Prevalence of depression among inpatients and outpatients and key associated sociodemographic and clinical factors, 2010 - 2022: A systematic review

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Abstract

Depression has a higher prevalence than other mood disorders, and the disability it causes is a global burden. Although mental health is an essential component of normal functioning and health, mental disorders such as depression are neglected. The study aimed to summarize the prevalence of depression, gender differences, and associated factors in inpatients and outpatients. A systematic review approach was used, whereby the PubMed, Google Scholar, and Scopus electronic databases were searched for studies published between the years 2010 and 2022 to identify observational studies with the above information on different continents. Data characteristics were extracted independently by two investigators. After scanning and evaluation, 52 articles were initially identified. After further screening, 28 articles were reviewed for the study. These 28 cross-sectional studies included a total of 46979 individuals. From the literature reviewed, common factors associated with depression included demographic characteristics, biopsychosocial factors, substance abuse, a history or family history of mental illness, and a history or family history of chronic illness. Women were more prone to depression than men (54.9%). In terms of geographical location, the prevalence of depression was highest in North America at 36.0% and lowest in Europe at 25.0%. Further studies are needed to evaluate the prevalence of depression and associated factors specific to other geographical locations.

Keywords**:** *Depression, Family history, Prevalence, Biopsychosocial factors.*

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Introduction

The American Psychiatric Association defines depression as 'A common and serious mental illness that negatively affects how you feel, the way you think, and how you act. Depression exhibits feelings of sadness and/or a loss of interest in activities that one once enjoyed (American Psychiatric Association, 2013). 'Depression can result in emotional and physical problems at work, at school or home' (Negewo, Debocho, Guteta, 2020). It is the leading cause of disability worldwide and is a major contributor to the overall global burden of disease. 'Depression ranges from mild to moderate and severe states (Siyoum, Assfaw, Yitbark, Tesfaw, 2021).

The exact cause of depression is not known, but it is believed that biological factors such as physical changes in the brain, hormonal changes, and inherited traits contribute to its development (Abuladze, Opikova, Lang, 2020). Among the potential causes of depression, genetics, brain chemistry, certain medical conditions, substance use, stress, and poor nutrition

have been identified as factors that trigger the development of depression (Limone, Toto, 2022). In terms of genetics, an individual is more likely to experience depressive symptoms or to suffer from depression if others in their family suffer from depression or other mood disorders (Remes, Mendes, Templeton, 2021). It is estimated that depression is determined by genetics in approximately 40% of cases, although the genes for depression remain unclear. Additionally, brain chemistry plays a role in the progression of depression when there is an imbalance in neurotransmitters involved in mood regulation such as dopamine, serotonin and norepinephrine, (Schimelpfening, 2022), while studies show that some medical conditions and chronic illnesses (diabetes mellitus, chronic pain, multiple sclerosis, cancer), sleep disorders and thyroid conditions predispose to depression (Wang, Wu, Lai, 2017). Despite a range of literature on depression and the factors associated with it, there are no continental distribution data because most studies are conducted in isolated parts of the continent. Also, although the criteria for the diagnosis of depression are standardized internationally, its prevalence, factors associated with it, awareness, and attitudes towards it differ between reporting countries on the same continents. More studies in the field should, therefore, be conducted to create awareness, identify literature gaps, and identify factors associated with depression, as this can aid in reducing the global burden of depression.

2. Methods

2.1 Literature search

Relevant studies published between 2010 and 2022 described the prevalence of depression or depressive symptoms in patients from different inpatients in different medical specialties and outpatients (the two main clinical settings in patient care) in the general population were identified using PubMed, PsycINFO, Google Scholar and Scopus. The selected articles were then screened by title, abstract and reference list using the approach recommended by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines. Initially, relevant papers were identified through title and abstract searches. The full text of the retrieved articles was then assessed. The objective of the search strategy was to identify studies reporting prevalence rates and determine sociodemographic and clinical factors linked to depression in inpatients in different medical specialities, outpatients in the general population and involved applying the 'explode' command to search MeSH (Medical Subject Headings) terms such as "prevalence and depression", "inpatients and outpatients" and "sociodemographic and clinical factors". In addition, relevant synonyms such as "incidence, frequency, hospitalised, non-hospitalised, age, gender, socioeconomic status, ethnicity, education, comorbidities, treatment history, severity, duration" were used. The combined terms were related to ("depression" AND "prevalence") OR ("depression" AND "incidence"), ("inpatient" OR "hospitalised" OR "patient") AND ("outpatient" OR "non-hospitalised") ("sociodemographic" OR "socioeconomic" OR "demographic") AND ("clinical factors" OR "comorbidities" OR "severity").

2.2. Inclusion criteria

The study inclusion criteria were as follows: (*i*) articles that included patients diagnosed with pre-existing medical condition other than psychiatric disorders (*ii*) articles in peer-reviewed journals that included only patients with a current degree of clinically relevant depression

sufficient to warrant clinical intervention, regardless of the depression severity (mild, moderate or severe); (*iii*) studies in which depression was confirmed by validated self-report instruments or diagnostic structured interviews; (*iv*) articles with study populations who were recruited from outpatient clinics only; and (*v*) articles in English only.

2.3. Exclusion criteria

The exclusion criteria were as follows: (*i*) studies that failed to report the specific prevalence of depression; (*ii*) studies on patients whose depression predated any other physical disorder; (*iii*) studies on patients diagnosed with more than one psychiatric disorder (in addition to depression); and (*iv*) studies that were conducted before 2010.

2.4 Research question: What are the prevalence rates of depression among inpatients and outpatients within a clinical setting, and what are the key sociodemographic and clinical factors associated with it between 2010 and 2022?

To assess the heterogeneity of prevalence among studies, the following formula was used (Potone et al., 2015).

Formula:

$I^2 = Q - df/Q \times 100\%$.

I^2 (prevalence):

(32.8+17.2+5.9+25.5+18.0+14.4+9.2+29.8+56.7+25.0+25.0+21.2+17.0+58.4+4.0+38.3+9.1+28.0+54.7+71.4+53.9+23.4+6.4+71.4+49.8)- (29-1) ÷ 685.1 ×100:

((685.1 – 28) ÷ 685.1) ×100= 95.9%

95.9%- high heterogeneity

I^2 (mean age):

(36.8+51.6+39.0+39.7+51.6+71.3+36.1+42.6+64.5+36.0+70.2+74.0+47.6+80.5+45.0+55.5+50.1+41.8+48.0+14.2+64.0+44.9+53.3+44.4)- (25-1) ÷ 1202.7 ×100:

((1202.7-24.0) ÷1202.7) ×100= 98.0%

98.0%-high heterogeneity

Where:

- Q = Cochran's Q statistics (a measure of the total variability)
- df = Degrees of freedom (number of studies minus one)
- We classified heterogeneity based on the following I2 values: 0 to 40%: might not be important; 30% to 60%: may represent moderate heterogeneity; 50% to 90%: may represent substantial heterogeneity; and 75% to 100%: considerable heterogeneity.

3. Results and Discussion

Screening the titles and abstracts identified 52 articles, of which 17 were excluded because they were published before 2010, i.e., before the review period, or did not meet the inclusion criteria because they were systematic reviews. The remaining 35 articles were further screened and subjected to a detailed full-text assessment. Of these 35 articles, 7 were excluded, 5 because the

full version could not be accessed and 2 because it did not have a sample size. The remaining 28 cross-sectional studies were reviewed and used in this study (Fig. 1). The total sample size was 46 979 individuals (Fig. 1).

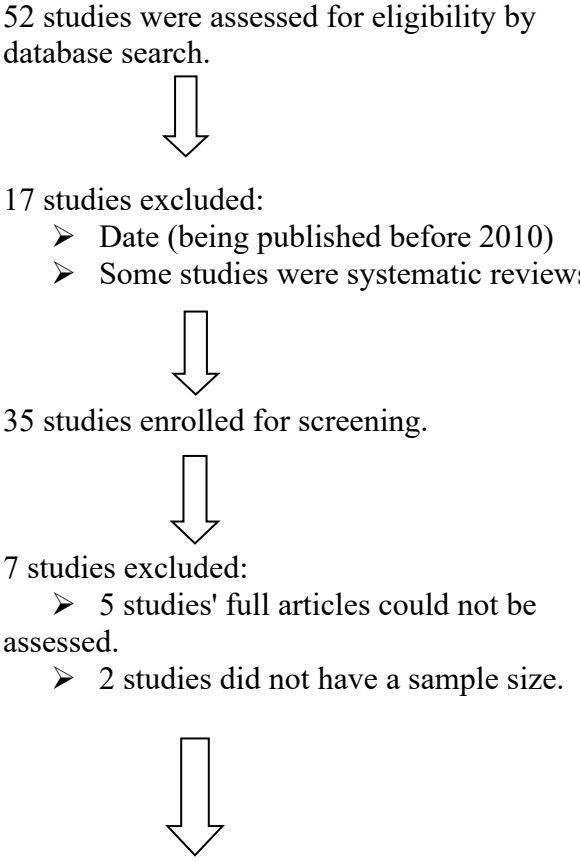

Figure 1. Flow diagram showing how the literature search was done, based on the study inclusion and exclusion criteria.

Of the total of 28 cross-sectional studies reviewed, 15 analysed the prevalence of depression in eight different departments in various hospitals: 3 studies recruited patients from internal medicine clinics, 4 from neurology, 1 from dermatology, 1 from ophthalmology, 1 from paediatrics, 3 from otolaryngology, and 2 with combined medical specialities. The prevalence of depression and associated factors in the general outpatient population, geriatric population, Family Medicine, and Primary care were investigated in another 13 studies. Twelve studies used structured interviews and questionnaires to assess for depression, 5 used the Patient Health Questionnaire (PHQ-9), 3 used the Beck Depression Inventory (BDI), 1 used a combination of PHQ-9 and BDI, and 7 used other methods. The full study characteristics are summarised in Table 1. Subgroup analyses by age, medical discipline, publication date, country, and method of diagnosis of depression were conducted to explore the heterogeneity between studies (Table 1).

Table 1: Selected characteristics of the 28 studies included in the systematic review.

Study	Country	Specialty	Age (years), mean	Year of publication	Study design	Diagnostic method	Prevalence of depression, %
Zhang et al, (2014)	China	General Population	44.4	2014	Descriptive cross-sectional	PHQ-9	32.8
Potone, S., Ridola, Marianetti, (2015)	Italy	Internal medicine	53.3	2012	Descriptive cross-sectional	BDI	17.2
Xiong et al., (2015)	China	Internal medicine	44.9	2015	Descriptive cross-sectional	PHQ-9, MINI	5.9
Weisbord et al (2014)	USA	Internal Medicine	64.0	2014	Descriptive cross-sectional	PHQ-9	25.5
Zduncz, Sendela, Szypowska (2014)	Poland	Paediatrics	14.2	2014	Descriptive cross-sectional	CDI	18.0
Dickstein et al (2015)	USA	Neurology	48.0	2013	Descriptive cross-sectional	PHQ-9	14.4
Mao et al (2013)	China	Neurology	NR	2013	Descriptive cross-sectional	HAMD	9.2
Vogel et al (2011)	Denmark	Neurology	41.8	2011	Descriptive cross-sectional	MDI	29.8
Worku et al (2014)	USA	Neurology	NR	2014	Descriptive cross-sectional	QIDS-C16	56.7
Balieva et al (2016)	Norway	Dermatology	50.1	2016	Descriptive cross-sectional	HDRS	5.8
Ishikawa et al (2015)	Japan	Primary care	55.5	2015	Descriptive cross-sectional	ICPC-2	12.4
Rondet et al (2013)	France	Primary care	45.0	2010	Descriptive cross-sectional	Structured interview	56.7
Popescu et al (2012)	Canada	Ophthalmology	80.5	2012	Descriptive cross-sectional	GDS-15	25.0

Asghari et al (2012)	Iran	ENT	47.6	2012	Descriptive cross-sectional	BDI	25.0
Abuladze, Opikova, Lang, (2020)	Estonia	ENT	74.0	2020	Descriptive cross-sectional	Structured interview	21.2
Alamri, Bari & Ali, 2017	Saudi	Inpatients	70.2	2017	Descriptive cross-sectional	PHQ-9	17.0
Negewo, Bari, Ali (2017)	Ethiopia	Internal medicine, surgery and gynaecology	36.0	2019	Descriptive cross-sectional	Structured interview	58.4
Peltzer, Phaswana-Mafuya (2013)	South Africa	General population	64.5	2013	Descriptive cross-sectional	Structured interview	4.0
Shin et al (2017)	Korea	General population	42.6	2017	Descriptive cross-sectional	PHQ-9	38.3
Siyoum et al (2021)	Ethiopia	Internal medicine and surgery	36.1	2021	Descriptive cross-sectional	Structured interview	9.1
Von Fingerhut et al (2021)	Russia	General population	71.3	2021	Descriptive cross-sectional	Questionnaire	28.0
Zou et al (2018)	China	Geriatric	NR	2018	Descriptive cross-sectional	Structured interview	54.7
Zhou et al (2021)	China	General population	51.6	2014	Descriptive cross-sectional	Questionnaire	71.4
Solomon et al (2019)	Ethiopia	General population	39.7	2019	Descriptive cross-sectional	Questionnaire	53.9
Cakici et al (2017)	North Cyprus	General population	39.0	2017	Descriptive cross-sectional	Structured interview	23.4
Moledina et al (2018)	Tanzania	General population	NR	2018	Descriptive cross-sectional	Questionnaire	6.4
Lee et al (2016)	China	ENT	51.6	2014	Analytic Cohort study	BDI	71.4
Salihu, Udofia (2016)	Nigeria	Family medicine	36.8	2016	Descriptive cross-sectional	Questionnaire	49.8

PHQ-9 = Patient Health Questionnaire; BDI = Beck Depression Inventory; MINI = Mini International Neuropsychiatric Interview; CDI =Category Development Index; HAMD =Hamilton Rating Scale for Depression; MDI = Major Depression Inventory; QIDS-C16 = Quick Inventory of Depression Symptomatology; HDRS = Hamilton Depression Rating Scale; ICPC-2 = International Classification of Primary Care; GDS-15 = Geriatric Depression Scale; ENT = ear, nose and throat; NR = Not Recorded

3.1 Factors associated with depression in different continents

This study found that factors associated with depression varied geographically. There were common and general associated factors found in the literature reviewed, such as sociodemographic, biopsychosocial, and clinical characteristics, social support, and substance abuse. Other factors were specific to geographical location, as illustrated in Table 2. The most common comorbidities associated with depression were found to be diabetes mellitus and old age. Inpatients with a high prevalence of depression were most commonly found in the neurology, medical (internal medicine), and surgical specialties.

Table 2: Summary of the associated factors of depression in different literature

Continent	**Associated factors specific to certain studies**	**Associated factors present in all articles (apply to all continents)**
Asia	2 studies from China showed that factors such as diet, physical activity, tremors, and medical conditions such as Parkinson's disease were associated with depression. 1 study from Japan demonstrated that headache, dyspnoea, dizziness, tiredness, sleep disturbance, fever, nonspecific chest pain, and psychological symptoms were associated with depression.	1. Age 2. Gender 3. Residence 4. Marital status 5. Education level 6. Employment 7. Income 8. History of comorbidities 9. Body mass index 10. Duration of hospital stay in inpatients 11. Alcohol 12. Smoking (cigarettes) 13. Medical discipline that patients are admitted to (inpatients).
Europe	1 Russian study looked at additional psychological factors such as daily communication with a loved one. 1 study from Italy only focused on the association of endocopy with depression. 1 study from Denmark illustrated the association of systemic lupus erythema with depression.	
Africa	1 South African study demonstrated that diet, functional disability, and cognitive impairment were associated with depression. 1 Ethiopian study revealed an	

	association of depression with suicide attempts, pain, self-isolation, and fear of death. 1 Tanzanian study illustrated the prevalence of depression to be 6.5% with past psychological stress, family history of depression being significant risk factors, and sufficient income being a protective factor. 1 study from Nigeria found no association between GPs' ability to identify depression and the presence or absence of somatic symptoms	
North America	1 study from the USA focused on the association of chronic dialysis with depression. Another US study demonstrated an association between depression in patients with epilepsy and multiple sclerosis. 1 study from the USA focused on the association of Parkinson's disease with depression.	

3.2 The estimated percentage mean prevalence of depression in different geographical locations

The estimated mean prevalence of depression in both outpatients and inpatients was grouped in terms of geographical location (continent) based on the reviewed articles. North America showed the highest prevalence of 36.0%, while Europe showed the lowest prevalence of 25.0%. Fig. 2 summarizes the estimated prevalence of depression in different geographical locations.

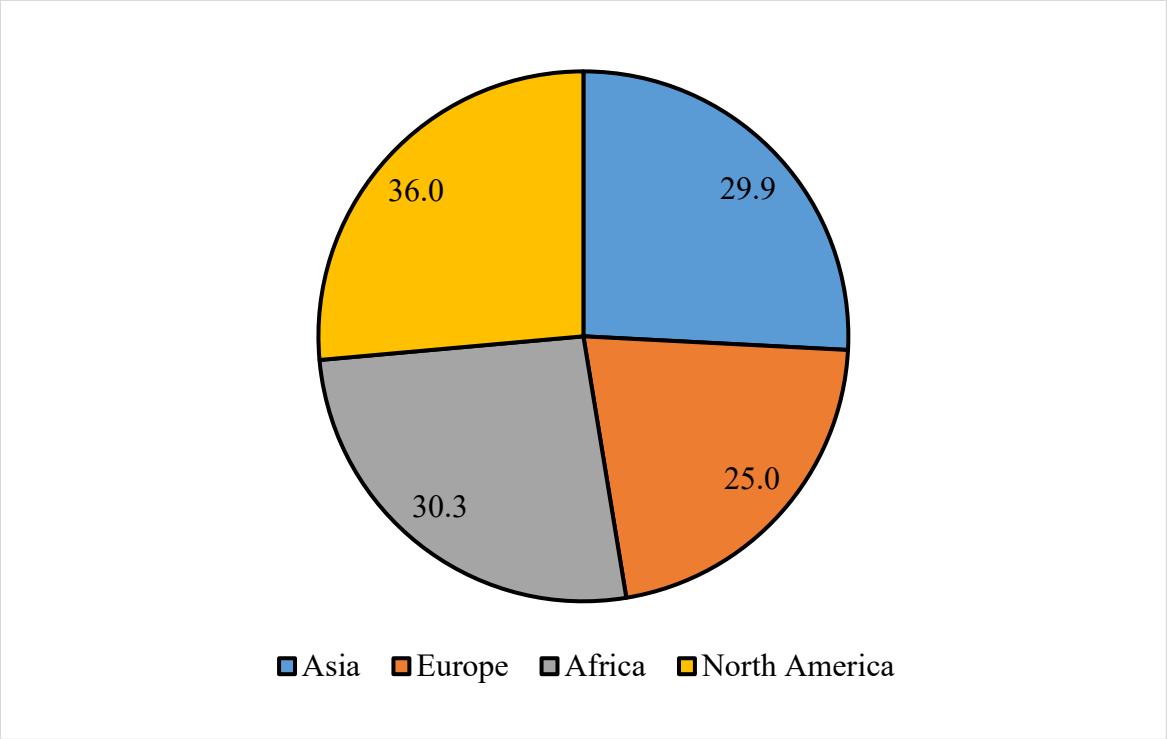

Figure 2: A summary of the estimated percentage mean prevalence of depression in different geographical locations

It was believed that the prevalence of depression is likely to be higher in lower socioeconomic settings than in wealthy, developed countries, owing to advances in diagnosis and treatment (Eaton et al., 2001). However, this study showed that North America had the highest prevalence of depression. In contrast, Europe, also a developed and high-income continent, had a low prevalence of depression.

The literature generally shows that women are more prone to depression and depressive symptoms than men, as a result of the hormonal changes they undergo.[3] We found that, of a total of 46979 individuals in the articles reviewed, women comprised 54.9% and men 45.1% (Fig. 3). This higher prevalence among women is consistent with the findings of Negewo *et al* (2020) and Siyoum *et al* (Siyoum et al., 2021). While the articles reviewed have shown that women generally have a higher prevalence of depression than men, in some parts of the world, in countries such as Russia and Canada, a higher male prevalence was reported in some literature. (Von Fingerhut, Mizukami, Yam, 2021; Hsu, Marshall, 1987).

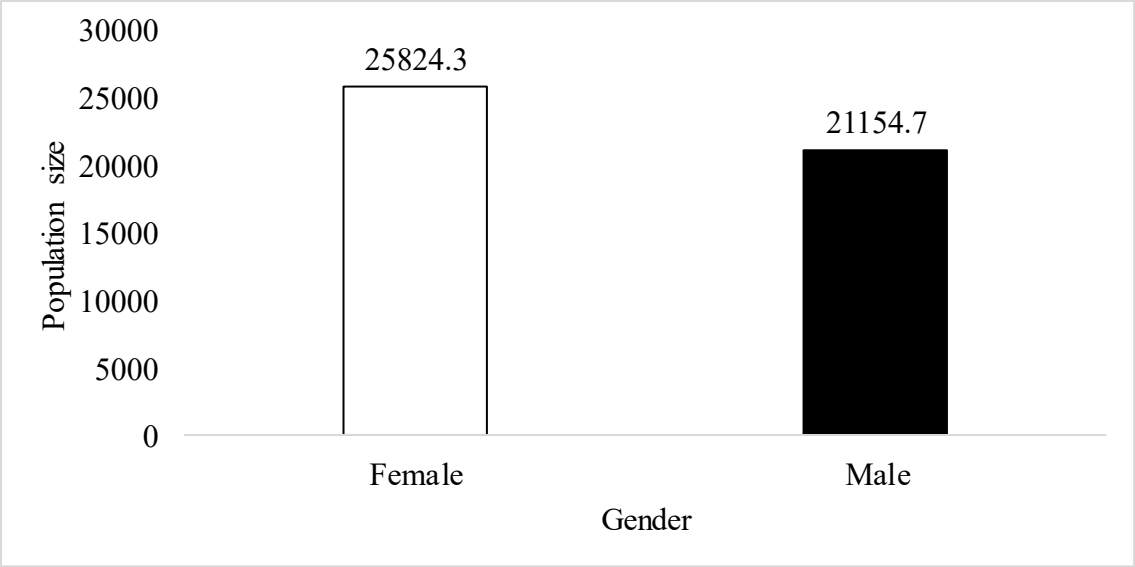

Figure 3. Gender difference in the prevalence of depression in literature reviewed.

In china, the geriatric population was found to be more prone than younger people to depression or depressive symptoms in the general population (outpatient) setting, especially elderly people who live alone, have little to no communication with loved ones, and are not physically active. This agrees with the report of the Centers for Disease Control and Prevention (2022) that the majority of older adults are depressed demonstrating ≤5% prevalence of depression in elderly people; however, there can be an up to 13.5% rise in elderly people who require home healthcare, and an up to 11.5% rise in elderly people who are hospitalised.

4. Conclusion

The prevalence of depression will forever remain specific to each country and individuals every year and can be low or high depending on the awareness of depression in the population and the stigma associated with depression. Firstly, the literature demonstrates a higher prevalence in North American countries compared with African countries, with a difference of 5.7%, which could be due to multiple reasons, such as awareness of depression in the developed countries and advances in its diagnosis and treatment. In addition, stigma, lack of awareness, denial, and cultural beliefs could be among the reasons for the lower prevalence in African countries. Secondly, most studies show that females, older people, single people, those who have lower educational and socioeconomic status, a history or a family history of chronic illness, or a history or a family history of mental disorders, and those who are smokers are more prone to developing depression. However, in contrast, in Canada, depression was found to be more common in men and married couples.

Recommendations

Given the differences observed between countries and continents in the present study, more studies on depression and mental health should be carried out to provide a more realistic representation of the prevalence of depression globally and to help us understand the similarities and differences in risk factors among different communities. More studies are especially

encouraged within the African context to understand how cultural values can influence various ethnicity in dealing with mental health challenges.

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