



Original Article

Impact of High Blood Pressure (HBP) on Health among Indian Stockholders

Tuhin Subhra Roy¹ , B.Chandra Mohan Patnaik^{2,*} , Ipseeta Satpathy³ ¹Research Scholar, KSoM, KIIT Deemed to be University, Bhubaneswar, Odisha, India²Professor KSoM, KIIT Deemed to be University, Bhubaneswar, Odisha, India³Senior Professor, KSoM, KIIT Deemed to be University, Bhubaneswar, Odisha, India

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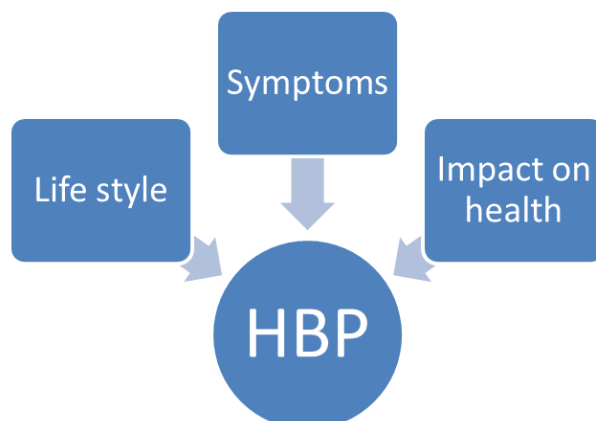
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ABSTRACT

HBP is the leading preventable cause of illness and premature death worldwide. It is easily diagnosed and can be controlled with relatively simple interventions. Yet, it is often unrecognized. When diagnosed, it requires life-long management and patients may be unaware of the need for continuous monitoring and adherence to treatment, which can be difficult to achieve. Moreover, while diagnosis and initiation of medication usually takes place in primary care, its management involves all levels of the health system, with referral to specialists if certain complications arise. The present study is being undertaken to understand the awareness level of HBP due to the food habits and other related issues. For the purpose of the study, the investor communities have been included and this study will be one of its kinds in recent times. The findings concluded that for most of the stockholders in the urban and sub-urban areas male and female awareness levels of HBP due to the lifestyle and awareness level of HBP symptoms were very low. However, the awareness level related to HBP and its impact on health-related issues is better for males and females in urban and male respondents of sub-urban areas, but female respondents in semi-urban areas are having very limited knowledge of HBP and its implications. The present study will help to create awareness level of HBP and its impact on health related issues in general and help to develop HBP free healthy world.

GRAPHICAL ABSTRACT



* Corresponding author: B. Chandra Mohan Patnaik

✉ E-mail: Email: bcmpatnaik@gmail.com

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Introduction

Hypertension is a major contributing factor for cardiovascular disease (CVD) and renal diseases that can increase the risks of co morbidities such as myocardial infarction, stroke, and heart failure (HF) [1]. Studies have revealed that risk factors such as obesity and genetic factors can influence the occurrence and development of hypertension [2, 3]. In addition, complicated regulatory networks, including the renin- angiotensin-aldosterone system (RAAS), the nervous system and arterial remodeling [4-6], also affect the progression of hypertension. Because blood pressure (BP) is difficult to control, the priority is finding drug targets to effectively control and manage BP in the hypertensive population. In this review, we primarily describe the classical and new drug targets used in hypertension therapy. Hypertension is a major controllable risk factor for heart disease and stroke, the first- and the third-leading causes of death among adults in the United States. Coronary heart disease, stroke, congestive heart failure, various renal diseases, and peripheral vascular disease all become progressively likely as blood pressure rises, making the prevention and treatment of hypertension essential [7]. Systolic, diastolic, and pulse pressure are important predictors of cardiovascular risk [8, 9]. Blood pressure, especially systolic blood pressure rises with age. However, among older hypertensive, cardiovascular risk is more strongly related to systolic than diastolic pressure [10, 11]. In fact, more recent reports suggest an inverse association of the risk and diastolic blood pressure for any given level of systolic blood pressure.

Both economically developing and developed countries face acute challenges related to hypertension. As people live longer and become more physically active, obesity, physical inactivity, and unhealthy diets are becoming increasingly prevalent health problems [12, 13]. Hypertension is reported to be as prevalent as in developed countries in many developing countries, especially in urban societies [14-16]. Likewise, the lack of broad and effective preventive measures will lead to an even wider

prevalence of hypertension [17]. It is not only an indication of the high prevalence of hypertension that morbidity associated with hypertension is on the rise, but also of poor detection, management, and control [18].

Healthcare systems have been under a lot of pressure due to the COVID-19 pandemic over the past two years. COVID-19 outbreaks have negatively impacted the lives of many people, especially those with chronic conditions, such as hypertension, diabetes, cardiovascular disease, and renal disease, due to the limited access and utilization of healthcare as well as the social and economic stresses they have caused [19]. Although it is unknown whether the delayed diagnoses and interventions contributed to complications in some patients, it is possible that they did. In addition, the increased barriers imposed by the pandemic have generated many patients at risk of developing a severe COVID-19 infection who were not adequately identified in the early stages of the pandemic. A COVID-19 infection was associated with hypertension because it increased susceptibility to the virus and led to more severe symptoms [20]. As a result of lockdowns and movement restrictions, unhealthy lifestyle behaviours have also been promoted, such as sitting more, gaining more weight, smoking, and drinking alcohol [21]. Some individuals, however, responded to the COVID-19 outbreak by increasing their self-care out of fear of contamination and to try to better protect them [22, 23].

Literature review

Primary hypertension is the most prevalent type, affecting between 90-95 percent of patients diagnosed with hypertension. The primary hypertension does not have a clearly defined cause. This differentiates idiopathic from secondary hypertension, in which blood pressure elevation occurs contrarily to another identifiable cause [24]. Even though primary hypertension cannot be identified, several factors contribute to it. The factors that contribute to the primary hypertension, such as age, body mass index (BMI), smoking, and alcohol consumption have been identified in many studies [25-27].

The secondary hypertension accounts for between 5-10% of all hypertension cases. It results from an identifiable cause. High blood pressure may result from specific pathophysiology or condition, or it may be caused by the ingestion of drugs, foods, or chemicals.

There is a significant degree of genetic control over an individual's blood pressure, although quantitative estimates range between 35% and 70%. Approximately, half of all patients with hypertension have family members who have high blood pressure or have died prematurely from cardiovascular problems. People who have a strong family history of hypertension, but with normal blood pressure, have a higher risk of developing hypertension. There is often an increase in peripheral vascular resistance in patients with essential hypertension and a normal heart rate. It is possible to increase cardiac output when essential hypertension is present in its early stages. This allows the arterial resistance to gradually rise and the cardiac output to return to baseline. As left ventricular damage progresses in hypertension, cardiac output decreases, so that peripheral vascular resistance maintains blood pressure. At the final stage, the cardiac output may be so impaired that BP then decreases, rendering the patient severely hypertensive [28].

Sustained hypertension can lead to heart failure, coronary artery disease, myocardial infarction, and sudden death. Several neurohormonal substances play a role in the hypertension-induced hypertrophy of the myocardium [29]. The increased tension generated by hypertension causes collagen to accumulate as well as elastin fibres to be reduced, fragmented, and broken. Combined with dyslipidaemia and on-going inflammation in hypertension-affected arteries, atherosclerotic plaque development is expedited [30].

The characteristic retinal changes include arteriolar narrowing, arteriovenous crossing changes, alteration of light reflexes on arterioles, cotton-wool spots, micro aneurysms, eye haemorrhage, visual edema, and blurred disc margin [31]. Furthermore, changes in the eye's microcirculation are often precursors to kidney

damage. As a result of hypertension, atherosclerosis also damages the retina. Detachment or haemorrhage of the retina may result in blindness [32].

Research gaps

After going through the various previous studies, it was observed that very limited research being undertaken in the context of awareness level of impact of HBP on life style, awareness level of HBP symptoms, and sensibility of health related issues due to HBP especially in the context of semi urban and urban areas of Odisha, India. The same being also justified and clarified during the pilot study. No study being focused on investor by earlier researchers.

Various research questions related to the present paper before undertaking the study were:

- ✓ Whether there exists awareness level of the impact of life style and high blood pressure, or not?
- ✓ Whether there exist awareness levels of symptoms of HBP, or not?
- ✓ If there exists sensibility level of HBP and its impact on health?

Rationality of the study

The present study very much needed to create the awareness among the stock holders in the post COVID-19 for the better health of country. The growth of any country is related better health of the people in the country. People with good health will be able to contribute for the growth of the country and more specifically in general the awareness level will help and protect the family of the person with these kinds of HBP issues so that adequate steps will be considered for the betterment of health. The present study will definitely contribute to the existing literature.

Objectives of the study

- ✓ To understand the awareness level of HBP due to lifestyle in the study area.
- ✓ To study the awareness level of symptoms of HBP in the study area.

- ✓ To know the sensibility level of HBP and its impact on health in the study area.

Scope of the study

The present study is confined to various stockholders in the suburban and urban areas of various parts of Odisha, India. It includes the respondents of Bhubaneswar, Cuttack, Rourkela, Sambalpur, Bargarh, Berhampur, and Puri. The participants include only those people concerned with the investor community. The reason during the preliminary study and review of literature is the gap area in not much study being undertaken by the researchers.

Research design

The current research is based on secondary as well as primary data. For collecting primary data initially 32 variables were identified from the review of the literature and 6 core group discussions consisting of 8 members each. The same questionnaire was used for conducting the pilot study among the urban and semi-urban populations by taking 57 respondents from the initial variables. However, after the pilot study, 25 variables were retained. Five-point Likert-type scale method was used for the computation of data along with analysis of variances and this purpose score of 4 for Fully Aware (FA), score 3 for Aware (A), score 2 for Partial Aware (PA), score 1 for Neutral (N) and score 0 for Not Aware (NA). For the collection of desired data, 509 questionnaires were distributed and of that 387 were in proper form. The rate of responses was 76%. The sample for the current research was

collected through non-probabilities sampling, precisely through the convenient sampling technique. The data was collected with the help of local contacts in these areas especially those who were visiting local government and private hospitals in the study areas.

The sample size for the unknown population

$$N = \frac{Z^2 (P) (1-P)}{C^2} = \frac{(1.96)^2 (0.5)(1-0.5)}{(0.05)^2} = 384$$

Where,

Z= Standard normal deviation set at 95% confidence level is 1.96.

P= Percentage picking choice or response is 0.5.

C= Confidence interval is 0.05.

However, 387 responses were collected in a proper form so all are included in the study.

According to Table 1, the total urban males were 103 and female respondents were 87, similarly for the semi-urban female. Likewise, the total respondents male in the semi-urban areas were 109 and for female it was 88. The overall break up of various cities related to urban male, urban female, semi urban male, and semi urban female being also presented in Figure 1 under the heading of sampling frame.

In Table 2, for the urban male for the awareness level due to life style, awareness level for the symptoms, and sensibility of HBP and its impact on the maximum possible weight were 3708, 3296, and 3296 and the least possible weight were 0 for the all cases. The same values for the female urban respondents were 3132, 2784, and 2784, and the same for the least possible weight were 0.

Table 1: Sampling frame

Study areas	Urban		Semi-urban	
	Male	Female	Male	Female
Bhubaneswar	18	13	19	14
Cuttack	21	14	20	13
Rourkela	14	11	15	12
Sambalpur	13	12	12	11
Bargarh	12	14	11	12
Berhampur	13	11	17	12
Puri	12	12	15	14
Total	103	87	109	88

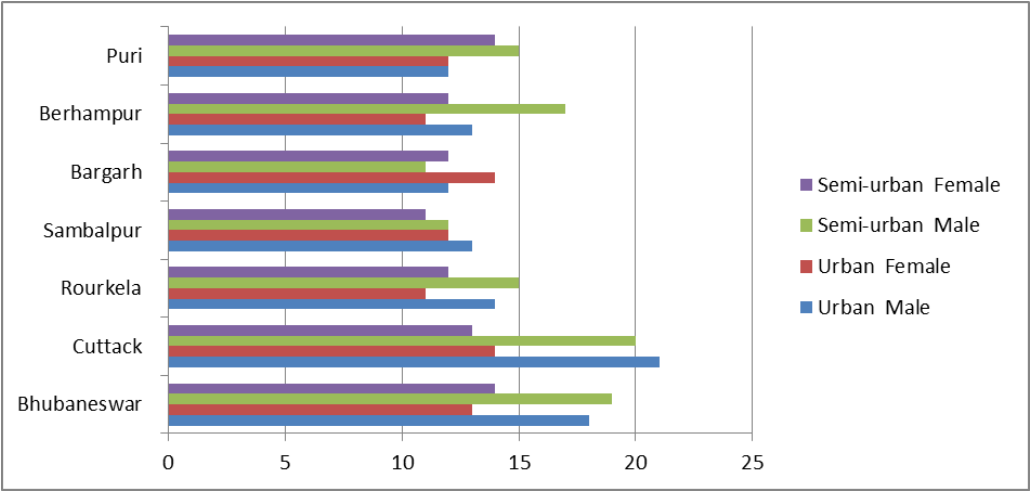


Figure 1: Sampling frame

Table 2: Computation of maximum possible weight and least possible weight

Category	Awareness level of HBP due to life style	Awareness level of HBP symptoms	Sensibility level of HBP and its impact on health related issues
Urban male			
The Maximum possible Weight	103X9X4=3708	103X8X4=3296	103X8X4=3296
Least possible weight	103X9X0=0	103X8X0=0	103X8X0=0
Urban female			
The Maximum possible Weight	87X9X4=3132	87X8X4=2784	87X8X4=2784
The least possible weight	87X9X0=0	87X8X0=0	87X8 X0=0
Sub-urban male			
The maximum possible weight	109X9X4=3924	109X8X4=3488	109X8X4=3488
The least possible weight	109X9X0=0	109X8X0=0	109X8X0=0
Sub-urban female			
The maximum possible weight	88X9X4=3168	88X8X4=2816	88X8X4=2816
The least possible weight	88X9X0=0	88X8X0=0	88X8X0=0

Source: Authors' own compilations

For the semi-urban male for the awareness level due to lifestyle, awareness level for the symptoms, sensibility of HBP, and its impact on the maximum possible weight were 3924, 3488, and 3488 and the least possible weight were 0 for the all the cases. Similarly, for the semi-urban female, respondents were 3168, 2816, and 2816

and the least possible weight were 0 for the all the cases. Figure 2 represents the overall average weight for the awareness level of HBP due to life style, awareness level of HBP symptoms, and sensibility level of HBP and its impact on health related issues. Figure 3 represents the symptoms of High Blood Pressure.

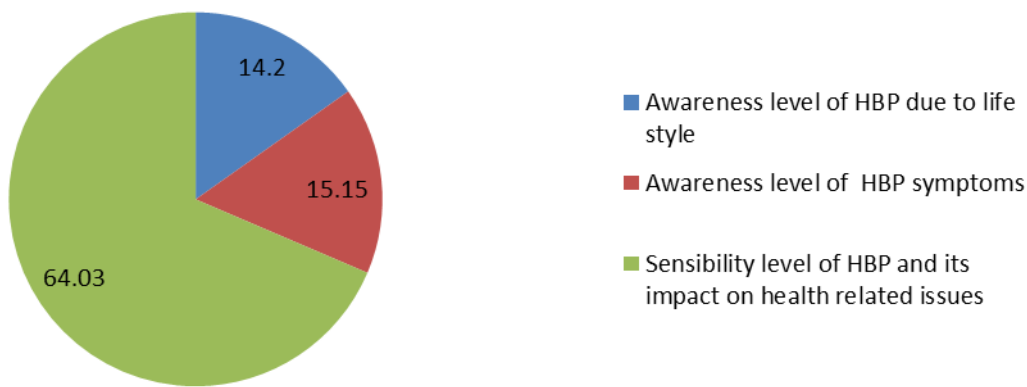


Figure 2: Average awareness level weight

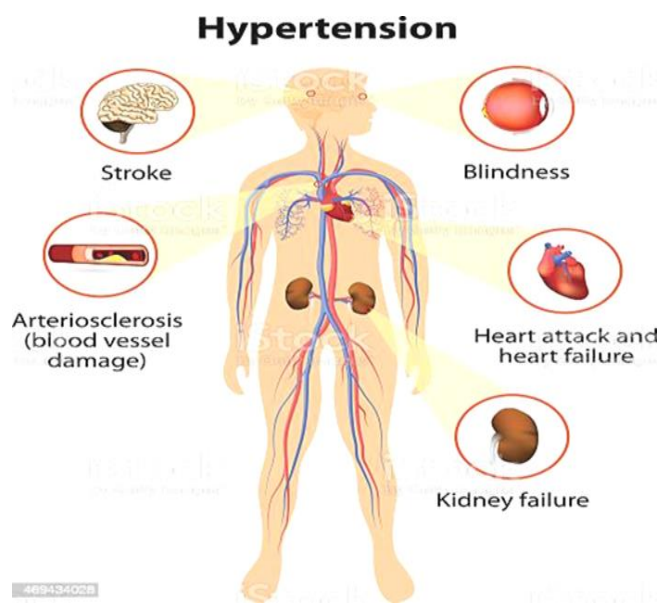


Figure 3: Symptoms of high blood pressure

Results and discussion

Based on Table 3, responding to the question related to awareness level of HBP due to the lifestyle, most of the participants were not aware of the same. In male urban case, they weighted perception score to the maximum possible weighted score was 16.13 % and the same for the urban female, sub-urban male, and sub-urban female were 14.43%, 15.53 %, and 10.70%, respectively. It shows that sub-urban female were not much aware as compared with others, although it is not encouraging for the whole category. Similarly joining to the query related to awareness level of HBP symptoms, it seems that very poor level of awareness for the same. In case of sub-urban female, it was 12.18% weight score to the total possible maximum score. For the

other respondents of sub-urban male, the urban female and urban male the percentage of perception weighted score to the total maximum possible score were 16.05%, 16.85%, and 15.53%, respectively. The overall average perception weight score was 15.15%. Joining the to the survey, in case of question related to sensibility level of HBP and its impact on health-related issues, there is better awareness level in for the urban male, female, and sub-urban male. However, there is very poor awareness level among the female respondents of sub-urban areas considered for the study. Accordingly, the actual awareness levels to the maximum possible weighted score were 78.64%, 87%, 78.81%, and 11.65%, respectively.

Limitations of the study and future research direction

Table 3: Analysis of data

Attributes	UM	UF	SUM	SUF
On the basis of Objective-1: Awareness level of HBP due to life style				
HBP due to overweight.	84	43	76	39
HBP due to eating of too much salt and do not eat enough fruit and vegetables.	63	41	67	31
HBP due to the lack of inadequate physical exercise.	58	67	56	42
HBP due to drinking of too much alcohol or coffee.	46	64	61	45
HBP due to excessive smoking.	66	44	70	35
HBP due to inadequate sleep or disturbed sleep.	62	60	59	31
HBP due to age over 60 years old.	58	51	66	39
HBP due to the family history.	79	40	80	37
HBP due to staying in backward or deprived areas.	82	42	75	40
Total weight	598	452	610	339
The maximum possible weight	3708	3132	3927	3168
The least weight	0	0	0	0
% of total weight to maximum possible weight	16.13	14.43	15.53	10.70
Average weight	14.20			
On the basis of objective-2: Awareness level of HBP symptoms				
Severe headaches	85	57	82	54
Nosebleed	55	51	77	30
Fatigue or confusion	50	52	71	29
Vision problems	70	70	58	45
Chest pain	52	66	40	46
Difficulty in breathing	70	58	65	56
Irregular heartbeat	62	51	76	49
Blood in the urine	68	64	91	34
Total weight	512	469	560	343
Maximum possible weight	3296	2784	3488	2816
Least weight	0	0	0	0
% of total weight to maximum possible weight	15.53	16.85	16.05	12.18
Average weight	15.15			
On the basis of objective-3: Sensibility level of HBP and its impact on health related issues				
It raises risk of heart attack and stroke.	357	318	373	33
Likely to develop heart failure.	352	306	366	34
Chest pain experience	335	290	358	26
Complications in kidney	329	324	362	34
Likely to develop vision problems permanently.	252	293	359	45
Lead to sexual dysfunction.	363	289	389	53
Risk for peripheral artery disease (PAD).	359	294	377	45
Leads to hearing impaired	345	308	365	58
Total weight	2592	2422	2749	328
Maximum possible weight	3296	2784	3488	2816
Least weight	0	0	0	0
% of total weight to maximum possible weight	78.64	87	78.81	11.65
Average weight	64.03			

Source: Annexure A, B, C, and D and Table 2.

The present study is limited to the perceptions of the stock holders in the areas of the Bhubaneswar, Cuttack, Rourkela, Sambalpur, Bargarh, Berhampur, and Puri of Odisha, India. The present study cannot be generalized. However, if the study will be conducted in the

different geographical location the result may be differ from the present study. The research can be undertaken for the other sections of the society such as among women, school and college students, and employees working in Information and Technology (IT) sector as well as the other sectors.

Implications of the study

The present study will help to create the awareness level of various dynamics associated with HBP. With the creation of awareness level, the health of a country will be improved. Likewise, there will be more happiness in the family and society. The county with higher HBP will be direct impact on the more pressure on medical services to provide as this HBP leads to various health-related issues.

Conclusion

In the study areas, it was felt that most of the people were not much aware of HBP due to be overweight, too much eating, lacking physical exercise, having drinking habits, excess smoking, inadequate sleep, and having a family history, etc. there is uniformity of awareness level in all the study areas. The same is also reflected in the case of the second parameter of awareness level of HBP symptoms. The majority of respondents were not aware of the symptoms like headache, nosebleed, fatigue, vision problem, chest pain, breathing problem, and blood in the urine. Similarly, regarding the awareness level of sensibility level of HBP and its impact on health-related issues it seems that respondents of urban males, urban females, and sub-urban males were aware of the health impact but in the case of sub-urban female respondents were not aware of the same. Normally, the people with investment approach and completely being dependent income on this, they have to go through lot of stress due to uncertainty for the future of their investment. This stress leads to HBP and ultimately creates lot of health disorders. The present study finding shows that there is a lack of awareness among the people in the study areas and need to be addressed at the earliest. This is not only the responsibility of the government, but also so all the friends, family members, and healthcare staff who are aware of the same so that the issue can be resolved and the dream of an HBP-free India can be realized.

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Authors' contributions

All authors contributed to data analysis, drafting, and revising of the paper and agreed to be responsible for all the aspects of this work.

Conflict of Interest

The author declared that they have no conflict of interest.

ORCID:

Tuhin Subhra Roy

<https://www.orcid.org/0000-0001-7927-8803>

B.Chandra Mohan Patnaik

<https://www.orcid.org/0000-0002-5979-0989>

Ipseeta Satpathy

<https://www.orcid.org/0000-0002-0155-5548>

References

- [1]. Böhm M., Anker S.D., Butler J., Filippatos G., Ferreira J.P., Pocock S.J., Mahfoud F., Brueckmann M., Jamal W., Ofstad A.P., Schöler E., Empagliflozin improves cardiovascular and renal outcomes in heart failure irrespective of systolic blood pressure, *Journal of the American College of Cardiology*, 2021, **78**:1337 [[Google Scholar](#)], [[Publisher](#)]
- [2]. Ohara K., Masuda T., Murakami T., Imai T., Yoshizawa H., Nakagawa S., Okada M., Miki A., Myoga A., Sugase T., Sekiguchi C., Effects of the sodium-glucose cotransporter 2 inhibitor dapagliflozin on fluid distribution: A comparison study with furosemide and tolvaptan, *Nephrology*, 2019, **24**:904 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [3]. Masuda T., Watanabe Y., Fukuda K., Watanabe M., Onishi A., Ohara K., Imai T., Koepsell H., Muto S., Vallon V., Nagata D., Unmasking a sustained

- negative effect of SGLT2 inhibition on body fluid volume in the rat, *American Journal of Physiology-Renal Physiology*, 2018, **315**:F653 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [4]. Eickhoff M.K., Dekkers C.C.J., Kramers B.J., Laverman G.D., Frimodt-Moller M., Jorgensen N.R., Faber J., Danser A.J., Gansevoort R.T., Rossing P., Persson F., Effects of dapagliflozin on volume status when added to renin-angiotensin system inhibitors, *Journal of clinical medicine*, 2019, **8**:779 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [5]. Masuda T., Muto S., Fukuda K., Watanabe M., Ohara K., Koepsell H., Vallon V., Nagata D., Osmotic diuresis by SGLT2 inhibition stimulates vasopressin-induced water reabsorption to maintain body fluid volume, *Physiological reports*, 2020, **8**:e14360 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [6]. Ohara K, Masuda T, Morinari M, Okada M, Miki A, Nakagawa S, Murakami T, Oka K, Asakura M., Miyazawa Y., Maeshima A., The extracellular volume status predicts body fluid response to SGLT2 inhibitor dapagliflozin in diabetic kidney disease, *Diabetology & Metabolic Syndrome*, 2020, **12**:37 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [7]. Tsuboi N., Sasaki T., Okabayashi Y., Haruhara K., Kanzaki G., Yokoo T., Assessment of nephron number and single-nephron glomerular filtration rate in a clinical setting, *Hypertension Research*, 2021, **44**:605 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [8]. Heerspink H.J.L., Stefansson B.V., Correa-Rotter R., Chertow G.M., Greene T., Hou F.F., Mann J.F., McMurray J.J., Lindberg M., Rossing P., Sjöström C.D., Dapagliflozin in patients with chronic kidney disease, *New England Journal of Medicine*, 2020, **383**:1436 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [9]. Kearney P.M., Whelton M., Reynolds K., Whelton P.K., He J., Worldwide prevalence of hypertension: a systematic review, *Journal of hypertension*, 2004, **22**:11 [[Google Scholar](#)], [[Publisher](#)]
- [10]. Yusuf S., Reddy S., Ounpuu S., Anand S., Global burden of cardiovascular diseases: part I: general considerations, the epidemiologic transition, risk factors, and impact of urbanization, *Circulation*, 2001, **104**:2746 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [11]. Thomson S.C., Vallon V., Effects of SGLT2 inhibitor and dietary NaCl on glomerular hemodynamics assessed by micropuncture in diabetic rats, *American Journal of Physiology-Renal Physiology*, 2021, **320**:F761 [[Google Scholar](#)]
- [12]. Ezzati M., Vander Hoorn S., Lawes C.M.M., Leach R., James W.P.T., Lopez A.D., Rodgers A., Murray C.J.L., Rethinking the "Diseases of Affluence" Paradigm: Global Patterns of Nutritional Risks in Relation to Economic Development, *PLoS medicine*, 2005, **2**:e133 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [13]. Addo J., Smeeth L., Leon D.A., Hypertension in sub-saharan Africa: a systematic review, *Hypertension*. 2007, **50**:1012 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [14]. Addo J., Amoah A.G.B., Koram K.A., The changing patterns of hypertension in Ghana: a study of four rural communities in the Ga District, *Ethnicity & disease*, 2006, **16**:894 [[Google Scholar](#)], [[Publisher](#)]
- [15]. Khor G.L., Cardiovascular epidemiology in the Asia-Pacific region, *Asia Pacific journal of clinical nutrition*, 2001, **10**:76 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [16]. Vorster H.H., The emergence of cardiovascular disease during urbanisation of Africans, *Public Health Nutrition*, 2002, **5**:239 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [17]. Chobanian A.V., Bakris G.L., Black H.R., Cushman W.C., Green L.A., Izzo Jr J.L., Jones D.W., Materson B.J., Oparil S., Wright Jr J.T., Roccella E.J., 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 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [18]. Wiredu E.K., Nyame P.K., Stroke-related mortality at Korle Bu Teaching Hospital, Accra, Ghana, *East African medical journal*, 2001, **78**:180 [[Google Scholar](#)]
- [19]. Weber T., Amar J., de Backer T., Burkard T., van der Giet M., Gosse P., Januszewicz A., Kahan T., Mancia G., Mayer C.C., Muesan M.L., COVID-19 associated reduction in hypertension-related

- diagnostic and therapeutic procedures in Excellence Centers of the European Society of Hypertension, *Blood Press*, 2022, **31**:71 [Crossref], [Google Scholar], [Publisher]
- [20]. Savoia C., Volpe M., Kreutz R., Hypertension, a moving target in COVID-19: current views and perspectives, *Circulation Research*, 2021, **128**:1062 [Crossref], [Google Scholar], [Publisher]
- [21]. Kreutz R., Dobrowolski P., Prejbisz A., Algharably E.A.H., Bilo G., Creutzig F., Grassi G., Kotsis V., Lovic D., Lurbe E., Modesti P.A., Lifestyle, psychological, socioeconomic and environmental factors and their impact on hypertension during the coronavirus disease 2019 pandemic, *Journal of hypertension*, 2021, **39**:1077 [Crossref], [Google Scholar], [Publisher]
- [22]. Mancia G., Rea F., Ludergrani M., et al. Renin-angiotensin-aldosterone system blockers and the risk of COVID-19, *New England Journal of Medicine*, 2020, **382**:2431 [Crossref], [Google Scholar], [Publisher]
- [23]. Semenzato L., Botton J., Drouin J., Baricault B., Vabre C., Cuenot F., Penso L., Herlemont P., Sbidian E., Weill A., Dray-Spira R., Antihypertensive drugs and COVID-19 risk: a cohort study of 2 million hypertensive patients, *Hypertension*, 2021, **77**:833 [Crossref], [Google Scholar], [Publisher]
- [24]. Cappuccio F.P., Micah F.B., Emmett L., Kerry S.M., Antwi S., Martin-Peprah R., et al. Prevalence, detection, management, and control of hypertension in Ashanti, West Africa, *Hypertension*, 2004, **43**:1017 [Crossref], [Google Scholar], [Publisher]
- [25]. Addo J., Smeeth L., Leon D.A., Prevalence, detection, management, and control of hypertension in Ghanaian civil servants, *Ethnicity & disease*, 2008, **18**:505 [Google Scholar], [Publisher]
- [26]. Agyemang C., Bruijnzeels M.A., Owusu-Dabo E., Factors associated with hypertension awareness, treatment, and control in Ghana, West Africa, *J Hum Hypertens*. 2006, **20**:67 [Crossref], [Google Scholar], [Publisher]
- [27]. Pobee J.O., Larbi E.B., Belcher D.W., Wurapa F.K., Dodu S.R., Blood pressure distribution in a rural Ghanaian population, *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1977, **71**:66 [Crossref], [Google Scholar], [Publisher]
- [28]. Amoah A.G., Hypertension in Ghana: a cross-sectional community prevalence study in greater Accra, *Ethnicity & disease*, 2003, **13**:310 [Google Scholar], [Publisher]
- [29]. National High Blood Pressure Education Program Working Group report on primary prevention of hypertension, *Arch Intern Med*, 1993, **153**:186 [Google Scholar], [Publisher]
- [30]. Rose G., Sick individuals and sick populations, *Int J Epidemiol*. 1985, **14**:32 [Crossref], [Google Scholar], [Publisher]
- [31]. Whelton P.K., He J., Appel L.J., Cutler J.A., Havas S., Kotchen T.A., Roccella E.J., Stout R., Vallbona C., Winston M.C., Karimbakas J., Primary prevention of hypertension: clinical and public health advisory from The National High Blood Pressure Education Program, *Jama*, 2002, **288**:1882 [Crossref], [Google Scholar], [Publisher]
- [32]. Appel L.J., Moore T.J., Obarzanek E., Vollmer W.M., Svetkey L.P., Sacks F.M., Bray G.A., Vogt T.M., Cutler J.A., Windhauser M.M., Lin P.H., A clinical trial of the effects of dietary patterns on blood pressure. DASH Collaborative Research Group, *N Engl J Med*. 1997, **336**:1117 [Crossref], [Google Scholar], [Publisher]

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