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Hypertension prevalence, awareness, and control in Arab countries: A systematic review

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Abstract

One billion of the world’s population has hypertension, resulting in four million deaths per year. Data on the prevalence of hypertension in the Arab world are very limited. This review summarizes existing knowledge regarding prevalence, awareness, and control of hypertension in Arab countries. The PubMed, Cochrane Library, Scopus, and CINAHL databases were searched for publications on HTN among Arab people from 1980 to January 2011. Only 13 studies were identified in the literature from 10 Arab countries. The overall estimated prevalence of hypertension was 29.5% (n = 45,379), which indicates a higher prevalence of hypertension among Arabs compared to people from the USA (28%) and sub-Saharan African (27.6%). Awareness of hypertension was reported for 46% of the studies and varied from 18% (Jordan) to 79.8% (Syria). The control rate varied from 56% (Tunisia) to 92% (Egypt and Syria). The prevalence of hypertension was found to increase with age, occurring more frequently in Arab women.

Key words adherence, Arab, hypertension, lifestyle modification, systematic review.

INTRODUCTION

Hypertension (HTN) is a major risk factor for cardiovascular disease (CVD), which is the leading cause of morbidity and mortality worldwide (World Health Organization, 2004). One billion of the world’s population has HTN, resulting in four million deaths per year (World Health Organization, 2004). In fact, HTN is the third leading cause of death in the world, and is responsible for one in every eight deaths worldwide, with a mortality rate of 13% (World Health Organization, 2004). In addition, it is estimated that one-third of the world’s population (1.5 billion people) will have HTN by 2025 as a result of aging and increased obesity (Libby & Braunwald, 2008). The prevalence of HTN is increasing, despite effective drug therapy and lifestyle modification programs that target hypertensive patients. Uncontrolled blood pressure (BP) can lead to coronary heart disease, congestive heart failure, stroke, and renal failure (Lakhan et al., 2003). Screening, early detection, and control of HTN are critical, as the risk of CVD doubles for each 20 mmHg increase in systolic BP or 10 mmHg increase in diastolic BP above 115/75 mmHg (Chobanian et al., 2003). In addition, controlling BP lowers the risk of stroke by 30%, myocardial infarction by 20–25%, and heart failure by more than 50% (World Health Organization, 2004). HTN extracts a high financial cost, which could be contained by utilizing effective screening and prevention programs (World Health Organization, 2004). Most Arab countries have the expertise and resources to develop and implement preventive measures to reduce morbidity and mortality from potentially preventable complications of HTN, such as stroke, myocardial infarction, and renal failure. Thus, an examination of HTN prevalence, awareness, control, and risk factors in Arab countries is an important foundation for prevention programs.

To our knowledge, data on the prevalence of HTN in the Arab world are limited, and there is no published literature review on the prevalence, awareness, and control of HTN in Arab countries. Thus, the purpose of this paper was to summarize existing knowledge regarding prevalence, awareness, and control of HTN in Arab countries. In addition, areas for future research to raise awareness of the importance of HTN prevention and treatment in Arab people will be identified.

ARAB COUNTRIES

The Arab world consists of 22 developing nations and territories, with a combined population of 358 million people. These countries are Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, the Palestine territory (Gaza Strip and West Bank).
Bank), Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen. Although Arab states vary socioeconomically, they share a similar language, culture, and religion, all of which play a major role in designing and providing population-based health promotion and preventive care programs, which are the most important approaches for tackling HTN morbidity and mortality. The World Health Organization and the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure have emphasized the role of health promotion and disease prevention as the most cost-effective approaches to contain the HTN epidemic (Chobanian et al., 2003; World Health Organization, 2004). Efforts to raise awareness of HTN stress the importance of health promotion and disease prevention as important arenas to improve the quality of care and to contain the cost of health care in the Arab world.

The Arab world characterized by a large proportion of young people with an average life expectancy of 70 years (World Health Organization, 2012). The region has a high prevalence of obesity (13% for men and 24.5% for women), diabetes mellitus (11.3%), and smoking (30% among men and 5% among women) (World Health Organization, 2012). Currently, CVD has emerged as one of the leading causes of death in this population.

SEARCH STRATEGIES

The PubMed, Cochrane Library, Scopus, and CINAHL databases were searched for publications on HTN among Arab people from 1980 to January 2011. The search was performed with the following keywords: HTN, blood pressure, and cardiovascular risk factors, combined with Arabs, Arab World, Arab countries, Middle East, North Africa, Arabian Gulf, and specific country names. A manual search of reference lists from identified papers supplemented the electronic search. We included only studies that were conducted in an Arab country within the past 20 years, included adults aged 18 years and above, provided data on the prevalence or incidence of HTN, measured BP using standard measurement procedures, and defined HTN defined as BP ≥ 140/90 mmHg and/or self-reported use of antihypertensive medication. Studies that used only self-reporting of history of HTN without BP measurement were excluded. Studies that included the prevalence of HTN for only men or women were also not included. The search was conducted in English and was limited to articles published in Arabic and English. However, all reviewed studies were in the English language.

The prevalence of HTN was estimated by dividing the total number of participants with HTN (BP ≥ 140/90 mmHg and/or use of antihypertensive medication) by the total number of participants in all studies. The number of participants with HTN in each study was estimated by multiplying the total number of study participants by the prevalence of HTN in the study. Awareness of HTN was defined as self-reporting of any prior diagnosis of HTN by a healthcare professional. The control of HTN was defined as the current use of antihypertensive medication associated with an average BP < 140/90 mmHg, and for diabetic individuals, BP < 130/80 mmHg (Chobanian et al., 2003; World Health Organization, 2004).

LITERATURE RESULTS

The country name, HTN incidence and prevalence, sex, and age of the participants were recorded for the studies. Each paper was reviewed and analyzed descriptively. Thirteen studies from 10 Arab countries met the inclusion criteria (Fig. 1). Studies were available for Jordan (n = 3), Algeria (n = 2), Morocco (n = 1), Tunisia (n = 1), Egypt (n = 1), Syria (n = 1), Saudi Arabia (n = 1), Qatar (n = 1), United Arab Emirates (n = 1), and Oman (n = 1). Two studies from Jordan were excluded; one study excluded participants diagnosed with HTN and reported only HTN prevalence for undiagnosed patients, and the second study included only

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**Figure 1.** Summary of literature search.
Prevalence, awareness, and control

The overall crude prevalence of HTN (BP ≥ 140/90 mmHg and/or use of antihypertensive medication) reported in 11 studies (n = 45,379) was 29.5%. Two studies used a higher cut-off point of HTN as BP ≥ 160/95 mmHg (n = 1502) and reported a lower prevalence of HTN prevalence compared to the other studies (n = 43,877, 17.9% vs 29.9%). No study reported an incidence of HTN in Arab countries. HTN prevalence varied widely between and within countries. Between countries, the prevalence of HTN ranged from 16.3% in Jordan (BP ≥ 160/95 mmHg) to 44% in Algeria (Jaddou et al., 2000; Temmar et al., 2007), while within countries, the prevalence varied from 35.3% to 44% in Algeria (Ben Khedda et al., 2005; Temmar et al., 2007). For national studies, HTN prevalence ranged from 25.2% (Oman) to 39.6% (Morocco) (Al Riyami & Afifi, 2003; Tazi et al., 2003).

Only five studies reported the level of HTN awareness (Ibrahim et al., 1995; Ghannem & Fredj, 1997; Jaddou et al., 2003; Al-Nozha et al., 2007; Maziak et al., 2007). In four studies, almost two-thirds of participants with detected HTN were unaware of their high BP (not diagnosed with HTN), ranging from 62.5% in Egypt to 79.8% in Syria. Even though one study conducted in Jordan reported that most hypertensive patients (82%) were aware of their diagnosis (Jaddou et al., 2000), more than two-thirds of hypertensive patients did not achieve controlled BP. This rate of uncontrolled HTN is similar to the findings of other studies in Arab countries, where uncontrolled rates ranged from 56% (Tunisia) to 92% (Egypt and Syria) (Ghannem & Fredj, 1997; Jaddou et al., 2000; Tazi et al., 2003; Bener et al., 2004; Al-Nozha et al., 2007; Maziak et al., 2007; Baynouna et al., 2008). However, none of these studies accounts for the lower BP control for diabetic individuals (< 130/90 mmHg).

Table 1. Main studies in the literature review

<table>
<thead>
<tr>
<th>Authors, Year</th>
<th>Country</th>
<th>Setting</th>
<th>Sample size</th>
<th>HTN definition</th>
<th>Mean of BP measurements</th>
<th>Minimum/maximum age (years)</th>
<th>Female (%)</th>
<th>BP measurement</th>
<th>HTN (%)</th>
<th>Mean of all 4/3/2/1 readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibrahim et al., 1995</td>
<td>Egypt</td>
<td>National</td>
<td>6733</td>
<td>140/90 Mean of all 4</td>
<td>26.3</td>
<td>25</td>
<td>Manual†</td>
<td>56</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Ghannem &amp; Fredj, 1997</td>
<td>Tunisia</td>
<td>Regional</td>
<td>957</td>
<td>140/90 Mean of all 2</td>
<td>18.8</td>
<td>20</td>
<td>Manual</td>
<td>62</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Jaddou et al., 2000</td>
<td>Jordan</td>
<td>Regional</td>
<td>1502</td>
<td>140/90 One reading</td>
<td>10.3</td>
<td>25</td>
<td>Manual</td>
<td>81</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Bener et al., 2003</td>
<td>Qatar</td>
<td>National</td>
<td>6252</td>
<td>140/90 Mean of all 2</td>
<td>32.1</td>
<td>20</td>
<td>Manual</td>
<td>68</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Al Riyami &amp; Afifi, 2003</td>
<td>Oman</td>
<td>National</td>
<td>7011</td>
<td>140/90 Mean of all 2</td>
<td>25.2</td>
<td>20</td>
<td>Manual†</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Al-Nozha et al., 2007</td>
<td>United Arab Emirates</td>
<td>National</td>
<td>1602</td>
<td>140/90 Mean of all 2</td>
<td>28.5</td>
<td>20</td>
<td>Manual</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Temmar et al., 2007</td>
<td>Algeria</td>
<td>Regional</td>
<td>1346</td>
<td>140/90 Mean of the last 2</td>
<td>44</td>
<td>40</td>
<td>Electronic</td>
<td>52.9</td>
<td>52.9</td>
<td></td>
</tr>
<tr>
<td>Al-Nozha et al., 2007</td>
<td>United Arab Emirates</td>
<td>Regional</td>
<td>817</td>
<td>140/90 Mean of all 2</td>
<td>37.3</td>
<td>20</td>
<td>Manual</td>
<td>51</td>
<td>51</td>
<td></td>
</tr>
</tbody>
</table>

†Sphygmomanometer used. BP, blood pressure; HTN, hypertension.
Sex and age

Most studies had more than 50% females and included adults aged 20 years and older. Five studies found that HTN prevalence was greater in females (Ibrahim et al., 1995; Tazi et al., 2003; Bener et al., 2004; Al-Nozha et al., 2007; Temmar et al., 2007), whereas two studies indicated that HTN prevalence was higher in males (Maziak et al., 2007; Baynouma et al., 2008). However, four studies reported no significant association between HTN prevalence and sex (Ghannem & Fredj, 2008). However, four studies reported no significant association between HTN prevalence and sex (Ghannem & Fredj, 2008). This trend was similar for both males and females.

DISCUSSION

The literature review revealed a higher prevalence of HTN in Arab countries (29.5%) compared to the USA (28%) and sub-Saharan Africa (27.6%) (Wolf-Maier et al., 2003; Kearney et al., 2005). However, the prevalence of HTN in Arab countries was lower compared to European countries (44.2%) (Wolf-Maier et al., 2003). Urbanization and industrialization account for changes in social, economic, and environmental status, as well as lifestyle behaviors that increase behavioral and biologic risk factors (Libby & Braunwald, 2008). Therefore, a higher prevalence of obesity, physical inactivity, and increased salt and fat intake from consuming processed foods as a result of urbanization and industrialization are likely explanations for higher HTN in Arab populations.

Our findings indicate that the prevalence of HTN varied between and within countries. The reason for this variability is likely multifactorial, and could have occurred because of differences in study designs and timeframes. For example, most of the studies that reported low prevalence (e.g. Jordan and Tunisia) were conducted more than 15 years ago in community settings and used a higher cut-off point to define HTN (BP ≥ 160/95 mmHg). Inclusion criteria might also have accounted for some differences in HTN prevalence. For instance, a study in Algeria that included participants 40 years and older might have accounted for a higher prevalence of HTN than another study that included individuals 18 years and older (44% vs 35.3%). The difference in methodology of BP measurement between these studies might also have influenced the prevalence of HTN and explain the variability. The main differences between these studies were the use of different equipment (i.e. sphygmomanometer vs electronic BP monitor), the number of BP measurements, and the method used to estimate the mean BP measurements (i.e. last two measurements vs all measurements). However, findings from national surveys were more consistent, with prevalence rates ranging from 25.2% (Oman) to 39.6% (Morocco). Differences in the lifestyle and socioeconomic status of Arab countries, as well as prevalence rates ranging from 25.2% (Oman) to 39.6% (Morocco). Differences in the lifestyle and socioeconomic status of Arab countries, as well as between rural and urban areas within countries, might also explain the variability in the findings. The geographic variations in HTN prevalence have been well documented (Wolf-Maier et al., 2003). The prevalence of HTN varies by age and sex. In the reviewed studies, the prevalence of HTN was found to increase by age, which is consistent with reports from Europe and the USA (Wolf-Maier et al., 2003), as well as from sub-Saharan Africa (Addo et al., 2007). In addition, HTN tends to occur more frequently in Arab women compared to Arab men, which is contrary to data from the USA and sub-Saharan Africa where the prevalence of HTN is equal for both men and women (Wolf-Maier et al., 2003; Addo et al., 2007). This finding could be explained by the higher prevalence of obesity in women, as most studies indicated that HTN was more prevalent among obese individuals. In addition, social traditions, which emphasize traditional gender roles that women should take care of their family, limit women’s recreational and physical activities (Maziak et al., 2007). Another factor that affected HTN prevalence was the education levels of Arab people in each country. One study found that educational level had a significant influence on the prevalence of HTN; illiterate people in particular were more likely to be hypertensive compared to educated participants (Al-Nozha et al., 2007).

On average, the controlled rate of HTN in Arab countries is comparable to the 8% and 23% reported for the USA and European countries, respectively (Wolf-Maier et al., 2003). With regard to HTN awareness, our findings were in contrast to those of economically-developed countries, where approximately half to two-thirds of hypertensive patients were aware of their diagnosis (Kearney et al., 2004). Limited access to healthcare services, especially in rural areas, and a lack of preventive care (Jabbour, 2003) coupled with the silent symptoms of HTN, might contribute to the lack of HTN awareness and inadequate HTN control rate among the Arab population.

CONCLUSION

This systematic review of the literature included various studies that used different designs, inclusion criteria, and different definitions of HTN (BP ≥ 140/90 mmHg vs BP ≥ 160/95 mmHg), published from 1995 to 2008. The findings provide an approximate assessment of the prevalence of HTN, with many limitations in the accuracy of the measure, as a majority of studies reported only the crude prevalence of HTN. The data presented report an overall higher prevalence of HTN among the adult Arab population. Clearly, HTN is a major risk factor affecting a large portion of Arab people, making them vulnerable to coronary vascular diseases, renal diseases, and cerebrovascular diseases. The findings indicate a higher prevalence of HTN in Arab countries compared to the USA and sub-Saharan Africa. Moreover, the review indicated that HTN is more prevalent among women, obese participants, and older individuals, and that there is a lack of HTN awareness.

HTN awareness and prevention programs would provide the most cost-effective ways to prevent HTN (Chobanian et al., 2003; World Health Organization, 2004). Primary prevention programs should emphasize adopting healthy lifestyles (e.g. weight control, exercise, reduced sodium intake, and limited alcohol consumption) as effective means to prevent and control HTN. Additionally, initial screening for
HTN in early adulthood should be established in Arab countries to tackle HTN morbidity and mortality early in life. Improving the awareness, control, and treatment of HTN, as well as encouraging Arab people to adopt and maintain healthy lifestyles, are the keys to preventing a HTN epidemic. Furthermore, Arab countries should undertake regular national health surveys, which would include rigorous measurement of HTN status, to track trends and changes in HTN status and to develop national strategies to contain HTN epidemics. Successful efforts and initiatives in one Arab country would support and guide other countries to adopt these prevention programs that target HTN screening and awareness.

This literature review supports the need for further investigation of HTN prevalence, awareness, treatment, and control in the Arab population. Future research that identifies risk factors for HTN and factors that contribute to the lack of awareness, control, and medication adherence are warranted. Such research is essential to developing and designing cost-effective awareness and prevention programs that would help individuals overcome these barriers.

CONTRIBUTIONS
Study Design: AT.
Data Collection and Analysis: AT, LV, JM, NP, LP, DM.
Manuscript Writing: AT, LV, JM, NP, LP, DM.

REFERENCES