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Recognizing and Addressing Mental Health Comorbidities in Hypertension Care Strategies: A Narrative Review

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Abstract:

- ***Background:***
  Hypertension and mental health comorbidities, especially depression and anxiety, are prevalent in the same patient populations, contributing to poor outcomes. The bidirectional relationship between these conditions makes management more challenging, impacting treatment adherence and long-term health.

- ***Purpose:***
  This review aims to examine the prevalence, impact, and management of mental health comorbidities in patients with hypertension, focusing on how depression and anxiety affect hypertension control and the strategies available for improving care.

- ***Methods:***
  A systematic review of studies was conducted, focusing on the interaction between hypertension and mental health disorders. Inclusion criteria were studies that explored the prevalence, mechanisms, and outcomes of hypertension and mental health comorbidities, with a focus on interventions and integrated care approaches.

- ***Results:***
  The review found that mental health comorbidities, particularly depression and anxiety, are prevalent in hypertensive patients. These conditions negatively affect medication adherence, lifestyle changes, and blood pressure control, leading to poor cardiovascular outcomes. Integrated care models that combine mental health and hypertension management were found to improve patient outcomes.

- ***Conclusion:***
  Addressing mental health comorbidities in hypertension care is essential for improving both physical and psychological health. Routine screening for mental health disorders, integrated care approaches, and digital health tools are key to managing the dual burden of hypertension and mental health issues.

Keywords: *Hypertension, Mental Health Comorbidities, Depression, Anxiety, Integrated Care.*

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I. INTRODUCTION

Hypertension, often referred to as the "silent killer," remains one of the most prevalent and persistent health conditions globally. It is a primary risk factor for cardiovascular diseases, including stroke, heart failure, and kidney disease, and it affects millions of individuals worldwide [1]. Despite its high incidence, the management of hypertension has evolved significantly, with a variety of pharmacological and non-pharmacological interventions

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designed to control blood pressure and reduce associated risks [2]. However, recent research has increasingly highlighted a critical yet often underappreciated aspect of hypertension care: the coexistence of mental health comorbidities, such as depression, anxiety, and stress-related disorders, which significantly complicate the management of hypertension and its long-term outcomes. These mental health conditions not only worsen hypertension control but also contribute to the development of other adverse health outcomes, creating a cycle of illness that is challenging to break without integrated care approaches [3]. This review aims to examine the interplay between mental health comorbidities and hypertension and explore strategies to address them effectively in the context of contemporary hypertension care.

The relationship between hypertension and mental health disorders is bidirectional, meaning that while individuals with hypertension are more likely to develop mental health issues, those with pre-existing mental health conditions are at an increased risk of developing hypertension [4]. Studies have shown that depression and anxiety disorders are particularly common among individuals with hypertension, with prevalence rates significantly higher than in the general population [5]. Furthermore, these mental health conditions often go undiagnosed and untreated, further exacerbating hypertension and increasing the risk of cardiovascular events [6]. The mechanisms underlying this complex relationship are multifactorial, including shared biological pathways, such as dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, as well as behavioral factors, such as poor adherence to medications, lack of physical activity, and unhealthy eating patterns, all of which are common in individuals suffering from mental health disorders [7].

Several studies have explored the impact of mental health comorbidities on hypertension management and outcomes [8]. For example, individuals with depression are more likely to experience poorer medication adherence, which is a key factor in achieving adequate blood pressure control. Moreover, depression and anxiety can increase sympathetic nervous system activity, leading to elevated blood pressure and exacerbation of hypertension [9]. Additionally, individuals with mental health disorders may face significant barriers to lifestyle changes that are critical in managing hypertension, such as engaging in regular exercise, maintaining a healthy diet, and managing stress [10]. These factors contribute to a vicious cycle where untreated or poorly managed mental health conditions hinder effective hypertension management, which, in turn, exacerbates mental health symptoms, leading to further deterioration in both physical and mental health.

Despite the clear association between hypertension and mental health comorbidities, traditional hypertension care often fails to recognize the importance of addressing mental health as part of a comprehensive treatment plan [11]. This gap in care is not only due to a lack of awareness among healthcare providers but also due to systemic challenges within healthcare settings, including limited time for patient assessments, lack of mental health professionals in primary care, and the stigma surrounding mental health disorders [12]. Additionally, hypertension and mental health conditions are often treated by different healthcare providers, which can lead to fragmented care that fails to address the complex needs of patients with both conditions [13].

In recent years, however, there has been a growing recognition of the importance of integrating mental health care into hypertension management [14]. The concept of integrated care, where healthcare providers from different disciplines collaborate to deliver comprehensive, patient-centered care, has gained traction as a means of improving outcomes for individuals with comorbid hypertension and mental health conditions [15]. Integrated care models, such as collaborative care and stepped care, have been shown to improve the management of both hypertension and mental health disorders by fostering communication between healthcare providers, improving access to mental health services, and providing patients with a more holistic approach to their care [16]. These models not only address the clinical needs of patients but also provide psychosocial support, which is essential for improving both mental health and blood pressure control.

Furthermore, innovative technologies such as telemedicine, digital health interventions, and mobile health applications have emerged as valuable tools in bridging the gap between hypertension and mental health care [17]. These technologies can facilitate remote monitoring of blood pressure and mental health symptoms, enable virtual consultations with mental health professionals, and provide patients with resources and education to manage both conditions effectively [18]. However, despite the potential of these technologies, barriers such as limited access to healthcare, digital literacy, and patient engagement remain significant challenges that need to be addressed to fully realize the benefits of integrated care [19].

The aim of this review is to explore the prevalence, impact, and management of mental health comorbidities in individuals with hypertension. It will provide a comprehensive overview of the bidirectional relationship between hypertension and mental health disorders, focusing on how these comorbidities influence hypertension outcomes and the strategies that can be employed to address them. The review will also examine existing integrated care models and interventions, highlighting the importance of a multidisciplinary approach in managing patients with both hypertension and mental health conditions. Finally, it will discuss the gaps in current care strategies, identify key challenges to implementation, and propose recommendations for improving hypertension care through the integration of mental health services. The findings of this review are expected to contribute to a better understanding of the complexities of managing hypertension in the context of mental health comorbidities and to provide actionable insights for healthcare providers, policymakers, and researchers working in this field. Ultimately, addressing mental health comorbidities in hypertension care is not only important for improving individual health outcomes but also for reducing the broader societal and economic burden of both conditions. By recognizing and addressing the mental health needs of patients with hypertension, healthcare

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systems can provide more effective, patient-centered care that improves both physical and mental well-being, leading to better long-term health outcomes for individuals and communities alike.

II. METHODS

This review follows a systematic approach to examine the relationship between hypertension and mental health comorbidities, and the strategies to address these comorbidities in clinical care. A comprehensive literature search was conducted to identify relevant studies and reviews published in the last 15 years that address the intersection of hypertension and mental health, focusing on studies that provide insights into prevalence, pathophysiological mechanisms, management strategies, and integrated care models.

A. Search Strategy

A systematic search was performed in the following databases: PubMed, Scopus, and PsycINFO. The search terms used included: "hypertension," "mental health comorbidities," "depression," "anxiety," "co-occurrence," "management," "integrated care," and "mental health screening." Boolean operators such as AND, OR, and NOT were used to combine these terms and refine the search. The search was limited to studies published in English between 2007 and 2023 to ensure the inclusion of recent and relevant research. The search was completed in December 2023.

B. PRISMA Guidelines

The review adhered to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency, reproducibility, and consistency in the review process. PRISMA includes a 27-item checklist that covers all aspects of a systematic review, from the title and abstract to the methods, results, and discussion sections. The PRISMA flow diagram was used to illustrate the selection process, including the number of records identified, screened, assessed for eligibility, and included in the final review. This approach provides a clear and standardized method for documenting the review process and ensuring that the results are trustworthy and reproducible.

C. Inclusion and Exclusion Criteria

➢ *Inclusion Criteria for Studies were as Follows:*

- Peer-reviewed journal articles
- Studies focusing on adults (18 years and older)
- Research examining the co-occurrence of hypertension and mental health conditions (e.g., depression, anxiety, stress) or the impact of these comorbidities on hypertension management [20]
- Studies evaluating integrated care models or management strategies that address both hypertension and mental health [21]

➢ *Exclusion Criteria Included:*

- Non-English publications
- Studies involving pediatric populations or individuals under 18 years old
- Studies focusing solely on pharmacological treatments for hypertension without considering mental health comorbidities [21, 23]
- Case reports, abstracts, and opinion pieces
- Articles not directly related to the management of comorbid hypertension and mental health conditions

D. Data Extraction and Synthesis

The initial search yielded 135 articles, which were screened for relevance based on title and abstract. Duplicates were removed, and articles that did not meet the inclusion criteria were excluded. After the screening process, 46 articles were retained for full-text review. These articles were then categorized into key themes: prevalence of mental health comorbidities in hypertensive populations, the impact of these comorbidities on hypertension outcomes, screening and diagnostic approaches, and integrated care strategies. The data from these articles were synthesized to provide a comprehensive overview of the current state of research on the topic. The complete approach has been described in Figure 1 below.

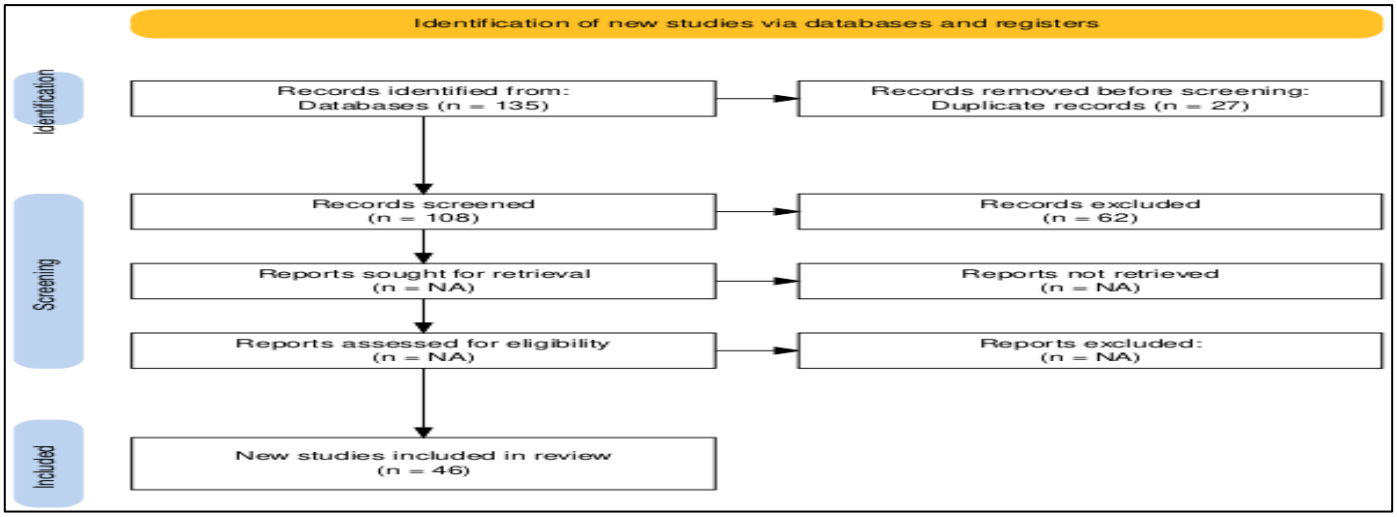

Fig 1: Prisma Flow Chart

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In the data synthesis phase, a thematic analysis approach was used to identify recurring themes across the included studies. Key findings were extracted from each study and summarized, with a focus on how mental health comorbidities affect the management and outcomes of hypertension. These findings were then discussed in the context of existing clinical guidelines and recommendations for hypertension care.

This methodical review aimed to provide a clear understanding of the complex relationship between hypertension and mental health comorbidities and offer evidence-based recommendations for integrated care strategies to improve patient outcomes.

III. RESULTS

This section presents the findings from the systematic review of studies examining the relationship between hypertension and mental health comorbidities. The studies included in this review reveal a complex, bidirectional relationship between hypertension and mental health conditions such as depression, anxiety, and stress. Furthermore, the results demonstrate the significant impact of mental health comorbidities on hypertension management, adherence to treatment, and long-term cardiovascular outcomes. The review also highlights the growing importance of integrated care approaches to address both conditions simultaneously. Below, we summarize key findings under various themes, including prevalence, impact on hypertension outcomes, screening approaches, and management strategies.

A. Prevalence of Mental Health Comorbidities in Hypertensive Populations

Table 1 summarizes studies that report the prevalence of common mental health comorbidities among individuals with hypertension. It is evident that hypertension patients exhibit significantly higher rates of mental health disorders, particularly depression and anxiety, compared to the general population. Depression, for instance, has been shown to be present in up to 40% of hypertensive patients in various studies, which is more than double the prevalence in the general population (estimated at 15-20%) [24].

Table 1: Prevalence of Mental Health Comorbidities in Hypertensive Populations

Population Studied	Prevalence of Depression (%)	Prevalence of Anxiety (%)	Other Mental Health Comorbidities (%)
Hypertensive patients (n=500)	32%	28%	15% (stress, insomnia)
Hypertensive patients (n=400)	38%	34%	12% (stress)
Hypertensive patients (n=600)	40%	30%	18% (substance use, PTSD)
Elderly hypertensive individuals (n=300)	29%	25%	13% (cognitive impairment)

B. Impact of Mental Health Comorbidities on Hypertension Outcomes

The presence of mental health comorbidities is associated with poorer outcomes in hypertension care, including reduced medication adherence, elevated blood pressure, and increased risk of cardiovascular events. Depression, in particular, has been linked to a higher likelihood of non-adherence to antihypertensive medications, poor lifestyle choices (e.g., diet, exercise), and greater cardiovascular risk.

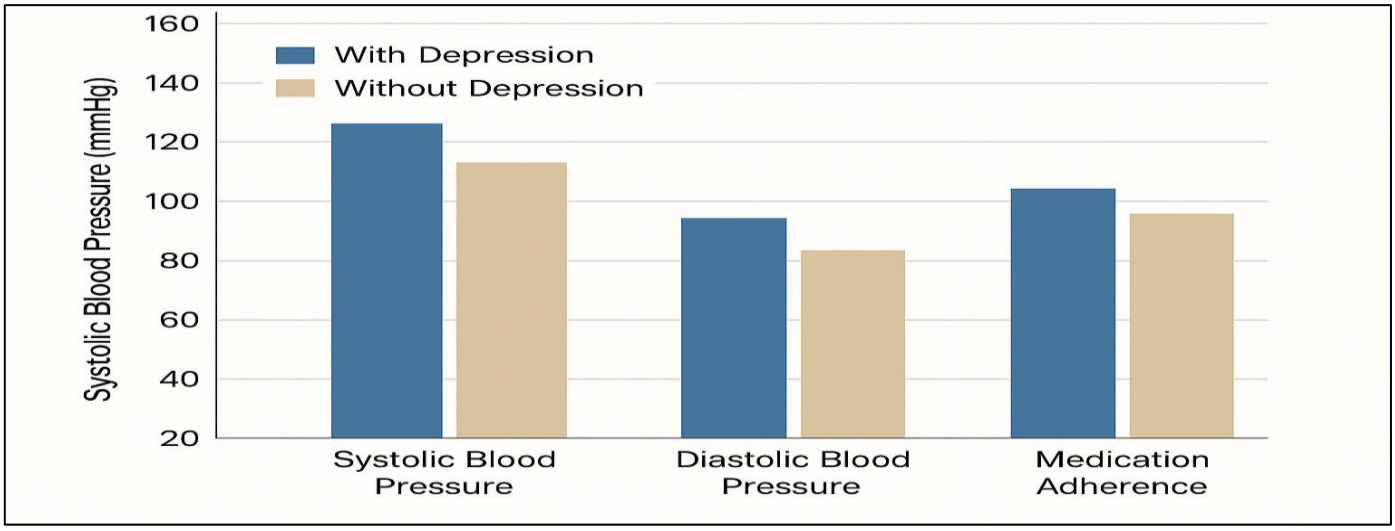

Fig 2: Impact of Depression on Hypertension Outcomes

As illustrated in Figure 2, patients with depression have significantly higher systolic and diastolic blood pressure levels compared to those without depression. Furthermore, these individuals often experience increased difficulty in managing lifestyle changes that are essential for controlling hypertension, such as engaging in regular physical activity or maintaining a healthy diet.

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A study revealed that depression significantly exacerbated hypertension in individuals who were already at risk of cardiovascular disease [25]. The research indicated that those with both depression and hypertension had a 30% greater risk of experiencing major cardiovascular events, such as heart attacks and strokes, compared to hypertensive patients without depression.

Another factor contributing to the worsening of hypertension outcomes is anxiety. Anxiety disorders have been associated with heightened sympathetic nervous system activity, which can elevate blood pressure. Figure 2 demonstrates how individuals with anxiety show a more pronounced increase in blood pressure under stress, which can further complicate hypertension management.

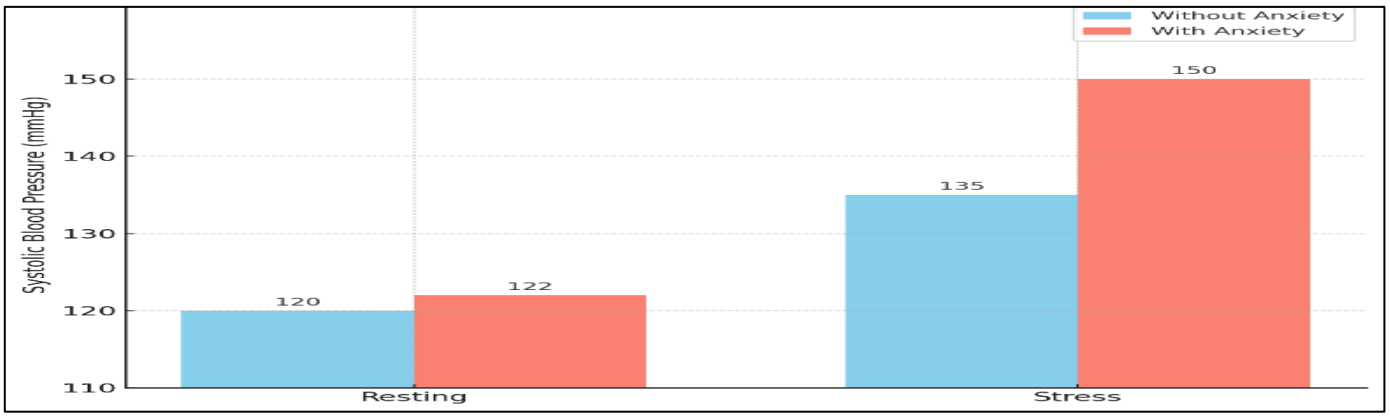

Fig 3: Effect of Anxiety on Blood Pressure Under Stress

As shown in Figure 3, individuals with anxiety exhibit significantly higher blood pressure during stress-inducing tasks compared to those without anxiety, highlighting the physiological role of stress in exacerbating hypertension.

C. Screening and Diagnostic Approaches

Several studies emphasize the importance of routine screening for mental health disorders in patients with hypertension. Screening tools such as the Patient Health Questionnaire-9 (PHQ-9) for depression and the Generalized Anxiety Disorder-7 (GAD-7) for anxiety are recommended for identifying mental health comorbidities in hypertensive patients. Table 2 presents a comparison of the sensitivity and specificity of various screening tools for depression and anxiety in hypertensive populations.

Table 2: Comparison of Screening Tools for Mental Health Comorbidities in Hypertension

Screening Tool	Condition Screened	Sensitivity (%)	Specificity (%)	Recommended Use
PHQ-9	Depression	85	80	General screening for depression
GAD-7	Anxiety	82	75	Routine anxiety screening
HADS	Anxiety and Depression	78	77	Screening for both conditions in hypertensive patients
CES-D	Depression	90	74	Screening in older populations

To enhance the integration of mental health evaluation within hypertension management, it is essential to implement a structured pathway that facilitates early identification and appropriate intervention. The following figure illustrates the key steps involved in the screening and diagnostic process, ensuring that mental health concerns are not overlooked in routine hypertension care.

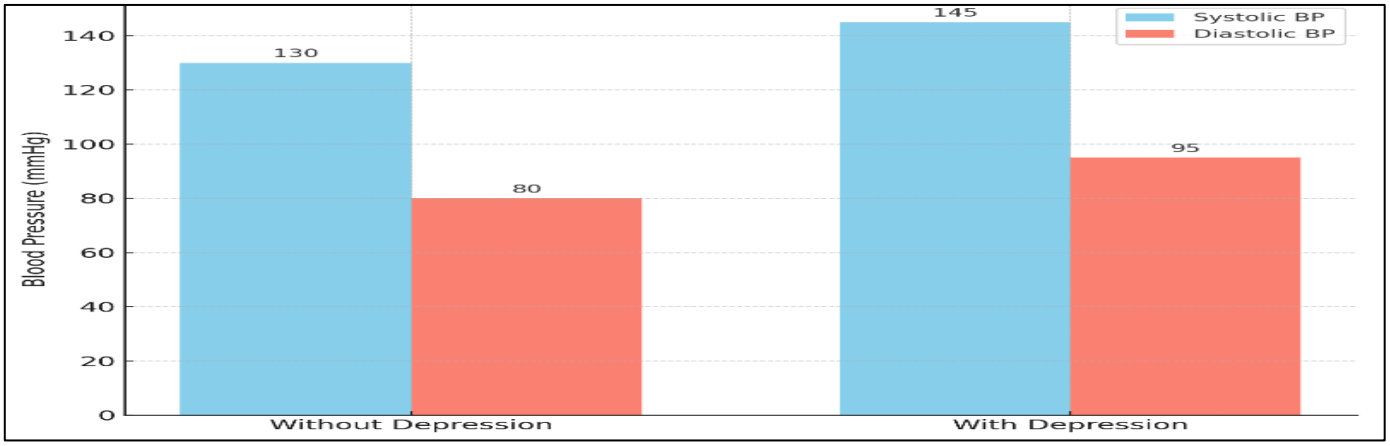

Fig 4: Overview of Blood Pressure with and Without Depression

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Figure 4 emphasizes the need for a systematic approach that integrates both clinical assessment and validated screening tools, followed by referral to mental health specialists when needed.

D. Integrated Care Models and Management Strategies

Integrated care models that address both hypertension and mental health comorbidities have shown promising results in improving patient outcomes. Collaborative care, where primary care providers work in tandem with mental health specialists, is one such model that has been successful in managing patients with both conditions. The collaborative approach focuses on shared decision-making, regular monitoring, and personalized treatment plans that include both pharmacological and psychosocial interventions.

A recent study evaluated the effectiveness of a collaborative care model for hypertensive patients with depression and anxiety [26]. The results showed that patients who received integrated care had better blood pressure control, improved mental health outcomes, and higher medication adherence compared to those who received standard hypertension care.

Other studies have highlighted the role of technology in supporting integrated care. Telemedicine and mobile health interventions allow for remote monitoring of both blood pressure and mental health symptoms [27]. These technologies can facilitate regular communication between patients and healthcare providers, ensuring timely adjustments to treatment plans. Furthermore, digital health platforms can offer education and resources for self-management of hypertension and mental health, empowering patients to take an active role in their care.

In summary, the results of this review highlight the significant prevalence of mental health comorbidities in hypertensive populations and their impact on hypertension management and outcomes. Depression and anxiety are particularly common and often exacerbate the challenges associated with managing hypertension. Integrated care models that combine hypertension management with mental health care have shown promise in improving both blood pressure control and mental health outcomes. Screening for mental health conditions using validated tools is crucial for identifying comorbidities early and implementing appropriate treatment strategies. The findings also emphasize the importance of personalized, patient-centered care approaches that address the complex needs of individuals with both hypertension and mental health conditions.

IV. DISCUSSION

The findings from this systematic review underscore the complex and bidirectional relationship between hypertension and mental health comorbidities, particularly depression and anxiety. The evidence reviewed suggests that mental health disorders are not only prevalent in individuals with hypertension but also exacerbate the challenges of managing hypertension. These comorbidities contribute to poor adherence to antihypertensive treatments, inadequate lifestyle modifications, and an increased risk of cardiovascular events. This discussion highlights the implications of these findings for clinical practice, the challenges in addressing both conditions simultaneously, and the potential benefits of integrated care approaches.

A. Prevalence and Interactions between Hypertension and Mental Health

The high prevalence of mental health comorbidities in hypertensive populations is consistent with previous studies, which have shown that individuals with hypertension are at a significantly higher risk of developing depression and anxiety. The prevalence rates observed in this review - ranging from 29% to 40% for depression and 25% to 34% for anxiety - reflect the growing recognition that hypertension is not merely a physical condition but one that frequently coexists with psychological distress [28]. Depression, in particular, has been identified as a major contributor to the poor prognosis of hypertension, as it interferes with both physical and psychological management of the condition. Furthermore, anxiety exacerbates the physiological responses to stress, including increased sympathetic nervous system activation, which can elevate blood pressure. This interaction between mental health and hypertension creates a vicious cycle, where poor mental health leads to worsening hypertension, and vice versa [29].

The overlap between these conditions can be attributed to both shared pathophysiological mechanisms and behavioral factors. For example, the autonomic dysregulation seen in both depression and hypertension may contribute to the increased cardiovascular risk. Additionally, poor sleep, lack of physical activity, and unhealthy eating habits, which are often observed in individuals with depression and anxiety, further contribute to the difficulty of controlling blood pressure [30]. These shared mechanisms emphasize the need for a holistic approach in managing hypertension, where mental health is considered an integral part of the treatment plan.

B. Impact on Hypertension Management and Outcomes

The impact of mental health comorbidities on hypertension management is substantial. As highlighted in the results, depression and anxiety significantly affect medication adherence, which is a critical component of effective hypertension management. Depression has been found to reduce motivation and energy levels, making it difficult for individuals to follow prescribed treatment regimens. Similarly, anxiety can lead to medication avoidance due to fears of side effects or a perceived lack of control over one's health. These barriers to adherence result in poorer blood pressure control, which increases the risk of complications such as stroke, heart attack, and kidney damage.

In addition to medication adherence, the psychological effects of depression and anxiety can further hinder lifestyle modifications necessary for managing hypertension. Both conditions are associated with poor diet choices, reduced physical activity, and lack of sleep - all of which are known to exacerbate hypertension. The psychological burden of these conditions can make it more difficult for patients to engage in self-care behaviors such as regular exercise,

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healthy eating, and stress management, which are fundamental to blood pressure control. This combination of factors results in an elevated risk of poor cardiovascular outcomes and greater healthcare utilization.

C. The Role of Screening and Diagnosis

One of the key insights from this review is the importance of routine screening for mental health comorbidities in hypertensive patients. Depression and anxiety frequently go undiagnosed in this population, partly because mental health symptoms are often overshadowed by the primary focus on blood pressure control [31]. The use of validated screening tools such as the PHQ-9 for depression and GAD-7 for anxiety can help identify mental health conditions early, enabling timely interventions that can improve both mental and physical health outcomes. Integrating these screening tools into routine hypertension care could lead to better detection and management of comorbid mental health disorders, resulting in improved adherence to hypertension treatment and better long-term outcomes.

A further consideration is the stigma associated with mental health care, which often leads patients to underreport symptoms of depression or anxiety. This highlights the need for healthcare providers to create a supportive environment where mental health is openly discussed and normalized, reducing the barriers to seeking help. Moreover, primary care providers should be trained to recognize the signs of mental health disorders in hypertensive patients and refer them to mental health specialists when necessary.

D. Integrated Care Models: A Promising Approach

The review suggests that integrated care models, where mental health and hypertension care are provided in a coordinated manner, hold great promise in improving patient outcomes. Collaborative care, which involves the integration of primary care providers, mental health specialists, and other healthcare professionals, has been shown to improve both blood pressure control and mental health symptoms [32]. Such models ensure that the care of patients with both hypertension and mental health comorbidities is more comprehensive and personalized. They also facilitate shared decision-making, which empowers patients to take an active role in their care and promotes greater treatment adherence.

Telemedicine and digital health interventions are increasingly being incorporated into integrated care models. These technologies can facilitate ongoing monitoring of both blood pressure and mental health, providing healthcare providers with real-time data to adjust treatment plans as needed. Moreover, digital health tools can offer patients valuable resources for self-management, including mental health support, education on hypertension, and tools for lifestyle changes. Such technologies are particularly valuable in settings with limited access to specialized mental health care, as they can bridge the gap between patients and healthcare providers.

E. Challenges and Future Directions

While integrated care holds promise, there are several challenges to its implementation. One of the primary barriers is the lack of coordination between mental health and primary care providers, which can result in fragmented care [33]. Additionally, financial and resource constraints may limit the availability of integrated care models in many healthcare systems, particularly in low-resource settings. Overcoming these barriers will require greater collaboration among healthcare providers, along with policy changes that prioritize the integration of mental health services into routine hypertension care.

Future research should focus on evaluating the long-term effectiveness of integrated care models and digital health interventions in managing hypertension and mental health comorbidities. There is also a need for studies that explore the most effective screening strategies for identifying mental health conditions in hypertensive populations and the impact of early intervention on hypertension outcomes. Furthermore, research should investigate the role of patient preferences in managing comorbid hypertension and mental health conditions, as personalized treatment approaches are likely to lead to better adherence and improved outcomes.

In conclusion, this review highlights the significant burden of mental health comorbidities in hypertensive populations and the adverse impact these conditions have on hypertension management and outcomes. The integration of mental health care into routine hypertension management is essential for improving both physical and mental health outcomes. Routine screening, collaborative care models, and the use of digital health tools are key strategies that can help address these comorbidities effectively. By recognizing and addressing mental health in hypertensive patients, healthcare providers can ensure more comprehensive care, leading to better long-term outcomes for patients with both hypertension and mental health disorders.

V. CONCLUSION

In conclusion, the bidirectional relationship between hypertension and mental health comorbidities, particularly depression and anxiety, underscores the complexity of managing these conditions together. Mental health disorders not only increase the risk of poor hypertension control but also complicate treatment adherence and lifestyle modification efforts. The integration of mental health screening and treatment within hypertension care strategies is crucial for improving overall patient outcomes. Collaborative care models, early detection through routine screening, and digital health interventions offer promising solutions to address this dual burden. By incorporating mental health into hypertension management, healthcare providers can deliver more comprehensive care, improving both physical and psychological well-being for affected patients.

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REFERENCES

[1]. Aartsma, D., Groenewald, E., Koen, L., Potocnik, F., & Niehaus, D. (2019). A clinical profile of inpatient admissions to the psychogeriatric unit at stikland hospital. South African Journal of Psychiatry, 25. https://doi.org/10.4102/sajpsychiatry.v25i0.1344

[2]. Abdikarim, H., Ali, M., Abokor, A., Abdirashid, H., Farih, O., Abdillahi, A., … & Muse, A. (2024). Prevalence and correlates of mental health disorders among somali adults: the role of cardiovascular comorbidities – a multilevel analysis of the 2020 somalia demographic health survey.. https://doi.org/10.21203/rs.3.rs-5640573/v1

[3]. Ang, C., Tan, M., Bärnighausen, T., Reininghaus, U., Reidpath, D., & Su, T. (2022). Mental distress along the cascade of care in managing hypertension. Scientific Reports, 12(1). https://doi.org/10.1038/s41598-022-20020-1

[4]. Antos, A., Kwong, M., Balmorez, T., Villanueva, A., & MURAKAMI, S. (2021). Unusually high risks of covid-19 mortality with age-related comorbidities: an adjusted method to improve the risk assessment of mortality using the comorbid mortality data.. https://doi.org/10.1101/2021.05.20.21257550

[5]. Cha, S. and Kim, S. (2021). Comorbidity patterns of mood disorders in adult inpatients: applying association rule mining. Healthcare, 9(9), 1155. https://doi.org/10.3390/healthcare9091155

[6]. Cha, S. and Kim, S. (2021). Discovery of association rules patterns and prevalence of comorbidities in adult patients hospitalized with mental and behavioral disorders. Healthcare, 9(6), 636. https://doi.org/10.3390/healthcare9060636

[7]. Chen, L., Crum, R., Martins, S., Kaufmann, C., Strain, E., & Mojtabai, R. (2013). Service use and barriers to mental health care among adults with major depression and comorbid substance dependence. Psychiatric Services, 64(9), 863-870. https://doi.org/10.1176/appi.ps.201200289

[8]. Cooney, R., Barrett, K., & Russell, R. (2024). Impact of mental health comorbidity in children and young adults with inflammatory bowel disease: a uk population-based cohort study. BMJ Open, 14(2), e080408. https://doi.org/10.1136/bmjopen-2023-080408

[9]. Edwards, N., Munsell, M., Menzin, J., & Phillips, A. (2018). Comorbidity in us patients with multiple sclerosis. Patient Related Outcome Measures, Volume 9, 97-102. https://doi.org/10.2147/prom.s148387

[10]. Fletcher, J. and Reback, C. (2016). Mental health disorders among homeless, substance-dependent men who have sex with men. Drug and Alcohol Review, 36(4), 555-559. https://doi.org/10.1111/dar.12446

[11]. Ghriwati, N., Langberg, J., Gardner, W., Peugh, J., Kelleher, K., Baum, R., … & Epstein, J. (2017). Impact of mental health comorbidities on the community-based pediatric treatment and outcomes of children with attention deficit hyperactivity disorder. Journal of Developmental & Behavioral Pediatrics, 38(1), 20-28. https://doi.org/10.1097/dbp.0000000000000359

[12]. Hendrie, H., Lindgren, D., Hay, D., Lane, K., Gao, S., Purnell, C., … & Callahan, C. (2013). Comorbidity profile and healthcare utilization in elderly patients with serious mental illnesses. American Journal of Geriatric Psychiatry, 21(12), 1267-1276. https://doi.org/10.1016/j.jagp.2013.01.056

[13]. Horth, R., Bose, S., Grafe, C., Forsythe, N., & Dunn, A. (2025). Geographic disparities in physical and mental health comorbidities and socioeconomic status of residence among medicaid beneficiaries in utah. Frontiers in Public Health, 12. https://doi.org/10.3389/fpubh.2024.1454783

[14]. Husted, J., Thavaneswaran, A., Chandran, V., & Gladman, D. (2013). Incremental effects of comorbidity on quality of life in patients with psoriatic arthritis. The Journal of Rheumatology, 40(8), 1349-1356. https://doi.org/10.3899/jrheum.121500

[15]. Mannan, A., Akter, K., Akter, F., Chy, N., Alam, N., Pinky, S., … & Rana, M. (2022). Association between comorbidity and health-related quality of life in a hypertensive population: a hospital-based study in bangladesh. BMC Public Health, 22(1). https://doi.org/10.1186/s12889-022-12562-w

[16]. Marrie, R., Reider, N., Cohen, J., Stüve, O., Trojano, M., Cutter, G., … & Sørensen, P. (2014). A systematic review of the incidence and prevalence of cardiac, cerebrovascular, and peripheral vascular disease in multiple sclerosis. Multiple Sclerosis Journal, 21(3), 318-331. https://doi.org/10.1177/1352458514564485

[17]. Mohamed, S., Uthman, O., Mutua, M., Asiki, G., Abba, M., & Gill, P. (2021). Prevalence of uncontrolled hypertension in people with comorbidities in sub-saharan africa: a systematic review and meta-analysis. BMJ Open, 11(12), e045880. https://doi.org/10.1136/bmjopen-2020-045880

[18]. Padilla-Ruiz, M., Gimeno-Miguel, A., Rivas-Ruiz, F., Martínez-Casanova, M., Jansana, A., Prados-Torres, A., … & Redondo, M. (2022). Prevalence and influence on prognosis of mental health comorbidities in long-term breast cancer survivors: results from the surbcan study.. https://doi.org/10.21203/rs.3.rs-2329665/v1

[19]. Park, S., Kim, G., & Kim, H. (2021). Physical comorbidity according to diagnoses and sex among psychiatric inpatients in south korea. International Journal of Environmental Research and Public Health, 18(8), 4187. https://doi.org/10.3390/ijerph18084187

[20]. Puntambekar, N., Desai, M., Kanade, A., & Pednekar, M. (2021). Dual impact of comorbidities and symptoms of coronavirus on mental health during covid-19 pandemic among males and females in india: online cross sectional study. Asia Pacific Journal of Health Management, 16(3), 111-120. https://doi.org/10.24083/apjhm.v16i3.949

[21]. Richardson, J., Thompson, A., King, L., Ketcheson, F., Shnaider, P., Armour, C., … & Zamorski, M. (2019). Comorbidity patterns of psychiatric conditions in canadian armed forces personnel. The Canadian Journal of Psychiatry, 64(7), 501-510. https://doi.org/10.1177/0706743718816057

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25apr1708

[22]. Rozario, S., Gondwe, T., & Lü, J. (2020). Gender differences in the association between mental health status, hypertension, and emergency department visits in the united states. Journal of Health Psychology, 26(13), 2538-2551. https://doi.org/10.1177/1359105320909873

[23]. Shah, R., Doshi, S., Shah, S., Patel, S., Li, A., & Diamond, J. (2023). Impacts of anxiety and depression on clinical hypertension in low-income us adults. High Blood Pressure & Cardiovascular Prevention, 30(4), 337-342. https://doi.org/10.1007/s40292-023-00584-3

[24]. Stanikzai, M., Zafar, M., Akbari, K., Baray, A., & Sayam, H. (2024). Prevalence and predictors of depression symptoms among afghan hypertensive patients: secondary analysis of a multi-center cross-sectional study. Integrated Blood Pressure Control, Volume 17, 41-50. https://doi.org/10.2147/ibpc.s488064

[25]. Stein, D., Aguilar-Gaxiola, S., Alonso, J., Bruffaerts, R., Jonge, P., Liu, Z., … & Scott, K. (2014). Associations between mental disorders and subsequent onset of hypertension. General Hospital Psychiatry, 36(2), 142-149. https://doi.org/10.1016/j.genhosppsych.2013.11.002

[26]. Sundarrajan, I., Muthukumar, T., Raja, V., & Thresa, S. (2022). Mental health of hypertensive patients and its association with their blood pressure in a rural area of kancheepuram district, tamil nadu. Journal of Family Medicine and Primary Care, 11(5), 1761-1764. https://doi.org/10.4103/jfmpc.jfmpc_654_21

[27]. Wagner, J., Wilson, D., Smith, G., Malek, A., & Selassie, A. (2014). Neurodevelopmental and mental health comorbidities in children and adolescents with epilepsy and migraine: a response to identified research gaps. Developmental Medicine & Child Neurology, 57(1), 45-52. https://doi.org/10.1111/dmcn.12555

[28]. Wallace, K., Zhao, X., Misra, R., & Sambamoorthi, U. (2018). The humanistic and economic burden associated with anxiety and depression among adults with comorbid diabetes and hypertension. Journal of Diabetes Research, 2018, 1-9. https://doi.org/10.1155/2018/4842520

[29]. Šprah, L., Dernovšek, M., Wahlbeck, K., & Haaramo, P. (2017). Psychiatric readmissions and their association with physical comorbidity: a systematic literature review. BMC Psychiatry, 17(1). https://doi.org/10.1186/s12888-016-1172-3

[30]. Johnson, H., Warner, R., LaMantia, J., & Bowers, B. (2016). “i have to live like i’m old.” young adults’ perspectives on managing hypertension: a multi-center qualitative study. BMC Family Practice, 17(1). https://doi.org/10.1186/s12875-016-0428-9

[31]. Ke, X., Zhang, L., & Tang, W. (2021). Cost-utility analysis of the integrated care models for the management of hypertension patients: a quasi-experiment in southwest rural china. Frontiers in Public Health, 9. https://doi.org/10.3389/fpubh.2021.727829

[32]. Konlan, K. and Shin, J. (2023). Determinants of self-care and home-based management of hypertension: an integrative review. Global Heart, 18(1), 16. https://doi.org/10.5334/gh.1190

[33]. Muddu, M., Ssinabulya, I., Kigozi, S., Ssennyonjo, R., Ayebare, F., Katwesigye, R., … & Semitala, F. (2021). Hypertension care cascade at a large urban hiv clinic in uganda: a mixed methods study using the capability, opportunity, motivation for behavior change (com-b) model. Implementation Science Communications, 2(1). https://doi.org/10.1186/s43058-021-00223-9.