



CODEN [USA]: IAJPB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**

SJIF Impact Factor: 7.187

<https://zenodo.org/records/10644224>Available online at: <http://www.iajps.com>

Review Article

**SELF-MEDICATION AMONG PEOPLE LIVING WITH  
HYPERTENSION****Prof. J S Venkatesh<sup>1</sup>, Dr.Santosh Uttangi<sup>2</sup>, Akhila K.R<sup>3</sup>, Anagha T.J<sup>4</sup>, Anjali Maria Thomas<sup>5</sup>, Aadithya<sup>6</sup>**<sup>1</sup>Professor and HOD, Department of Pharmacy Practice, S C S College of Pharmacy, Harapanahalli, Karnataka, India<sup>2</sup>Department of Pharmacy Practice, S C S College of Pharmacy, Harapanahalli, Karnataka, India<sup>3-6</sup>PharmD Interns, S C S College of Pharmacy, Harapanahalli, Karnataka, India**Abstract:**

*Self-medication is a prevalent practice among individuals with hypertension, driven by health beliefs impacting medication adherence and treatment outcomes. This review, spanning English-language literature from 2000 to 2014, examines the scope of self-medication, focusing on the scale, types of medication, and influencing factors. Of the 27 studies meeting inclusion criteria, 22 concentrated on complementary and alternative medicines (CAMs). Findings reveal that 11% of patients obtain anti-hypertensive medications over-the-counter (OTC), while 25% resort to CAMs, primarily herbs, to lower blood pressure. Recommendations from acquaintances, dissatisfaction with conventional medicine, and cost concerns influence CAM usage. Additionally, 70% of hypertensive patients use OTC medicines for minor ailments. Concurrent use of anti-hypertensive medications, analgesics, and herbal remedies is common. Despite varying sociodemographic profiles, low disclosure of self-medication practices persists. This review underscores the need for further studies to evaluate the impact of self-medication on hypertension treatment, emphasizing the importance of health professionals' awareness in managing hypertension.*

*KEYWORDS: Self-medication, Over-the-counter (OTC), Complementary and Alternative Medicines (CAMs), Sociodemographic profile, Health beliefs, Medication adherence, Cost concerns.*

**Corresponding author:****Anjali Maria Thomas,**

PharmD Intern,

S C S College of Pharmacy,

Harapanahalli, Karnataka, India

QR code



*Please cite this article in press Anjali Maria Thomas et al., Self-Medication Among People Living With Hypertension., Indo Am. J. P. Sci, 2024; 11 (01).*

**INTRODUCTION:**

As a major cause of the majority of cardiovascular illnesses globally, hypertension continues to be a serious public health concern<sup>1-2</sup>. By 2025, there are expected to be over 1.5 billion hypertensive individuals worldwide, up from the current estimate of 970 million<sup>3</sup>. While proper management of hypertension has been linked to a decrease in cardiovascular events<sup>4</sup>, only 25% of people with high blood pressure have acceptable blood pressure control<sup>5</sup>.

One popular kind of self-care is self-medication, which is described as using items to address illnesses or symptoms that one has identified. These products can include over-the-counter (OTC) medications, herbal remedies, nutritional supplements, and vitamins<sup>6</sup>. It fosters a sense of self-empowerment by empowering patients to take charge of their health care<sup>7</sup>. Nevertheless, self-medication habits may result in adverse effects<sup>9-10</sup> or drug interactions if nonprescription medicines are used concurrently with prescription medication<sup>8</sup>. Moreover, incorrect self-medication can result in polypharmacy, extended use, incorrect dosage, and misdiagnosis.

The potential danger of self-medication is very high in patients with chronic conditions like hypertension<sup>12</sup>. OTC medications<sup>8</sup> and complementary and alternative medicines (CAMs)<sup>13-15</sup> are frequently utilized in studies including patients with cardiovascular disorders. Though hypertension is a major contributing factor to a major worldwide risk for death and morbidity<sup>2</sup>, self-medication among hypertensive individuals is particularly noteworthy because patients frequently create customized treatment plans<sup>16-17</sup>. According to a recent comprehensive study, THM is the most popular form of complementary and alternative medicine (CAM) utilized by patients with hypertension in Sub-Saharan Africa for self-medication. Nevertheless, there was no proof of the usage in the four research that formed the basis of the evaluation. Yet, there was no proof of the use of OTC or alternative forms of complementary and alternative medicine in the four research that formed the basis of the review<sup>18</sup>.

It's critical to comprehend the self-medication habits of individuals with hypertension in order to guarantee effective hypertension control. But it's crucial to understand that self-medication behaviours can take many other forms, not only the self-initiated use of complementary treatments. Using over-the-counter

(OTC) medications, prescription drugs used without a prescription, and complementary and alternative medicine (CAMs) (e.g., herbal medicines, nutritional supplements, and home cures are all constituted forms of self-medication<sup>6,19-20</sup>. Therefore, the intention of this review is to examine the several ways that people with hypertension self-medicate. This covers both self-medication used to treat other illnesses and self-medication aimed at lowering high blood pressure. This review also describes the communication that occurs between patients and healthcare providers regarding self-medication, as well as the factors that influence self-medication habits.

**METHODS:**

The Cumulative Index to Nursing and Allied Health Literature (CINAHL), Academic Search Complete (EBSCO), Medline (Ovid), and Scopus were the online databases used for a thorough search of literature published between January 2000 and December 2014. The combined search terms "hypertension," "blood pressure," "chronic disease," or "cardiovascular" were used with the items that follow search terms: "over the counter," "non-prescription," "self-medication," "herbal medicine," "traditional medicine," "complementary medicine," or "alternative medicine."

CAMs or over-the-counter medications used for self-medication by hypertension patients were included in the review's original study papers. All peer-reviewed English-language articles on human subjects were eligible, although there were no national restrictions. Articles that couldn't distinguish the data on hypertensive research participants from other study populations were also disqualified, as were meeting reports, editorials, comments, and case reports. From the retrieved articles' reference lists and earlier review articles, other articles were looked up.

**RESULTS:**

In the full-text assessment, a total of 27 publications were found to match the requirements for inclusion. According to the World Bank's country classification<sup>21</sup>, 10 of the research were conducted in 6 developed nations, including the United States, and 17 research were conducted in 12 developing nations (Mexico, South Africa, Philippines, Turkey, Jordan, Nigeria, Uganda, India, Morocco, Palestine, Malaysia, Ghana), as well as in the Kingdom, Republic of Trinidad and Tobago, Taiwan, Singapore, and Japan.

Ten studies were carried out in a community context, and seventeen were carried out in hospitals or clinics. The major method of data collection was survey

design, which involved employing structured or semi-structured questions in face-to-face interviews. Sample sizes varied, ranging from 85622 respondents in a population-based investigation conducted in Taiwan<sup>23</sup>, to 72 patients in Turkey<sup>22</sup>.

### The fraction of patients who use self-medication

Considering the variety of self-medication techniques used by hypertension patients, this review divides these techniques into three types of self-medication: (1) using antihypertensive drugs, (2) using over-the-counter medications, and (3) using complementary and alternative medicine.

#### ● Self-administration of antihypertensive drugs

Despite the fact that the antihypertensive medications in question were classified as prescription-only, two investigations<sup>24-25</sup> found self-medication with them. According to Balbuena et al.<sup>24</sup> 131 out of 245 elderly Mexican adults bought drugs without a prescription. Twenty-seven (11%) of the 246 over-the-counter drugs that patients took had anti-hypertensive properties<sup>24</sup>. 4 of 33 (11%) individuals with a smaller research (n = 78) conducted in the Philippines took anti-hypertensive medications that they bought over the counter<sup>25</sup>. The study did not specify the brand or kind of antihypertensive medication that was bought, nor the location of the purchase. Self-medication by outpatients with other prescription drugs solely. A study conducted in the Republic of Trinidad and Tobago also found that hypertension, and the majority of these medications, including lorazepam and diazepam, were linked to sleep difficulties<sup>26</sup>.

#### ● OTC medication self-medication

Three studies from the Republic of Trinidad and Tobago and the United States examined OTC medication use in hypertension patients. Seventy percent of patients used over-the-counter medications on average. However, due to variations in the recollection period and the time frame that patients were requested to take into account when answering the questionnaire, this average should be interpreted with caution. The percentage of users increases with the length of the recall period: 32, 86, and 92% for two weeks, one month, and six months, respectively<sup>26-28</sup>.

The most often used over-the-counter medication was analgesic. Analgesics were used to treat mild illnesses by 62% of hypertension patients (102/165) in the Republic of Trinidad and Tobago, including paracetamol (66%), rubefacient analgesics (37%), and nonsteroidal anti-inflammatory medications (NSAIDs) (26%). The study also found that using NSAIDs along with anti-hypertensive medications (such as beta-blockers, thiazides, and angiotensin-

converting enzyme inhibitors) may lessen the effects of the latter<sup>26</sup>. Eighty-six percent (142/165) of hypertensive older adults who took part in the study in the US used two or more over-the-counter medications<sup>28</sup>. The study found that 99 patients (60%; n = 165) utilized analgesics; 49 patients reported using over-the-counter NSAIDs (ibuprofen, aspirin), and 39 patients revealed using paracetamol<sup>28</sup>. Additional over-the-counter medications included in the examined research were sympathomimetics, laxatives, decongestants, antihistamines, and expectorants<sup>26-28</sup>.

#### ● Self-administration of CAMs

Out of 22 publications on complementary and alternative medicine (CAM), 13 offered information on using different CAMs for self-medication, 8 discussed the use of herbal remedies<sup>29-36</sup>, and the final article<sup>37</sup> discussed the use of Traditional Chinese Medicines (TCM) particularly. This review serves as an example of how widely different studies have defined and categorized complementary and alternative medicine. Seven studies<sup>39,40,42,43,45,48,49</sup> employed the National Centre for Complementary Alternative Medicine's classification system (NCCAM) to classify complementary and alternative medicine (CAMs) into five categories: energy therapies, mind-body intervention, biological-based therapies (such as herbal remedies, vitamins, and dietary supplements), manipulative and body-based techniques, and alternative medical practice<sup>50</sup>. Six research<sup>22,38,41,44,46</sup> either created their own standards or provided a vague explanation of their categorization scheme. This review categorizes the percentage of hypertension patients who use complementary and alternative medicine (CAMs) into two groups: (i) those who use CAMs to treat hypertension, and (ii) those who utilize CAMs for any kind of health issue.

#### 1. Using CAMs for self-medication to treat hypertension

Ten studies, all in developing nations, were compared in terms of CAM consumption and economic development<sup>22,29</sup>. The average recorded by studies<sup>30,32,35,36,45-47,49</sup> was greater (30.7%) than the average of 10% reported by four studies were out in developed nations<sup>34,37,40,41</sup>. The two most popular CAMs utilized by patients were herbal remedies and nutritional supplements<sup>29-32,47</sup>. Garlic, neem, roselle, ginger, vinegar, lemon, tea, bitter leaves, black seed, aloe vera, cod liver oil, and fish oil are among the many herbal remedies for hypertension that were found in the evaluated studies<sup>37,46</sup>. The papers that were analyzed included reports on the usage of different CAMs. The most often used complementary and alternative medicine (CAM) for the treatment of hypertension in the US was homoeopathy<sup>40</sup>. The

practice of Ayurveda was selected by 57% of Indian hypertension patients<sup>46</sup>. For patients with hypertension, mind-body therapies (such as healing practices, prayer, meditation, and stress-reduction workshops) were frequently employed in the US<sup>40-42</sup>, UK<sup>39</sup>, and Japan<sup>43</sup>. Furthermore, certain ethnicities reported using traditional treatments to treat hypertension, such as hijama (cupping blood-letting) in Jordan and Japan<sup>32,43</sup> and applying cold packs to the forehead (22 in Turkey). Ten trials reported using CAMs in addition to antihypertensive medications<sup>22,30-32,36,38,44,46-48</sup>. Three of these trials included reports of diarrhea, tummy pain, and diplopia as a neem adverse effect and skin responses following aloe vera usage<sup>36,46,48</sup>. Exacerbation of hypertension was the other unfavorable impact of concurrent CAM use, as noted by 69 out of 93 Indian patients who expressed dissatisfaction with CAMs. For that reason, these patients stopped using CAMs later on<sup>46</sup>.

## 2. Using CAMs for self-medication of other medical conditions

A majority of 38.2% of hypertension patients used complementary and alternative medicine (CAMs) for other medical illnesses, according to eight research (34, 36–40, 42, 48). According to a national survey conducted in the United States, 59% of older adults with hypertension utilized herbal remedies and supplements to manage chronic diseases; however, only 6% of respondents used this complementary and alternative medicine (CAM) specifically for hypertension<sup>40</sup>. In the United States, the most popular herbal medications utilized by hypertension patients were chondroitin, glucosamine, garlic, and fish oil<sup>42</sup>. The poll also revealed that the most popular supplements (80%) were vitamin C (18%), followed by calcium (27%) and multivitamins (80%). According to a study conducted in Palestine, some herbs, including hawthorn, garlic, rosemary, olives, and anise, are used to treat diabetes and cancer in addition to hypertension. Of the 4575 hypertension patients in the research, 86% used one or more CAM kinds<sup>48</sup>. 120 circulating hypertensive patients in Nigeria were also reported to have used complementary and alternative medicine (CAM) for the treatment of other concomitant conditions, such as typhoid, malaria, skin disorders, diabetes, erectile dysfunction, stomach problems, cough, and anxiety. The survey indicated that the most often used herb was neem<sup>36</sup>.

### Factors influencing self-medication practices in hypertensive patients

Fifteen investigations delved into examining the correlation between demographic and psychosocial

elements and the adoption of self-medication practices. The self-medication user profile was obtained from 12 of these studies, as the demographic details in the remaining three studies could not be extracted specifically for individuals with hypertension<sup>24,41,45</sup>. Among the 12 studies, there was considerable variation in the sociodemographic characteristics of patients involved in self-medication, as indicated in the reviewed articles.

The likelihood of complementary and alternative medicine (CAM) utilization for hypertension displayed an association with older age in two studies<sup>36,48</sup>. However, three studies<sup>30,39,49</sup> did not demonstrate such a correlation. Additionally, a study indicated that hypertensive patients below the age of 65 were more prone to using over-the-counter (OTC) medicines for minor ailments compared to their older counterparts<sup>26</sup>. Regarding gender disparities, two studies identified being male as an independent predictor of CAM usage<sup>29,49</sup>, while another reported that females were more inclined toward self-medication<sup>42</sup>. Nevertheless, four studies found no significant association between gender and CAM use<sup>30,35,36,39</sup>. Furthermore, while four studies did not find a correlation between the level of education and CAM use<sup>30,39,47,49</sup>, one study in Palestine indicated that lower education levels were associated with a higher prevalence of herbal medicine use<sup>48</sup>. In summary, the collective findings suggest that self-medication practices cannot be solely attributed to a specific sociodemographic profile.

Nine studies documented the reasons behind patients resorting to self-medication with complementary and alternative medicines (CAMs)<sup>29,32-36,45,46,48</sup>. In India, 59% of patients concurrently using CAMs with anti-hypertensive agents cited fear of adverse drug reactions as a motivating factor<sup>46</sup>. Similar concerns about minimizing the adverse effects of anti-hypertensive agents were reported in studies conducted in Turkey and Palestine<sup>45,48</sup>. An independent predictor for the use of herbal medicines in treating hypertension in Uganda was the belief in their effectiveness<sup>30</sup>. A Moroccan study revealed that 65% of patients perceived medicinal plants to be superior to conventional medicine<sup>33</sup>. Additionally, dissatisfaction with conventional treatments was identified as a reason for using CAMs in studies conducted in Nigeria<sup>36</sup> and Turkey<sup>45</sup>. Three studies in Uganda, Nigeria, and India highlighted patients' perceptions that traditional healers provided better personal attention and were more accessible<sup>29,30,46</sup>. Nigerian patients with hypertension also acknowledged perceived uncaring attitudes of health

practitioners and hospital phobia as reasons for resorting to CAMs<sup>36</sup>.

The perceived affordability of complementary and alternative medicines (CAMs) emerged as a significant factor in three studies conducted in an urban Nigerian community<sup>29</sup>, southeastern Morocco<sup>33</sup>, and among an urban African-American population in the United States. Patients expressed the belief that using CAMs could lead to reduced medication costs. The independent predictor for CAM usage was the perception that conventional medicines were financially burdensome, as indicated in a Ghanaian study involving 400 patients with hypertension<sup>49</sup>. However, despite this, a study in India found that over half of CAM users (56%) were dissatisfied with CAMs, with two-thirds of this group attributing their dissatisfaction to the expenses associated with CAM usage<sup>46</sup>.

#### **Communication between patients and health practitioners regarding self-medication**

Among older urban Mexicans, a study revealed that individuals engaging in self-medication relied on prior prescriptions from their doctors as a foundation for seeking additional medications without undergoing another consultation. Within this study, 17 out of 131 patients were reported to be self-medicating with anti-hypertensive agents<sup>24</sup>.

Research conducted in the United States highlighted that the primary motivator for the use of over-the-counter (OTC) medicines was recommendations from healthcare practitioners, including doctors, nurses, and pharmacists<sup>27,28</sup>. However, one of these studies noted challenges in acquiring OTC information from healthcare practitioners, with patients perceiving that doctors or pharmacists were too occupied to offer medicine-related information<sup>28</sup>. In these investigations, alternative sources of medicine information were identified, such as labels, books, magazine articles, pharmacy printouts, and advertisements<sup>27,28</sup>.

Concerning the utilization of complementary and alternative medicines (CAMs), nine studies indicated that, on average, over half of CAM users (52%) received suggestions from family members, friends, or neighbors<sup>22,31-33,35,41,43,46,48</sup>, ranging from 41%<sup>22</sup> to 84%<sup>46</sup>. Additionally, 11% of patients received recommendations from alternative therapists or herbalists to use CAMs<sup>48</sup>, while 6–40% of patients reported recommendations from doctors or pharmacists<sup>35,43,46,48</sup>. Furthermore, a study in Palestine and Turkey identified popular media (television, newspapers, and advertisements) as significant

sources of information and recommendations for the use of CAMs among patients with hypertension<sup>22,48</sup>.

The disclosure rate of complementary and alternative medicine (CAM) use was reported in six studies<sup>22,32,36,46</sup>. On average, 21% of patients (ranging from 5% to 32%) disclosed their CAM usage to their doctors. A study involving 196 Britons with hypertension indicated that only 7% of patients were specifically asked by doctors about their CAM use<sup>39</sup>. Patients' decisions not to disclose their self-medication with CAMs were influenced by their perceptions, including the belief that health practitioners lacked interest, a fear of upsetting health practitioners if their CAM practices were revealed, and the perception that disclosure was unnecessary<sup>49</sup>.

#### **DISCUSSIONS:**

In the studies examined, patients with hypertension engaged in self-medication practices primarily for two purposes: (1) addressing their hypertension (such as acquiring captopril without a prescription or using garlic to lower blood pressure) and (2) managing concurrent health conditions (such as using analgesics for low back pain or herbal remedies for diabetes).

Approximately 11% of patients reported engaging in self-medication with anti-hypertensive medicines, specifically purchasing them over-the-counter (OTC), despite these medications being classified as prescription-only. The phenomenon of self-medicating with prescription-only drugs, such as antibiotics, has been documented in previous studies, particularly in developing countries with less stringent regulations on medication usage<sup>51,52</sup>. A study involving Saudi Arabian pharmacists indicated that anti-hypertensive medicine, such as captopril, was frequently dispensed OTC without thorough questioning<sup>53</sup>. While the number of published articles on this practice is limited, the discovery is noteworthy due to the potential for inappropriate use of anti-hypertensive medications. Considering the low disclosure rates of self-medication practices, the actual proportion of patients acquiring anti-hypertensive medicine without a prescription may be higher than currently reported.

This review revealed that the simultaneous use of over-the-counter (OTC) medicines alongside anti-hypertensive agents is a common practice. Over two-thirds of individuals with hypertension utilize OTC medicines, primarily analgesics, to address minor ailments, raising concerns about potential drug interactions<sup>7,9,10</sup>. Given that pharmacies serve as the predominant point of access for purchasing OTC

medicines, pharmacists play a crucial role in furnishing information and education to patients regarding responsible self-medication<sup>54</sup>. Patient education should encompass information on potential interactions with other medications and guidance on when consultation with healthcare professionals is warranted<sup>19</sup>. Additionally, community-based approaches can contribute to patient education on self-medication. For instance, a study demonstrated the efficacy of a brief training program for mothers in enhancing knowledge about self-medication with OTC medicines, resulting in a reduction in the number of OTC medicines used<sup>56</sup>.

The broad range (5–67%) of individuals with hypertension using over-the-counter (OTC) complementary and alternative medicine (CAM) in this review aligns with previous findings regarding the utilization of traditional herbal medicines (THMs) for hypertension in Sub-Saharan Africa<sup>18</sup> and with reviews on CAM use among individuals with cardiovascular diseases<sup>13,57</sup>. Due to variable definitions of CAMs and differences in research design among the reviewed studies, significant uncertainty exists regarding the true extent of self-medication with CAMs. The notable proportion of self-medication with CAMs reported in this review suggests that individuals with hypertension tend to favor holistic approaches to managing their health. However, robust evidence regarding the efficacy, safety, and health-economic benefits of CAM use is currently lacking<sup>58</sup>. For instance, this review notes that garlic is commonly used as an herbal remedy for treating hypertension, despite limited strong evidence of its effectiveness<sup>51</sup>. Given that garlic can potentially interact with anticoagulants and increase the risk of bleeding<sup>59</sup>, its use should be monitored by healthcare practitioners. Consequently, crucial questions about CAM use should be addressed during clinical encounters<sup>60</sup>. A study in Trinidad, however, revealed that physicians perceived their lack of knowledge as a potential barrier to educating patients about potential drug-herb interactions<sup>61</sup>. Additionally, another study reported perceived barriers for physicians to initiate discussions with patients about their CAM use<sup>60</sup>. Indeed, there is a need to encourage healthcare professionals to play a crucial role in providing reliable information about responsible self-medication.

This review may have several potential limitations. Firstly, there is a notable variability in the quality of the studies reviewed, particularly in terms of study design and data presentation. Secondly, the inclusion of only English-language articles may exclude

potentially different findings reported in papers written in other languages. Thirdly, the overall number of studies examining self-medication with over-the-counter (OTC) and prescription-only medicines is relatively limited. Additional research with a specific emphasis on self-medication involving anti-hypertensive agents is required to formulate an appropriate policy approach.

### CONCLUSION:

A significant number of individuals with hypertension engage in self-medication using over-the-counter (OTC) medicines or complementary and alternative medicines (CAMs). The practice of self-medicating with anti-hypertensive agents remains insufficiently explored, highlighting the necessity for additional research in this area. Healthcare practitioners responsible for overseeing patients with hypertension should remain attentive to the potential for self-medication among their patients, aiming to enhance treatment outcomes and mitigate medication-related issues.

### ACKNOWLEDGMENTS

The authors thank Dr. Nagendra Rao, Principal, SCS College of Pharmacy, Harapanahalli, for his valuable support.

### CONFLICT OF INTEREST

None

### REFERENCES:

1. World Health Organization. A Global Brief on Hypertension: Silent Killer, Global Public Health Crisis. Geneva, Switzerland: World Health Organization, 2013.
2. World Health Organization. Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks. Geneva, Switzerland: World Health Organization, 2009.
3. Kearney PM, Whelton M, Reynolds K et al. Global burden of hypertension: analysis of worldwide data. *Lancet* 2005; 365: 217–23.
4. Hansson L, Zanchetti A, Carruthers SG et al. Effects of intensive blood-pressure lowering and low-dose aspirin in patients with hypertension: principal results of the Hypertension Optimal Treatment (HOT) randomised trial. *HOT Study Group. Lancet* 1998; 351: 1755–62.
5. Chobanian AV, Bakris GL, Black HR et al. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. *JAMA* 2003; 289:2560–72.

6. World Health Organization. Guidelines for the Regulatory Assessment of Medicinal Products for Use in Self-Medication. WHO/EDM/QSM/00.1. World Health Organization, 2000.
7. Hughes CM, McElnay JC, Fleming GF. Benefits and risks of self medication. *Drug Saf* 2001; 24: 1027–37.
8. Qato DM, Alexander GC, Conti RM, et al. Use of prescription and over-the-counter medications and dietary supplements among older adults in the United States. *JAMA* 2008; 300: 2867–78.
9. Forman JP, Rimm EB, Curhan GC. Frequency of analgesic use and risk of hypertension among men. *Arch Intern Med* 2007; 167: 394–9.
10. Zheng L, Du X. Non-steroidal anti-inflammatory drugs and hypertension. *Cell Biochem Biophys* 2014; 69: 209–11.
11. Sclafer J, Slamet LS, de Visscher G. Appropriateness of self-medication: method development and testing in urban Indonesia. *J Clin Pharm Ther* 1997; 22: 261–72.
12. Amoako EP, Richardson-Campbell L, Kennedy-Malone L. Self-medication with over-the-counter drugs among elderly adults. *J Gerontol Nurs* 2003; 29: 10–5.
13. Grant SJ, Bin YS, Kiat H, Chang DH. The use of complementary and alternative medicine by people with cardiovascular disease: a systematic review. *BMC Public Health* 2012; 12: 299.
14. Pharand C, Ackman ML, Jackevicius CA et al. Use of OTC and herbal products in patients with cardiovascular disease. *Ann Pharmacother* 2003; 37: 899–904.
15. Chagan L, Bernstein D, Cheng JW et al. Use of biological based therapy in patients with cardiovascular diseases in a university-hospital in New York City. *BMC Complement Altern Med* 2005; 5: 4.
16. Gascón JJ, Sánchez-Ortuño M, Llor B, Skidmore D, Saturno PJ. Why hypertensive patients do not comply with the treatment: results from a qualitative study. *Fam Pract* 2004; 21: 125–30.
17. McBane S, Halstater B. Evaluation of beliefs about hypertension in a general population. *J Prim Care Commun Health* 2011; 2: 96–9.
18. Liwa AC, Smart LR, Frumkin A et al. Traditional herbal medicine use among hypertensive patients in sub-Saharan Africa: a systematic review. *Curr Hypertens Rep* 2014; 16: 437.
19. Bennadi D. Self-medication: A current challenge. *J Basic Clin Pharm* 2013; 5: 19–23.
20. Goh LY, Vitry AI, Semple SJ, Esterman A, Luszcz MA. Self-medication with over-the-counter drugs and complementary medications in South Australia's elderly population. *BMC Complement Altern Med* 2009; 9: 42.
21. World Development Indicators. Population Dynamics. 2014. <http://data.worldbank.org/indicator/SP.POP.TOTL/countries?display=default> (accessed on 27 January 2015).
22. Toprak D, Demir S. Treatment choices of hypertensive patients in Turkey. *Behav Med* 2007; 33: 5–10.
23. Huang CY, Tsai YT, Lai JN, Hsu FL. Prescription pattern of chinese herbal products for diabetes mellitus in Taiwan: a population-based study. *Evid Based Complement Altern Med* 2013; 2013: 201329.
24. Balbuena FR, Aranda AB, Figueras A. Self-medication in older urban mexicans: an observational, descriptive, cross-sectional study. *Drugs Aging* 2009; 26: 51–60.
25. Reyes-Gibby CC, Aday LA. Prevalence of and risk factors for hypertension in a rural area of the Philippines. *J Community Health* 2000; 25: 389–99.
26. Extavour R, Edwards R. Non-prescription medicine use by outpatients of a hospital in north-central Trinidad living with hypertension, and the potential clinical risks. *Int J Pharm Pract* 2008; 16: 287–93.
27. Neafsey PJ, Jarrín O, Luciano S, Coffman MJ. Self-medication practices of Spanish-speaking older adults in Hartford, Connecticut. *Hispanic Health Care Int* 2007; 5: 169–79.
28. Neafsey PJ, Shellman J. Adverse self-medication practices of older adults with hypertension attending blood pressure clinics. *Internet J Adv Nursing Practice*. 2001; 5: 15.
29. Osamor PE, Owumi BE. Complementary and alternative medicine in the management of hypertension in an urban Nigerian community. *BMC Complement Altern Med* 2010; 10: 36.
30. Nuwaha F, Musinguzi G. Use of alternative medicine for hypertension in Buikwe and Mukono districts of Uganda: a cross sectional study. *BMC Complement Altern Med* 2013; 13: 301.
31. Hughes GD, Aboyade OM, Clark BL, Puoane TR. The prevalence of traditional herbal medicine use among hypertensives living in South African communities. *BMC Complement Altern Med* 2013; 13: 38.
32. Wazaify M, Alawwa I, Yasein N, Al-Saleh A, Afifi FU. Complementary and alternative medicine (CAM) use among Jordanian patients with chronic diseases. *Complement Ther Clin Pract* 2013; 19: 153–7.

33. Eddouks M, Maghrani M, Lemhadri A, Ouahidi ML, Jouad H. Ethnopharmacological survey of medicinal plants used for the treatment of diabetes mellitus, hypertension and cardiac diseases in the south-east region of Morocco (Tafilalet). *J Ethnopharmacol* 2002; 82: 97–103.
34. Tilburt JC, Dy SM, Weeks K, Klag M, Young JH. Associations between home remedy use and a validated self-reported adherence measure in an urban African-American population with poorly controlled hypertension. *J Natl Med Assoc* 2008; 100: 91–7.
35. Bahar Z, Kızılcı S, Beşer A et al. Herbal therapies used by hypertensive patients in Turkey. *Afr J Tradit Complement Altern Med* 2013; 10 292–8.
36. Olisa NS, Oyelola FT. Evaluation of use of herbal medicines among ambulatory hypertensive patients attending a secondary health care facility in Nigeria. *Int J Pharm Pract* 2009; 17: 101–5.
37. Tsai DS, Chang YS, Li TC, Peng WH. Prescription pattern of Chinese herbal products for hypertension in Taiwan: a population-based study. *J Ethnopharmacol* 2014; 155: 1534–40.
38. Mahfudz AS, Chan SC. Use of complementary medicine amongst hypertensive patients in a public primary care clinic in Ipoh. *Med J Malaysia* 2005; 60: 454–9.
39. Gohar F, Greenfield SM, Beevers DG, Lip GY, Jolly K. Self-care and adherence to medication: a survey in the hypertension outpatient clinic. *BMC Complement Altern Med* 2008; 8: 4.
40. Bell RA, Suerken CK, Grzywacz JG, Lang W, Quandt SA, Arcury TA. CAM use among older adults age 65 or older with hypertension in the United States: general use and disease treatment. *J Altern Complement Med* 2006; 12: 903–9.
41. Lee GB, Charn TC, Chew ZH, Ng TP. Complementary and alternative medicine use in patients with chronic diseases in primary care is associated with perceived quality of care and cultural beliefs. *Fam Pract* 2004; 21: 654–60.
42. Anderson JG, Taylor AG. Use of complementary therapies by individuals with or at risk for cardiovascular disease: results of the 2007 National Health Interview Survey. *J Cardiovasc Nurs* 2012; 27: 96–102.
43. Hu H, Li G, Duan J, Arao T. Prevalence, purposes, and perceived effectiveness of complementary and alternative medicine use in a hypertension population: a questionnaire survey. *ISRN Public Health*. 2013. doi:10.1155/2013/137472:1-7.
44. Peltzer K. Health beliefs and prescription medication compliance among diagnosed hypertension clinic attenders in a rural South African Hospital. *Curationis* 2004; 27: 15–23.
45. Mollaoğlu M, Aciyurt A. Use of complementary and alternative medicine among patients with chronic diseases. *Acta Clin Croat* 2013; 52: 181–8.
46. Shafiq N, Gupta M, Kumari S, Pandhi P. Prevalence and pattern of use of complementary and alternative medicine (CAM) in hypertensive patients of a tertiary care center in India. *Int J Clin Pharmacol Ther* 2003; 41: 294–8.
47. Amira OC, Okubadejo NU. Frequency of complementary and alternative medicine utilization in hypertensive patients attending an urban tertiary care centre in Nigeria. *BMC Complement Altern Med* 2007; 7: 30.
48. Ali-Shtayeh MS, Jamous RM, Jamous RM, Salameh NM. Complementary and alternative medicine (CAM) use among hypertensive patients in Palestine. *Complement Ther Clin Pract* 2013; 19: 256–63.
49. Kretchy IA, Owusu-Daaku F, Danquah S. Patterns and determinants of the use of complementary and alternative medicine: a cross-sectional study of hypertensive patients in Ghana. *BMC Complement Altern Med* 2014; 14: 44.
50. Frass M, Strassl RP, Friehs H, Müllner M, Kundi M, Kaye AD. Use and acceptance of complementary and alternative medicine among the general population and medical personnel: a systematic review. *Ochsner J* 2012; 12: 45–56.
51. Llor C, Cots JM. The sale of antibiotics without prescription in pharmacies in Catalonia, Spain. *Clin Infect Dis* 2009; 48: 1345–9.
52. Volpato DE, de Souza BV, Dalla Rosa LG, Melo LH, Daudt CA, Deboni L. Use of antibiotics without medical prescription. *Braz J Infect Dis* 2005; 9: 288–91.
53. Al-Mohamadi A, Badr A, Bin Mahfouz L, Samargandi D, Al Ahdal A. Dispensing medications without prescription at Saudi community pharmacy: Extent and perception. *Saudi Pharm J* 2013; 21: 13–8.
54. World Health Organization. The Role of the pharmacist in self-care and self-medication: report of the 4th WHO Consultative Group on the Role of the Pharmacist. The Hague, The Netherlands. <http://apps.who.int/medicinedocs/pdf/whozip32e/whozip32e.pdf> (accessed on 6 February 2015).
55. World Health Organization. Self-care in the context of primary healthcare. Report of the Regional Consultation, Bangkok, Thailand. [http://apps.searo.who.int/PDS\\_DOCS/B4301.pdf](http://apps.searo.who.int/PDS_DOCS/B4301.pdf) (accessed on 24 January 2015).
56. Suryawati S. CBIA: Improving the quality of self-medication through mothers' active learning.



- Essential Drugs Monitor World Health Organization Geneva. 2003; 32: 22–3.
57. Rabito MJ, Kaye AD. Complementary and alternative medicine and cardiovascular disease: an evidence-based review. *Evid Based Complement Alternat Med* 2013; 2013: 672097.
  58. Fischer FH, Lewith G, Witt CM et al. High prevalence but limited evidence in complementary and alternative medicine: guidelines for future research. *BMC Complement Altern Med* 2014; 14: 46.
  59. Borrelli F, Capasso R, Izzo AA. Garlic (*Allium sativum* L.): adverse effects and drug interactions in humans. *Mol Nutr Food Res* 2007; 51: 1386–97.
  60. Shelley BM, Sussman AL, Williams RL, Segal AR, Crabtree BF. ‘They don’t ask me so I don’t tell them’: patient-clinician communication about traditional, complementary, and alternative medicine. *Ann Fam Med* 2009; 7: 139–47.
  61. Clement YN, Williams AF, Khan K et al. A gap between acceptance and knowledge of herbal remedies by physicians: the need for educational intervention. *BMC Complement Altern Med* 2005; 5: 20.