n = 608)	*t*	Yes (n = 51)	No(n = 747)	*t*	Yes (n = 241)	No(n = 556)	*t*	Yes (n = 179)	No(n = 612)	*t*
	15.50(5.5)	16.33(5.1)	−1.692	15.31(5.8)	16.24(5.1)	−1.236	15.85(5.5)	16.31(5.0)	−1.107	15.92(5.6)	15.50(5.3)	0.52
	Yes (n = 181)	No(n = 601)		Yes (n = 48)	No(n = 734)		Yes (n = 231)	No(n = 550)		Yes (n = 173)	No(n = 602)	
GDS	7.16 (4)	3.83 (2.7)	12.084***	7.48 (4.2)	4.53 (3.3)	5.887**	8.95 (4)	4.5 (3.3)	7.993***	9.59 (3.4)	5.8 (3.7)	7.082***
	Yes (n = 181)	No(n = 597)		Yes (n = 48)	No(n = 370)		Yes (n = 231)	No(n = 546)		Yes (n = 177)	No(n = 595)	
CSI	33.87 (9.7)	25.97 (6.1)	12.282***	37.89 (10.8)	27.66 (7.7)	8.651***	40.44 (10.9)	27.64 (7.6)	9.960***	38.56 (10)	31.98 (9.7)	4.477***
	Yes (n = 183)	No(n = 597)		Yes (n = 50)	No(n = 730)		Yes (n = 233)	No(n = 546)		Yes (n = 173)	No(n = 600)	
PSS	17.1 (7.2)	9.31 (5.9)	13.703***	18.50 (7.08)	10.95 (6.99)	7.427***	20.46 (6.3)	10.95 (6.9)	8.416***	19.81 (7.1)	15.84 (6.7)	3.837***
	Yes (n = 49)	No(n = 70)		Yes (n = 13)	No(n = 106)		Yes (n = 59)	No(n = 60)		Yes (n = 28)	No(n = 88)	
ECR-R (avoidance)	3.7 (1.1)	3.69 (1.2)	0.06	4.05(0.8)	3.70 (1.2)	1.027	3.96 (0.8)	3.72 (1.2)	0.599	3.8 (0.9)	3.67 (1.3)	0.384
	Yes (n = 48)	No(n = 69)		Yes (n = 12)	No(n = 105)		Yes (n = 57)	No(n = 60)		Yes (n = 26)	1.98 (1)	
ECR-R(anxiety)	2.14 (1.2)	2.04 (1.1)	0.441	2.55 (1.1)	2.08 (1.1)	1.371	2.38 (1.2)	2.11 (1.1)	0.649	No(n = 88)	2.31 (1.3)	−0.923
	Yes (n = 184)	No(n = 595)		Yes (n = 50)	No(n = 730)		Yes (n = 234)	No(n = 544)		Yes (n = 174)	No(n = 599)	
MSPSS	51.03 (16.1)	60.86 (15.9)	−6.689***	51.80 (16.7)	58.74 (16.4)	−2.883**	52.08 (17.2)	58.65 (16.4)	−2.426*	48.04 (16.9)	53.71 (15.4)	−2.364*
	Yes (n = 179)	No(n = 587)		Yes (n = 49)	No (n = 717)		Yes (n = 227)	No(n = 538)		Yes (n = 170)	No(n = 589)	
NI												
	52.08 (11.5)	40.11 (11.3)	11.246***	54.90 (11.5)	42.66 (12.4)	7.179***	58.3 (10.7)	42.62 (12.3)	7.890***	57.35 (10.2)	49.79 (12)	4.483***
	Yes (n = 188)	No(n = 610)		Yes (n = 51)	No(n = 747)		Yes (n = 239)	No(n = 558)		Yes (n = 178)	No(n = 613)	
EQ	.699(.14)	.830(.16)	−11.160***	.666(.10)	.801(.17)	−6.011***	.705(.14)	.839(.16)	−12.20***	.760(.17)	.810(.17)	3.542***
EQ vas	No(n = 602)	Yes (n = 187)		Yes(n = 51)	No (n = 738)		No(n = 551)	Yes (n = 237)		No(n = 178)	70.04(16.8)	
	66.32(20.45)	80.21(16.23)	−8.494***	61.16(20.2)	78.01(17.7)	−6.528***	67.48(19.9)	80.99(15.9)	−9.25***	Yes (n = 604)	79.02(16.75)	5.194***

MoCA = Montreal Cognitive Assessment, GDS = Geriatric Depression Scale, CSI = Core Symptom Index, PSS = Perceived Stress Scale, ECR-R = Revised Experience of Close Relationship Questionnaire, MSPSS = Multidimensional Scale of Perceived Social Support, Neuroticism Inventory.
***p ≤ .001.
**p < .01.
*p < .05.

The fact that MoCA was not associated with depressive disorder could be because the depressive disorder group was minimized in severity because all levels of depressive severity were included (not only major depressive disorder).

4.1. Strengths and limitations

To the best of our knowledge, the present study included multi-centers with a large sample size of elderly patients using standardized measurements. It was perhaps the first study concerning the prevalence and associated factors particularly psychosocial variables observed in tertiary care hospitals. Recognizing and including all these psychosocial variables greatly benefits clinical implications as they establish a method to modify these psychosocial variables compared with not modifying sociodemographic variables.

However, this study had some limitations to be addressed here. First, this cross-sectional study could not conclude a causal relationship between potential predictors for the occurrence of the disorder; a long-term study may help clarify this relationship better. Second, we did not categorized types of depression, which may have presented a different risk factor association. Therefore, certain types of depressive and anxiety disorders need to be specified. Third, specific age ranges should be examined separately for the next analysis. Finally, many psychosocial assessments were based on self-reporting implying bias from respondents' interpretations of the questionnaire items.

5. Conclusion

The prevalence of depressive and anxiety disorders and suicide risk were comparable and higher than those reported in related studies. This was mostly because study sites comprised tertiary care hospitals. Psychosocial variables provided us a greater understanding related to their clinical circumstance concerning these disorders/conditions.

Author contributions

All authors have contributed to conception and participated on the protocol designed. All authors but SA performed data collection. TW and NW have participated on the analysis of the available data. NW and TW drafted the manuscript and the rest authors revised it critically for important intellectual content. All authors read and approved the final manuscript.

Disclosure

The author reports no conflicts of interest in this work.

Conflicts of interest

The author reports no conflicts of interest in this work.

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