



Original Research Article

Association Between Medicinal Plant Use and Depression Severity Among Cardiology Patients: A Clinical Pharmacy and Forensic Public Health Study.

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Abstract: **Background:** Medicinal plant use is common among patients with cardiovascular disease, but its relationship with depression severity and medication-related characteristics remains insufficiently understood. **Objective:** To determine the association between medicinal plant use and depression severity among cardiology patients and to describe patterns of medicinal plant use and relevant clinical characteristics. **Methodology:** A hospital-based cross-sectional study was conducted among 425 adult cardiology patients at Pakistan Institute of Medical Sciences, Islamabad, from March 2024 to February 2025. Data were collected through structured interviews and medical records. Depression severity was assessed using a validated depression assessment instrument, while medicinal plant use, cardiovascular characteristics, comorbidities, and medication burden were documented. Data were analyzed using descriptive statistics, chi-square tests, and ordinal logistic regression. **Results:** Among 425 patients, 159 (37.41%) reported medicinal plant use and 266 (62.59%) were non-users. Mild depression was present in 121 (28.47%), moderate in 102 (24.00%), moderately severe in 62 (14.59%), and severe depression in 36 (8.47%) patients. Depression severity was significantly associated with medicinal plant use ($\chi^2=12.73$, $p=0.013$). Medicinal plant users had higher odds of greater depression severity (AOR=1.84, 95% CI: 1.23–2.76; $p=0.003$). **Conclusion:** Medicinal plant use was significantly associated with greater depression severity, highlighting the importance of documenting herbal medicine use during cardiology care.

Keywords: Medicinal plants; herbal medicine; depression; cardiovascular disease; cardiology; clinical pharmacy; herb-drug interactions.

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INTRODUCTION

Cardiovascular diseases (CVDs) continue to be a major public health problem, and psychiatric disorders, such as depression are often present [1,2]. Patients with cardiac disease who are depressed experience chronic sadness, decreased interest, sleep and appetite disturbances, fatigue, and difficulty with concentration, which can make clinical treatment more difficult and may negatively impact adherence to treatment and health-related quality of life (HRQoL) [3,4]. Modern assessment of mental health is crucial in cardiovascular care, as there are complex biological, behavioral and psychosocial mechanisms that underlie the co-occurrence of both cardiovascular and depressive disorders [5].

Antidepressant medication is a common treatment for depression, but some patients may be hesitant to take medication due to concerns about side effects, long-term medication use, interactions with other medications, and access to treatment, and as a result may seek out alternative and complementary treatments [6,7]. In many communities, medicinal plants and herbal remedies are extensively used in treating psychological symptoms and overall health-related problems [8]. Cultural beliefs, traditional medicine, the perceived “naturalness”, affordability, and accessibility may also all play a role in their use [9]. Although the use of medicinal plants is widespread, problems arise with safe and coordinated clinical care, as these products may be used without the proper professional guidance or without notification to health professionals [8].

The clinical importance of medicinal plant use becomes significant among patients with cardiology diseases due to the potential pharmacological activity of complex or effects of its components on cardiovascular function and the possible interactions with cardiovascular and psychotropic drugs prescribed to these patients [10]. Herbal medicines could interact with platelet aggregation, blood pressure, cardiac rhythm, hepatic drug metabolism or with the activity of cytochrome P450 enzymes which may impact conventional therapy effects or safety [11]. Furthermore, plant species and preparation procedures, dose and product quality variations may lead to different therapeutic effects and safety profiles [12].

Medicinal plant use that is undocumented or inappropriate has several clinical and forensic public health concerns from a clinical pharmacy perspective including medication reconciliation, screening for drug-drug interactions, product authenticity, contamination, adulteration, inaccurate labeling and unregulated distribution [10,13]. These problems can affect the safety of the patient and make it difficult to assess treatment results. The relationship between the use of medicinal herbs and severity of depressive symptoms among patients under cardiology care, however, is still

not fully understood, in a context where traditional and conventional medicine coexist.

Research Objective

To determine the association between medicinal plant use and depression severity among cardiology patients, while documenting patterns of medicinal plant use and relevant clinical and medication-related characteristics.

MATERIALS AND METHODS

Study Design and Setting

This was a cross sectional study at the Pakistan Institute of Medical Sciences (PIMS), Islamabad, Pakistan, which was conducted in a hospital setting. The study was carried out in a sample of adult patients attending cardiac care outpatient and inpatient departments. The study evaluated the correlation between medicinal plant use and severity of depression, as well as associated clinical, medication and public health parameters. PIMS is a tertiary care teaching Hospital which offers specialized cardiovascular services to patients from Islamabad, Rawalpindi and its environs.

Study Duration

The study was conducted in a one-year period of time, from March 2024 to February 2025.

Study Population

Study population was adult patients who visited cardiology outpatient department and in-patient department of PIMS, Islamabad during the period of the study. All subjects were approached in sequence and consented to participate. The unit of analysis in this unit was individual cardiology patient.

Sample Size and Sampling Technique

A sample of 385 was determined using the following assumptions: a 95% confidence level, a 5% margin of error and a prevalence rate of 50%. The final sample size was raised to 425 participants, after allowing for 10% of non-response/incomplete data. Consecutive sampling was used to recruit eligible patients until the required sample size was achieved. The conservative prevalence assumption of 50% was used to estimate the sample size because a suitable local estimate of the use of medicinal plants was not available.

Inclusion and Exclusion Criteria

The patients included in the study were those aged ≥ 18 years with a documented cardiac condition, who were in cardiology care in PIMS during the study period and who gave informed consent for inclusion. The participants were also required to have enough comprehension and response power to the questionnaire of the study. Patients were excluded if they had a previously diagnosed severe psychiatric disorder other than depression, cognitive impairment that made reliable participation impossible, a severe acute medical instability or failed to give informed consent. Study information was rather incomplete for some patients, so

they were not included in the final analysis. Patients who were immediately managed for emergency or whose clinical condition did not allow for completion of the assessment were also excluded.

Data Collection Procedure

The information was obtained by conducting structured questionnaire interviews face to face and relevant information from medical records and medication history. Demographic factors, use of medicinal plants, depressive symptoms, diagnosis of cardiovascular diseases, drugs prescribed, comorbidities and clinical factors were documented. A standardized procedure was adopted with trained data collectors to reduce interviewer variation in administering the questionnaire. All participants had their own study code, and identifying information was removed from the analytical data set.

Assessment of Medicinal Plant Use

The utilization of medicinal plants was determined using a semi-structured interview which was used to document the type of medicinal plant or herbal product being used by each participant. To enhance classification and reproducibility, the vernacular/common name and, where reliably identifiable, botanical name of the plant was recorded. Product or brand name, stated ingredients, manufacturer and formulation were documented for commercially prepared herbal products as available. Other data provided were therapeutic indication, dose/frequency, duration of use, method of preparation, source of acquisition, recommendation by a healthcare professional or traditional practitioner, and disclosure to the treating physician/pharmacist. The subjects were divided into two groups: medicinal plant users and non-users based on their self-reported use of medicinal plants during the pre-defined study recall period. If the botanical identity was not reliably determined from the participants' common or vernacular name, or based on product information, the plant was identified by the common or vernacular name mentioned by the participants.

Assessment of Depression Severity

Depressive symptoms were measured with this validated depression assessment instrument suitable for the study population. The participants were classified based on the scoring system of the instrument selected into minimal (no depression) and severe depressive symptom groups. The validated instrument applied in the study was the same and the range of scores were confirmed as well, the severity cut-offs and validated language version of the instrument was confirmed and applied to all participants. The severity of depression was analysed as an ordered categorical variable for the primary analysis.

Clinical and Medication-Related Variables

All relevant variables were included, such as age, sex,

marital status, educational level, cardiovascular diagnosis, disease duration, comorbidities, hospitalization status, prescribed medications, number of medications and treatment history. Special consideration was paid to drugs that could interact with the medicinal plants used. Pharmacy records were searched for concomitant cardiovascular, psychotropic, antiplatelet, anticoagulant, antihypertensive and other relevant medications. Potential herb-drug interaction concerns were evaluated descriptively, based on available information about the pharmacological interactions, not based on the assumption that the use of two drugs together is a documented clinical interaction.

Forensic and Public Health Considerations

Where available, information on the sources, labelling, storage and collection of medicinal plant products was recorded. Any reported concerns about adulteration, contamination, incorrect labeling or unsupervised use were reported descriptively and taken into account for the general safety of the medication and the potential risks of unregulated herbal products. Forensic and public health related assessment on visible or reported product safety attributes such as product label, manufacturer information, ingredient disclosure, batch information/expiry date (if available), source of acquisition, storage conditions, and professional versus non-professional recommendation. The study did not consider products to be adulterated or contaminated unless laboratory testing was performed.

Study Variables and Operational Definitions

Medicinal plant use (use of any plant based preparation for therapeutic or health purposes) was the main independent variable. The main dependent variable was depression severity that was measured by the score and categorized by the selected depression assessment instrument. Potential confounding factors included demographic, cardiovascular, comorbidity, and medication-related. The main exposure was use of medicinal plants (user vs non-user). The main outcome was the severity of depression as determined by the validated instrument's pre-determined ordered severity levels. Potential confounders were: age, sex, socioeconomic and educational factors, cardiovascular disease type and duration, comorbidities, medication burden and other clinically relevant factors identified a priori.

Statistical Analysis

The data was analysed using SPSS version 26. Continuous variables were presented as mean $\pm$ SD or median with interquartile range as appropriate, and categorical variables were presented in terms of frequencies and percentages. Chi square test or Fisher's exact test was used to test association between medicinal plant use and the categorical variables while appropriate parametric and non-parametric tests were used for the continuous variables and their depression severity. Both the distribution of continuous variables

was examined prior to the choice of parametric or non-parametric tests. The relationship between medicinal plant use with ordered depression-severity categories was assessed in the primary analysis, using ordinal logistic regression. The proportional-odds assumption was examined prior to interpretation of the ordinal model, and an alternate regression method was employed if it was not met. Odds ratios (ORs) were adjusted for prespecified clinically relevant confounders, and adjusted odds ratios (AORs) with 95% confidence intervals were reported. Results were regarded as significant when p value was < 0.05.

RESULTS

Among 425 cardiology patients, the mean age was 56.8 ± 11.7 years, with 42.12% aged 40–59 years and 41.88% aged ≥ 60 years (table 1). Most participants were male (58.12%), married (75.06%), and from urban areas (63.76%). Higher education was reported by 36.47% of participants. Ischemic heart disease was the most common cardiovascular diagnosis (37.88%), followed by hypertension (27.29%) and heart failure (16.94%). Comorbidities were present in 63.29% of patients, while 32.71% were hospitalized. The mean number of prescribed medications was 4.6 ± 2.1 .

Table 1. Sociodemographic and Clinical Characteristics of Cardiology Patients (N=425)

Variable	Category	Number of Patients (n)	Percentage (%)
Age group	18–39 years	68	16.00
	40–59 years	179	42.12
	≥ 60 years	178	41.88
Age (years)	Mean $\pm$ SD		56.8 ± 11.7
Gender	Male	247	58.12
	Female	178	41.88
Marital status	Married	319	75.06
	Unmarried	67	15.76
	Widowed/divorced	39	9.18
Education	No formal/primary	117	27.53
	Secondary	153	36.00
	Higher education	155	36.47
Residence	Urban	271	63.76
	Rural	154	36.24
Cardiovascular diagnosis	Ischemic heart disease	161	37.88
	Hypertension	116	27.29
	Heart failure	72	16.94
	Arrhythmia	44	10.35
	Other cardiovascular disease	32	7.53
Comorbidity	Present	269	63.29
	Absent	156	36.71
Hospitalization status	Outpatient	286	67.29
	Inpatient	139	32.71
Number of prescribed medications	Mean $\pm$ SD		4.6 ± 2.1

Of the 425 participants, 159 (37.41%) reported medicinal plant use, while 266 (62.59%) were non-users (table 2). Among medicinal plant users, 39.62% reported use several times per week, 32.08% used medicinal plants daily, and 28.30% used them occasionally. Regarding duration, 42.77% had used medicinal plants for 1–6 months, 30.82% for >6 months, and 26.42% for <1 month. Cardiovascular conditions were the most frequently reported reason for use (45.91%), followed by general health (23.90%) and psychological symptoms (18.24%). Most users reported self-initiated use (57.86%), while only 14.47% received recommendations from healthcare professionals. Only 38.36% disclosed medicinal plant use to their physician or pharmacist.

Table 2. Pattern of Medicinal Plant Use Among Cardiology Patients (N=425)

Variable	Category	Number of Patients (n)	Percentage (%)
Medicinal plant use	Yes	159	37.41
	No	266	62.59
Frequency of use*	Daily	51	32.08

Duration of use*	Several times/week	63	39.62
	Occasionally	45	28.30
	<1 month	42	26.42
	1–6 months	68	42.77
	>6 months	49	30.82
Main reason for use*	Cardiovascular condition	73	45.91
	General health	38	23.90
	Psychological symptoms	29	18.24
	Other	19	11.95
Source/recommendation*	Self-initiated	92	57.86
	Traditional practitioner	44	27.67
	Healthcare professional	23	14.47
Disclosure to physician/pharmacist*	Yes	61	38.36
	No	98	61.64

Note: *Percentages for these variables are calculated among medicinal plant users (n=159).

Among the 159 medicinal plant users, garlic (*Allium sativum*) was the most frequently reported product (27.67%), followed by ginger (*Zingiber officinale*) at 20.13%, turmeric (*Curcuma longa*) at 15.72%, green tea (*Camellia sinensis*) at 13.84%, black seed (*Nigella sativa*) at 11.32%, and fenugreek (*Trigonella foenum-graecum*) at 6.29% (table 3). Garlic and black seed were mainly used for cardiovascular or general health purposes, whereas ginger, turmeric, and green tea were primarily used for general health. Other reported plants or products accounted for 5.03% of use.

Table 3. Medicinal Plants and Herbal Products Reported by Participants

Medicinal plant/herbal product	Botanical name	Number of Patients (n)	Percentage (%)	Main reported purpose
Garlic	Allium sativum	44	27.67	Cardiovascular/general health
Ginger	Zingiber officinale	32	20.13	General health
Turmeric	Curcuma longa	25	15.72	General health
Green tea	Camellia sinensis	22	13.84	General health
Black seed	Nigella sativa	18	11.32	Cardiovascular/general health
Fenugreek	Trigonella foenum-graecum	10	6.29	Metabolic health
Other reported plants/products		8	5.03	Various

Among the 425 cardiology patients, mild depression was the most frequent category, affecting 121 (28.47%) participants, followed by minimal/no depression in 104 (24.47%) and moderate depression in 102 (24.00%), shown in figure 1. Moderately severe depression was observed in 62 (14.59%) participants, while severe depression was present in 36 (8.47%). Overall, 47.06% of participants had moderate or greater depressive symptoms.

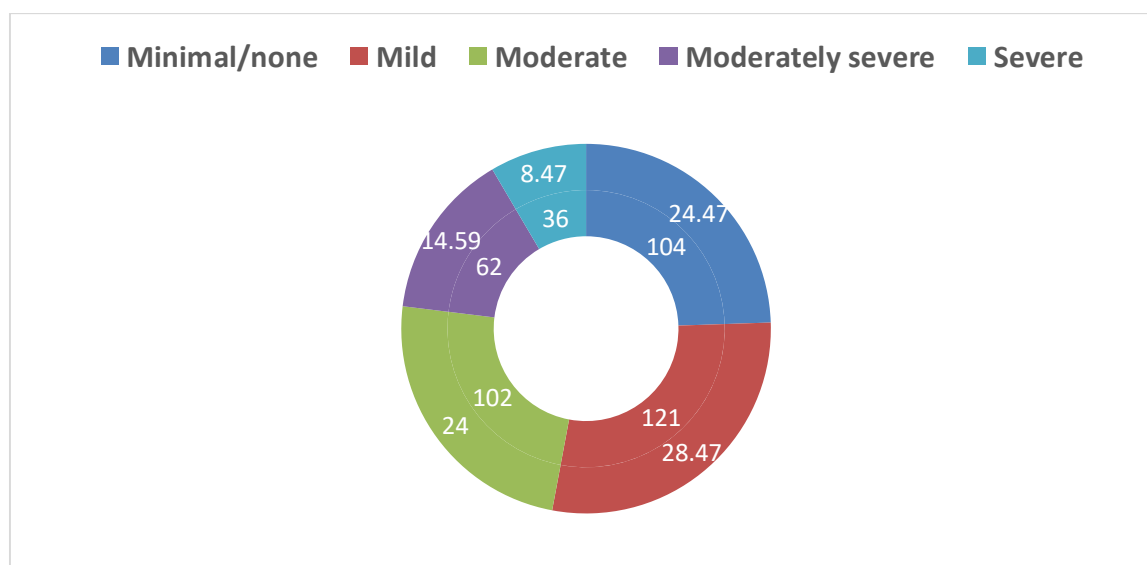


Figure 1. Distribution of Depression Severity Among Cardiology Patients

Medicinal plant users had a slightly higher mean age than non-users (58.2 ± 10.9 vs. 55.9 ± 12.0 years), although the difference was not statistically significant ($p=0.054$), shown in table 4. Disease duration was significantly longer among users (6.8 ± 4.5 vs. 5.7 ± 4.1 years; $p=0.013$). Users also received more prescribed medications than non-users (5.1 ± 2.2 vs. 4.3 ± 1.9 ; $p<0.001$). Median hospitalization duration was also greater among users (6 [4–9] vs. 5 [3–8] days; $p=0.021$).

Table 4. Comparison of Continuous Clinical Characteristics According to Medicinal Plant Use

Continuous variable	Medicinal plant users (n=159)	Non-users (n=266)	Test value	p-value
Age, years	58.2 ± 10.9	55.9 ± 12.0	$t = 1.93$	0.054
Disease duration, years	6.8 ± 4.5	5.7 ± 4.1	$t = 2.48$	0.013
Number of medications	5.1 ± 2.2	4.3 ± 1.9	$t = 3.89$	<0.001
Duration of hospitalization, days†	6 (4–9)	5 (3–8)	$U = 17,842$	50.021

Note: Independent-samples t -test was used for normally distributed continuous variables; Mann–Whitney U test was used for non-normally distributed variables. Distribution was assessed before test selection. †Median (IQR) reported because of non-normal distribution

Depression severity differed significantly according to medicinal plant use ($\chi^2=12.73$, $p=0.013$). Among medicinal plant users, 17.61% had minimal/no depression, 23.90% mild, 27.04% moderate, 18.87% moderately severe, and 12.58% severe depression (table 5). In comparison, among non-users, the corresponding proportions were 28.57%, 31.20%, 22.18%, 12.03%, and 6.02%, respectively. Thus, moderate-to-severe depression was more frequently observed among medicinal plant users than non-users.

Table 5. Association Between Medicinal Plant Use and Depression Severity

Medicinal plant use	Minimal/none (n; %)	Mild (n; %)	Moderate (n; %)	Moderately severe (n; %)	Severe (n; %)	Test value	p-value
Users (n=159)	28 (17.61)	38 (23.90)	43 (27.04)	30 (18.87)	20 (12.58)	$\chi^2 = 12.73$	0.013
Non-users (n=266)	76 (28.57)	83 (31.20)	59 (22.18)	32 (12.03)	16 (6.02)		
Total (N=425)	104 (24.47)	121 (28.47)	102 (24.00)	62 (14.59)	36 (8.47)		

Note: Pearson's chi-square test was used to assess the association between medicinal plant use and ordered depression-severity categories.

Comorbidity, hospitalization status, and medication burden were significantly associated with depression severity (table 6). Comorbidities were present in 79.41% of participants with moderately severe/severe depression compared with 56.28% of those with minimal/mild depression ($p=0.002$). Inpatients represented 47.06% of the moderately severe/severe group compared with 26.72% of the minimal/mild group ($p=0.001$). Similarly, use of >6 medications increased from 12.96% in the minimal/mild group to 30.88% in the moderately severe/severe group ($p=0.001$). Sex was not significantly associated with depression severity ($p=0.875$).

Table 6. Association of Clinical and Medication-Related Factors with Depression Severity

Variable	Category	Minimal/mild (n; %)	Moderate (n; %)	Moderately severe/severe (n; %)	Test value	p-value
Sex	Male	144 (58.30)	63 (55.26)	40 (58.82)	$\chi^2 = 0.27$	0.875
	Female	103 (41.70)	51 (44.74)	28 (41.18)		
Comorbidity	Yes	139 (56.28)	76 (66.67)	54 (79.41)	$\chi^2 = 12.16$	0.002
	No	108 (43.72)	38 (33.33)	14 (20.59)		
Hospitalization	Outpatient	181 (73.28)	69 (60.53)	36 (52.94)	$\chi^2 = 14.05$	0.001
	Inpatient	66 (26.72)	45 (39.47)	32 (47.06)		
Medication burden	≤3 medications	98 (39.68)	31 (27.19)	13 (19.12)	$\chi^2 = 13.21$	0.001
	4–6 medications	117 (47.37)	58 (50.88)	34 (50.00)		
	>6 medications	32 (12.96)	25 (21.93)	21 (30.88)		

Note: Pearson's chi-square test was used for categorical variables; Fisher's exact test was applied where required.

In the adjusted ordinal logistic regression model, medicinal plant use was significantly associated with greater depression severity (AOR=1.84, 95% CI: 1.23–2.76; $p=0.003$), shown in table 7. Older age (AOR=1.15, 95% CI: 1.01–1.31; $p=0.036$), longer cardiovascular disease duration (AOR=1.07, 95% CI: 1.01–1.14; $p=0.027$), comorbidity (AOR=1.58, 95% CI: 1.09–2.29; $p=0.016$), inpatient status (AOR=1.69, 95% CI: 1.12–2.54; $p=0.011$), and greater medication burden

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(AOR=1.10, 95% CI: 1.03–1.18; $p=0.006$) were also independently associated with higher depression severity. Female sex ($p=0.064$) and higher education ($p=0.190$) were not statistically significant predictors.

Table 7. Ordinal Logistic Regression for Factors Associated with Greater Depression Severity

Predictor	AOR	95% CI	p-value
Medicinal plant use (Yes vs No)	1.84	1.23–2.76	0.003
Age, per 10-year increase	1.15	1.01–1.31	0.036
Female sex	1.43	0.98–2.09	0.064
Cardiovascular disease duration, per year	1.07	1.01–1.14	0.027
Comorbidity (Yes vs No)	1.58	1.09–2.29	0.016
Hospitalization (Inpatient vs Outpatient)	1.69	1.12–2.54	0.011
Medication burden, per additional medication	1.10	1.03–1.18	0.006
Higher education	0.78	0.54–1.13	0.190

Note: Ordinal logistic regression was used with depression severity as the ordered outcome. AOR = adjusted odds ratio; CI = confidence interval. The model was adjusted for prespecified clinically relevant confounders. An AOR >1 indicates higher odds of being in a more severe depression category.

DISCUSSION

The mean age of these 425 cardiology patients was 56.8 ± 11.7 years, with 58.12% of them being male, and ischemic heart disease (37.88%) and hypertension (27.29%) being the most common diagnoses. Clinical depression was indicated with 28.47% of the subjects exhibiting mild depression, 24.00% with moderate symptoms and 14.59 % with moderately severe symptoms and 8.47 % with severe symptoms. They are similar to earlier results indicating a high psychological load in individuals with cardiovascular conditions. A systematic review of 101,825 participants found that depression symptoms were associated with poor cardiovascular health and vice versa, highlighting the need for regular psychological screening in cardiovascular populations [14].

The use of medicinal plants was reported by 159 (37.41%) participants, suggesting that the use of herbal remedy is a significant part of the health care behavior in this population. This prevalence is in the middle of the 2–46% range reported by a systematic review of 27 studies among cardiac patients using herbal medicine [15]. It was also more than the 28.6% of cardiac patients who used herbal products in a cross-sectional study in Turkey [16]. Variations could be attributed to the differences in the health care systems, cultural practices, characteristics of patients, and the definitions of herbal use among the different studies. Overall, 57.86% of users started treatment on their own and 14.47% were recommended to start by their healthcare professionals.

The manner of usage of the herbs also highlighted significant medication-safety implications. Garlic was the most frequently reported product (27.67%), followed by ginger (20.13%), turmeric (15.72%), green tea (13.84%), and black seed (11.32%). Pinar et al., (2017) reported the commonly consumed green tea (25%) and ginger (25%) amongst cardiac patients [16]. Noticeably, 61.64% of the medicinal-plant users who were interviewed did not mention their use to physicians or pharmacists. This is consistent with the

previous evidence which reported a low level of disclosures of complementary therapies to clinicians, and in a recent cardiology study, only 15% of those from a contemporary cohort reported using complementary medicine [17].

The main result was found to be the significant association between the use of medicinal plants and depression severity ($\chi^2=12.73$, $p=0.013$). The rate of moderate depression was higher in the medicinal plant users than non-users, with 27.04% having moderate depression, 18.87% having moderately severe depression, and 12.58% having severe depression in comparison to 22.18%, 12.03% and 6.02% of the non-users, respectively. This cross sectional association should not be interpreted as evidence of the cause of medicinal plant in depression, however. Herbal medicine has been examined in previous clinical studies not only as a determinant of depression but also as intervention to treat depression during the treatment of CHD. A meta-analysis of 13 randomized trials with 1,095 patients showed potential benefits of Chinese herbal medicines, but methodological limitations and the requirement for better quality trials were noted by the authors [18].

The observed association was strengthened following adjustment (Medicinal plant users were more likely to have more severe depression (AOR=1.84, 95% CI: 1.23–2.76; $p=0.003$)). Other independent factors for higher severity included older age (AOR=1.15; $p=0.036$), longer duration of cardiovascular disease (AOR=1.07; $p=0.027$), presence of comorbidity (AOR=1.58; $p=0.016$), inpatient status (AOR=1.69; $p=0.011$), and medication burden (AOR=1.10; $p=0.006$). The results of this study align with the literature that has shown an association between depression and increased cardiovascular morbidity and health care utilization [19]. They also theorize that the use of medicines from plants can be an indicator of higher levels of illness burden or psychological need that could be linked to depression, in addition to being a

result of it.

The clinical-pharmacy and public-health implications of these results are that systematic documentation of the use of herbal medicine should be included in medication history taking, especially for cardiovascular patients who are often taking multiple medicines. Potential herb–drug interactions and contamination, variable composition, and insufficient evidence of safety and efficacy have been noted in reviews [20]. On the other hand, a systematic review from 2022 indicates that certain Chinese herbal medicines could be beneficial in the treatment of coronary heart disease associated with depression; however, the findings only apply to specific standardized Chinese herbal products and do not extrapolate to all Chinese medicinal plants used for commercial or traditional purposes [21]. It is therefore important to conduct the present association longitudinally with standardized identification of the botanicals, assessment of product quality, psychometric validation of depression scales and botanical identification.

Strengths and Limitations

One of the strengths of the present study is the assessment of medicinal plant use in relation to depression severity, cardiovascular parameters, comorbidities and medication burden in a relatively substantial group of 425 cardiology patients, taking into consideration the clinically relevant confounding factors with multivariable ordinal logistic regression analysis. The study also delivers clinically relevant data on the type, frequency, duration, source, indication and disclosure of medicinal plant use, which brings to light important clinical-pharmacy and public-health considerations. However, due to the cross-sectional design, it is impossible to conclude with this study whether there were temporal or causal relationships between the use of medicinal plants and depression severity. Generalizability to other population groups may also be limited due to the sampling of only one tertiary-care hospital. The information on medicinal plant use was self-reported and may have been influenced by recall and/or reporting bias, and the botanical identification and quality assessment of the products were not laboratory verified. In addition, there is the possibility of unmeasured variables and socioeconomic status and psychological stressors, which cannot be ruled out as sources of residual confounding.

CONCLUSION

The use of medicinal plant was found to be prevalent among the patients of cardiology and was significantly related to the increased severity of depression. The results underscore the need to routinely ask about herbal medicine use during clinical evaluation (with particular reference to those taking multiple cardiovascular medications) as this may have implications for medication safety and clinical management. The

observed association is not necessarily causal and the use of medicinal plants could be due to increase in disease burden and/or unmet psychological needs. Standardised evaluation of the medicinal plants; product quality; herb–drug interaction and assessment of depressive symptoms in a prospective multicenter study are suggested to elucidate these relationships and to promote a more evidence-based and safe use of complementary medicine in cardiovascular treatment.

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