Disparities in Prevalence and Barriers to Hypertension Control

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Controlling hypertension (HTN) remains a challenge, as it is affected by various factors in different settings. The prevalence of hypertension control in the low and middle-income countries and high-income countries studies ranged from (3.8% to 50.4%) to (36.3% to 69.6%), respectively. Concerning barriers to hypertension control, patient-related barriers were the most frequently reported, followed by medication adherence barriers, lifestyle-related barriers, barriers related to the affordability and accessibility of care, awareness-related barriers, and, finally, barriers related to prescribed pharmacotherapy.

hypertension blood pressure prevalence barriers medication adherence awareness antihypertensive agents

1. Introduction

Persistent hypertension (HTN), or high blood pressure (BP), is a significant public health concern, with an estimated affected population of nearly 1.3 billion people worldwide [1]. It is considered a global epidemic disease that imposes a considerable health and economic burden on the healthcare system across low- and middle-income countries (LMIC) and high-income countries (HIC) [2]. Hypertension is a major factor contributing to the increased CVD mortality rate and is one of the major causes of premature mortality [3].

Hypertension treatments should keep blood pressure under optimal control to avoid negative consequences. Evidence has shown that patients with an excessive morning rise in BP and those who lack a nocturnal decrease in BP have an increased incidence of strokes, heart failure, and other CV events [4]. However, HTN control remains suboptimal; it can be achieved in less than half of hypertensive patients even though more patients have received treatment over time [3]. The inability to achieve and maintain HTN control is a significant healthcare concern, wherein patients with untreated or inadequately controlled HTN have a significantly increased risk of disease complications [1].

Hypertension prevalence, awareness, and control are subject to several disparities globally [5]. For example, the relative decrease in the age-standardized prevalence of hypertension by 2.6% in HIC was associated with a relative increase in the awareness, treatment, and control proportions. Meanwhile, in LMIC, the decrease in awareness and control has contributed to a rise of 7.7% in hypertension prevalence [5]. These observations

indicate the need for coordinated BP control interventions considering awareness, optimal treatment, and long-term control.

Identifying significant barriers that may prevent patients from attaining HTN control is critical. Additionally, there is a need for recent data on comparative prevalence values and the patient-related barriers hindering optimal BP control across LMIC and HIC. Although there are recent data from population-based studies covering hypertension prevalence, control, and treatment [5], patient-reported barriers to attaining HTN control have not been extensively and systematically presented in the recent literature.

2. Barriers to Optimal Hypertension Control

2.1. Patient-Related Barriers

Across all the included studies, these barriers were the most frequently reported, with a relatively higher impact on hypertension control in the HIC studies. Two main subcategories were identified, which include sociodemographic factors and comorbidities.

Sociodemographic Factors

Sociodemographic characteristics, including age, gender, and socioeconomic status, were reported to impact BP control. For example, an Iraqi study demonstrated that non-elderly male patients were more likely to have uncontrolled HTN regardless of their education level and employment status [6]. This might be explained by the difference in the healthcare-seeking behavior of non-elderly compared to elderly patients who had potentially more opportunities to seek healthcare services triggered by their underlying comorbidities and their need for regular follow-up visits. However, some studies in HIC highlighted that old age is a barrier to optimal BP control and a strong predictor of uncontrolled HTN [7][8]. Potential explanations include changes via physiological aging, comorbidities, the heterogeneity of the treatment among elderly patients, social exclusion, a lack of support, and insufficient knowledge about HTN self-management [7].

Concerning the gender impact on BP control, several studies in Chile, Singapore, and Tanzania highlighted that male patients were more prone to having poor BP control [7][9][10]. Meanwhile, Santosa et al. reported higher odds of BP control among male patients with diabetes in Sweden [11]. The gender-based differences in hypertension control could be attributed to differences in the patients' levels of concern and awareness of their hypertension. For example, a recent German study highlighted that women tend to be more concerned about their BP control than men [12]. Additionally, women tended to be more aware of their hypertension than men, as reported in two studies in Angola and Peru [13][14]. Men and premenopausal women of similar ages are at greater risk of CVD and renal diseases. However, BP increases to higher levels in postmenopausal women than in men [15]. This shows that gender barriers to optimal BP control depend on other risk factors such as age and health conditions such as menopause. It has also been suggested that BP levels in both genders are more likely to increase as the number of risk factors increases [16].

Furthermore, in a study conducted in LMIC, there was no significant association between education, employment level, and BP control [6]. In contrast, the HIC study's findings showed that patients with less than a high school education were more likely to be resistant to HTN treatment [17]. In addition, it was reported that a higher rate of uncontrolled BP is observed among people with low education levels [18].

Unsurprisingly, the LMIC studies tended to highlight the role of financial constraints and their adverse impact on medication adherence, leading to the suboptimal achievement of BP control [19]. Overall, socioeconomically disadvantaged people are more likely to have HTN and have a higher likelihood of having poor BP levels despite treatment [18]. This might underpin the need for customized interventions to target BP control improvement among individuals affected by socioeconomic challenges. Moreover, recent research has highlighted the impact of sociodemographic factors on hypertension control in the era of the COVID-19 pandemic. The findings showed that the pandemic negatively impacted the overall hypertension control of the younger population, the lower-income group, unmarried, and unemployed individuals [20].

Comorbidity

Comorbidity has various implications, including the necessity of a more complex therapeutic regimen and the increased likelihood of poor adherence to antihypertensives [21]. However, it can be argued that the presence of a comorbidity results in more chances of seeking healthcare services and, consequently, having higher odds of controlling risk factors [19]. Several studies, mainly in LMIC, have demonstrated a strong association between diabetes mellitus (DM) and poor BP control [6][22]. Besides poor BP control resulting from DM as a comorbidity, HTN plays a significant role in DM progression. In type 2 DM, HTN is often present in the insulin resistance syndrome in obesity and dyslipidemia. Meanwhile, in type 1 DM, HTN may indicate the onset of diabetic nephropathy [23]. The coexistence of HTN and DM necessitates a multifaceted approach considering the target levels and appropriate therapy selection [24][25].

Furthermore, across the LMIC and HIC studies, inadequate BP control was reported among those with elevated total cholesterol, LDL, and uric acid levels [26][27][28]. Additionally, stable angina pectoris significantly interfered with adequate BP control among hypertensive patients [26]. In addition, a strong association was demonstrated between CKD and poor BP control, particularly in the case of severe albuminuria or proteinuria [27]. Moreover, depression may interfere with BP control, with a significant correlation between systolic and diastolic BP levels and depression [29].

2.2. Medication Nonadherence

Suboptimal medication adherence was more pronounced in the LMIC studies (n = 9). A total of five studies have reported that more than 40% of their study participants had poor adherence to their antihypertensive medications [22][30][31][32][33]. In addition, the evidence shows that poor BP control is significantly associated with poor adherence [32][33]. Two Nigerian studies reported that forgetfulness was the most common reason for poor adherence, followed by financial barriers, a high pill burden, and the side effects of the antihypertensive medications [30][31]. Another study highlighted that a young age, living in rural areas, the fear of becoming accustomed to the medication, and

unsatisfactory treatment are common barriers to optimal adherence [34]. A recent study reported that patients who omitted their prescribed antihypertensive medications showed more inadequate BP control [35].

Nonetheless, additional evidence suggests that polypharmacy substantially affects blood pressure control more than medication adherence alone [36]. These findings show that medication adherence and BP control are multifactorial, implying the need for collaborative, multifaceted interventions for positive clinical outcomes [37].

2.3. Lifestyle Factors

This entry has frequently identified lifestyle-related BP control barriers in several LMIC and HIC studies. Approximately 60% of the factors related to individual health and quality of life are linked to lifestyle, indicating that those with unhealthy lifestyles are more likely to encounter morbidity, disability, and mortality [38]. The association between lifestyle factors, including physical inactivity, smoking, BMI, salt intake, alcohol consumption, stress, and poor BP control, has been confirmed [8][16][28][39]. Patients who perform physical activity at least four days per week are more inclined to have optimal BP control [39]. Moreover, smoking and an abnormally high BMI are independent predictors of elevated systolic BP [8]. It is worth highlighting that the parameters used to measure lifestyle factors vary among the reviewed studies. In addition, several factors could coexist in one patient. Therefore, a Chinese study that examined the impact of lifestyle factors on BP control highlighted that BP control was positively correlated with the number of lifestyle factors being addressed [16].

2.4. Pharmacotherapy-Related Barriers

The challenge of optimizing HTN pharmacotherapy has been highlighted exclusively across numerous LMIC studies. Monotherapy is recommended in those whose blood pressure is less than 20/10 mm Hg above the target; however, combination therapy would benefit those with a BP more than 20/10 mm Hg above the target [40]. The failure to intensify and optimize the pharmacotherapy with disease progression is significantly associated with lower odds of BP control [41]. However, uncontrolled hypertension was reported among patients on two or more antihypertensives, indicating a mixed relationship between the number of antihypertensives and BP control [8][17]. In a recent scientific statement by the American Heart Association, complexity, frequent changes, and a lack of immediate benefit of the treatment regimen are common contributors to nonadherence [42]. All of these therapy-related factors are becoming more frequent with the increasing the number of antihypertensives.

Besides being offered monotherapy or combination therapy, the choice of antihypertensive agent affects BP control. According to a Chinese study that explored the BP control barriers among patients with CVD, a correlation between non-dihydropyridine CCB and a lower rate of BP control was confirmed [26]. However, the extent of BP reduction should remain the primary determinant of reducing CVD risk among hypertensive patients, wherein the role of combination therapy is increasingly needed [40].

Moreover, long-term antihypertensive treatment is reported as a facilitator of medication adherence [43]. In addition, a longer duration of taking antihypertensive drugs is positively associated with adequate BP control [44]. The avoidance of medication errors is essential for optimizing HTN pharmacotherapy, considering that medication

errors represent a significant predictor of uncontrolled HTN [35]. Overall, as pharmacotherapy's optimization is not a one-time intervention in people with chronic diseases, continuous assessments of the effectiveness and safety alongside interventions to boost adherence are increasingly needed to improve clinical outcomes [37][45]. Further detailed evaluations of the ongoing prescribing patterns will provide a basis for interventions that are most likely to be adopted in clinical practice [46][47].

3. Implications for Hypertension Control across Different Countries

The BP control barriers' distribution appears differently due to the older ages in HIC and inadequate knowledge, poor medication adherence, and challenges regarding pharmacotherapy optimization in LMIC. Furthermore, the HIC studies have reported that older age is a determinant of suboptimal BP control [27][48]. These findings imply the need for more coordinated hypertension care for the older population with fewer caregivers and regular follow-ups and medication optimization support. It is also an area of further need for patient safety initiatives to support better hypertension control in this patient population.

Interventions to improve disease knowledge and enhance medication adherence are required, particularly in LMIC, to help hypertensive patients cope with long-term disease control [37]. The knowledge gaps among patients with chronic diseases are common and need to be addressed by relevant educational interventions [49]. In a systematic review of nonadherence to antihypertensive medications in LMIC, the findings suggested that medication adherence ranged from 25.4% to 63.4%, depending on the cut-off point scales (80–90%) or the MMAS eight-item scale, respectively [50]. Apart from these relatively special considerations, there is a generic need for community interventions to enforce a healthier lifestyle and pharmacotherapy optimization in most LMIC studies. Interventions that optimize pharmacotherapy which consider the simplifications of drug regimens are needed [51].

Finally, an examination of the frequency of the barriers encountered in LMIC studies indicates the need for interventions that tackle several barriers simultaneously. There is a need for the simultaneous consideration of barriers related to lifestyle, disease knowledge, medication adherence, pharmacotherapy optimization, and the cost of healthcare services. The evidence shows that multifaceted interventions that analyze all potential barriers and target them in a stepwise customized approach would be associated with significant BP control improvement in the community [52][53]. Care for chronic diseases, including hypertension, requires coordinated interprofessional care that involves multiple health industry team members. Collaborative models involving physicians, pharmacists, and nurses are feasible and promising with respect to proper design and coverage for all BP control determinants [54][55].

This entry is not without limitations. Although this entry provides a recent and comprehensive insight into the prevalence and patient-related barriers to BP control generated from survey-based studies in the last decade, it did not account for the considerable difference in the study populations between studies. All the limitations of survey studies are the inherent limitations of this entry, such as reporting and social desirability biases. Finally, this entry could be restricted to a systematic description of the findings due to the lack of planned statistical inferences.

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