

Risk factors of newly detected and masked untreated hypertension in a South Asian population of Type-2 diabetes patients

Sahrai Saeed¹, Abukar Mohamed Ali²,
Muhiddin Abdi Mahmoud³, Peter M. Nilsson⁴

doi: <https://doi.org/10.12669/pjms.39.3.7666>

How to cite this: Saeed S, Ali AM, Mahmoud MA, Nilsson PM. Risk factors of newly detected and masked untreated hypertension in a South Asian population of Type-2 diabetes patients. *Pak J Med Sci.* 2023;39(3):631-633. doi: <https://doi.org/10.12669/pjms.39.3.7666>

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Hypertension is a well-established cardiovascular risk factor in patients with diabetes, chronic kidney disease, obesity, heart failure and stroke. Among the modifiable risk factors, particularly diabetes together with sedentary lifestyle, smoking and obesity greatly influences cardiovascular risk in patients with hypertension.¹ In fact, diabetes is the most important cause of chronic kidney disease followed by hypertension. According to the European SCORE (Systematic COronary Risk Evaluation system) risk stratification tool, the presence of diabetes with signs of target organ damage (proteinuria, or with a major risk factor such as Grade-3 hypertension or hypercholesterolaemia) is defined as “very high risk” with a calculated 10-year SCORE risk of $\geq 10\%$.

In South Asia, the prevalence of diabetes, hypertension and atherosclerotic cardiovascular disease is on the rise.² Through a comprehensive literature review and our own

experiences, we recently demonstrated that South Asian populations, not only living in their native countries, but also in the Western countries, carry a significantly higher risk of diabetes and cardiovascular disease compared with native white Europeans.²

In a recent issue of Pakistan Journal of Medical Science (PJMS), Adnan et al.³ reported on the prevalence and covariates of hypertension in a study of 129 patients with diabetes (mean age 49 years, 65% females). The prevalence of overall hypertension was 58.1% (n=75) including 43.4% (n=56) with previously known and 14.7% (n=19) newly detected. Among those who had known hypertension, 45 (80.4%) were treated and only 27% in this group had achieved blood pressure (BP) control (clinic BP <140/90 mmHg). Women were more likely to have missed hypertension, while men had greater risk of having untreated hypertension. The definition of hypertension and BP controlled was based upon clinic/office BP with the threshold of 140/90 mmHg.

This is an important study investigating the burden of hypertension and BP control in patients with diabetes and adds useful information to the existing literature. Although the overall prevalence of hypertension was not low in the study, including 24-hour ambulatory BP (ABPM) recording could yield even higher prevalence of true hypertension, including so-called masked hypertension. In fact, 24-hour ABPM measurement not only identifies hypertension subtypes and evaluates treatment response (Fig.1), but can also detect other BP patterns such as blunted nocturnal BP fall (non-dipping) or nocturnal rise, which are not infrequent in patients with diabetes.⁴

Furthermore, BP control was assessed by office/clinic BP - threshold of 140/90 mmHg. However, for patients with diabetes, chronic kidney disease, and coronary artery disease (excluded by Adnan et al.), which all are defined as high-risk patients, the recommended therapeutic target by most guidelines is towards 135/80

1. Sahrai Saeed, MD, PhD.
2. Abukar Mohamed Ali, MD.
3. Muhiddin Abdi Mahmoud, MD.
Department of Nephrology,
Mnazi Mmoja Referral Hospital, Zanzibar.
4. Peter M. Nilsson, MD, PhD.
Department of Clinical Sciences,
Lund University, Skane University Hospital,
Malmö, Sweden.
- 1,2: Department of Heart Disease,
Haukeland University Hospital,
Bergen, Norway.

Correspondence:

Sahrai Saeed MD, PhD.
Department of Heart Disease,
Haukeland University Hospital,
Jonas Liesvei 65, Pb.1,
N-5021 Bergen, Norway.
E-mail: sahrai_saeed@hotmail.com

- * Received for Publication: February 6, 2023
- * Corrected & Edited: February 12, 2023
- * Accepted for Publication: February 28, 2023

mmHg or 130/80 mmHg in younger patients.

Further, the authors showed that modifiable factors such as lack of education, sedentary lifestyle, and unhealthy diet not only contribute to hypertension, but also increase the risk of undetected hypertension and masked untreated hypertension.

Orthostatic hypotension, which is common in patients with diabetes, was not discussed as it probably was not the aim of the study. However, orthostatic hypotension defined as a reduction in systolic BP of at least 20 mmHg or in diastolic BP of at least 10 mmHg within three minutes of standing, is associated with an increased risk of mortality and cardiovascular events.⁵ Resting heart rate also provides important clinical and prognostic information, both in the general population and in patients with hypertension, why it should also be recorded at the time of BP measurements⁶, which was not the case in the present study.

Finally, although the classes of antihypertensive medications were accounted for, the information about statin use was missing. Patients with hypertension, and Type-2 diabetes often have unfavourable lipid profile

(atherogenic dyslipidaemia: elevated triglycerides and LDL cholesterol, and low HDL cholesterol) and may benefit from a statin, which should be added to the patient's antihypertensive treatment.

Future perspectives: Despite the usual prescribed antihypertensive medications with maximal tolerable doses, many patients fail to achieve the recommended BP targets. The novel antidiabetic agents, sodium-glucose cotransporter-2 inhibitors (SGLT2i), can reduce office and ambulatory BP by several mmHg on top of conventional antihypertensive drugs⁷, and may help improve BP control in patients with diabetes, in whom the therapeutic target is often difficult to achieve. Apart from some expert opinions and position papers^{8,9}, there is very little evidence in the literature on the role of SGLT2i in diabetes as well as in other high-risk patients with cardiovascular disease in Pakistan. This can be the focus of future research.

Diabetes can contribute to subclinical LV dysfunction (diabetic cardiomyopathy) by both the direct effect on the LV myocardium through a load-independent impairment of systolic function, and by arterial stiffening

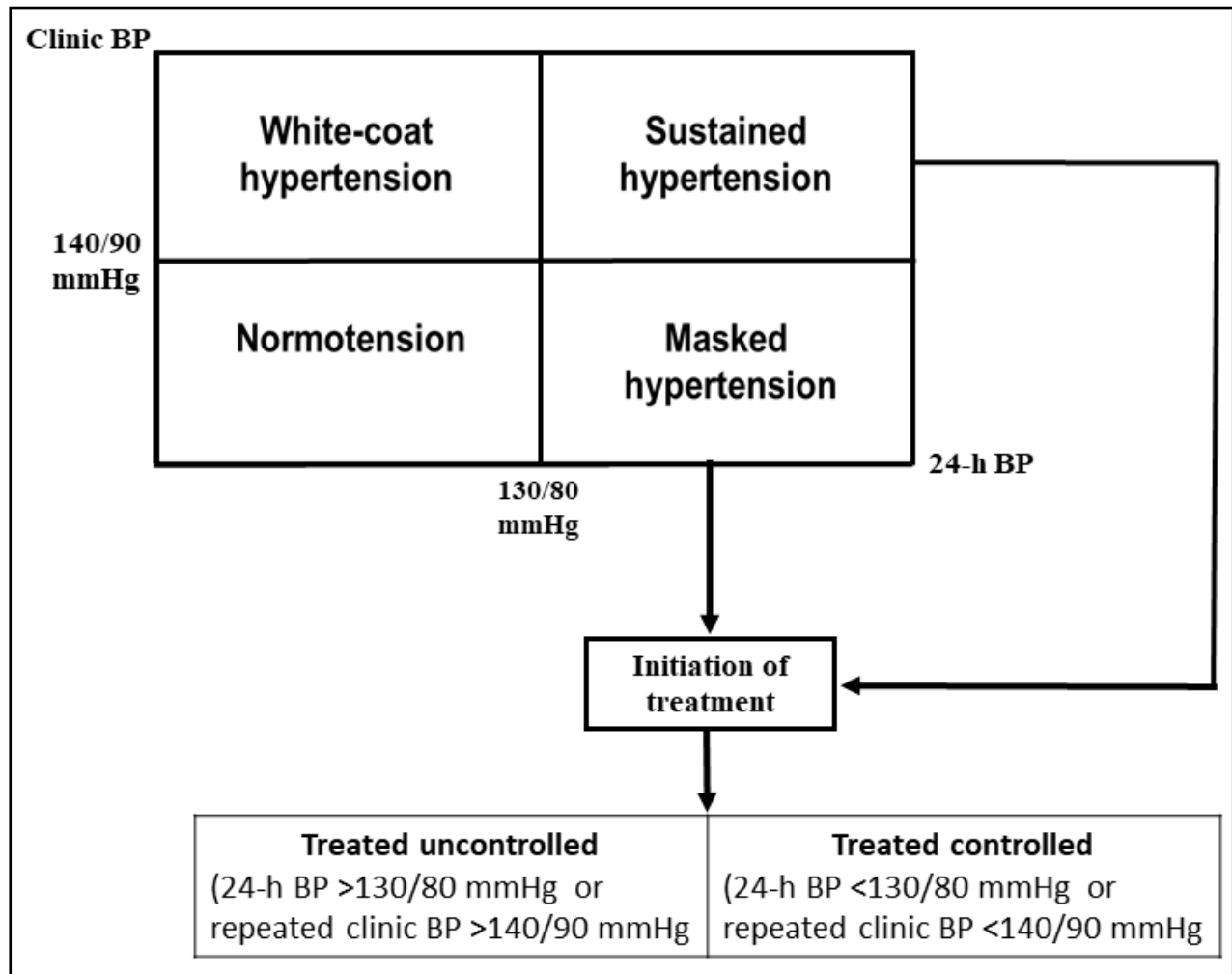


Fig.1: The definition of hypertension by combining office and 24-h blood pressure measurements.

increasing LV afterload.¹⁰ Future studies from the region should also include novel echocardiographic techniques such as strain imaging derived from speckle-tracking echocardiography for assessment of subclinical LV dysfunction.

Furthermore, Type-2 diabetes is associated with arterial stiffening and abnormal pulsatile arterial hemodynamics in patients with heart failure and preserved ejection fraction.¹¹ Hence, assessment of arterial hemodynamics such as arterial stiffness (pulse wave velocity) assessed by applanation tonometry, and systemic arterial compliance are warranted in future well-designed prospective research studies including patients with diabetes.

CONCLUSIONS

The findings that modifiable factors such as lack of education, sedentary lifestyle and unhealthy diet contribute to hypertension and treatment resistance, as well as increase the risk of undetected hypertension, are important and highlight the need of formal usage, patient education, improving compliance and tackling therapeutic inertia by the physician.

Studies have shown that diabetes is a predictor of resistant hypertension. Other predictors are older age, male gender, black African origin, obesity, established atherosclerotic cardiovascular disease and chronic kidney disease.^{12,13} In addition to pharmacological interventions, lifestyle interventions have also been shown to have beneficial effects with regard to reduction in the risk of diabetes by increasing insulin sensitivity, weight loss as well as improved glycaemic and lipid control. Every effort should be made to achieve better glycaemic and BP control in this relatively young population³, who are at substantially high risk of future vascular events such as stroke, myocardial infarction and heart failure, as well as cardiovascular mortality.

Funding: This work was not funded.

Conflict of Interest: None.

The opinion expressed in the present expert commentary is the view of the authors and does not necessarily reflect the view of the institutions the authors belong to.

REFERENCES

- Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension: The Task Force for the management of arterial hypertension of the European Society of Cardiology and the European Society of Hypertension: The Task Force for the management of arterial hypertension of the European Society of Cardiology and the European Society of Hypertension. *J Hypertens*. 2018;36(10):1953-2041.
- Saeed S, Kanaya AM, Bennet L, Nilsson PM. Cardiovascular risk assessment in South and Middle-East Asians living in the Western countries. *Pak J Med Sci*. 2020;36(7):1719-1725. doi: 10.12669/pjms.36.7.3292
- Adnan M, Noor W, Baig Mm. Risk factors of previously undiagnosed and known untreated hypertension among patients with Type-2 diabetes mellitus. *Pak J Med Sci*. 2023;39(2):361-366 doi: 10.12669/pjms.39.2.6329
- Wijkman M, Lanne T, Engvall J, Lindstrom T, Ostgren CJ, Nystrom FH. Masked nocturnal hypertension-a novel marker of risk in type 2 diabetes. *Diabetologia* 2009;52:1258-1264.
- Fagard RH, De Cort P. Orthostatic hypotension is a more robust predictor of cardiovascular events than nighttime reverse dipping in elderly. *Hypertension* 2010;56:56-61.
- Julius S, Palatini P, Kjeldsen SE, Zanchetti A, Weber MA, McInnes GT, et al. Usefulness of heart rate to predict cardiac events in treated patients with high-risk systemic hypertension. *Am J Cardiol* 2012;109:685-692.
- Tikkanen I, Narko K, Zeller C, Green A, Salsali A, Broedl UC, et al.; EMPA-REG BP Investigators. Empagliflozin reduces blood pressure in patients with type 2 diabetes and hypertension. *Diabetes Care*. 2015;38:420-428.
- Raza SA, Aamir AH, Jawa A, Qureshi FM, Ahmad I, Khan KM, Khan K, Naseer N, Islam N, Ishtiaq O, Mahar SA. Expert Opinion: Use of sodium glucose co-transporter type-2 inhibitors in South Asian population -The Pakistan perspective. *J Pak Med Assoc*. 2019;69(4):555-563.
- Kalra S, Ghosh S, Aamir AH, Ahmed MT, Amin MF, Bajaj S, et al. Safe and pragmatic use of sodium-glucose co-transporter 2 inhibitors in type 2 diabetes mellitus: South Asian Federation of Endocrine Societies consensus statement. *Indian J Endocrinol Metab*. 2017;21(1):210-230.
- Saeed S, Waje-Andreassen U, Nilsson PM. The association of the metabolic syndrome with target organ damage: focus on the heart, brain, and central arteries. *Expert Rev Cardiovasc Ther*. 2020;18(9):601-614.
- Chirinos JA, Bhattacharya P, Kumar A, Proto E, Konda P, Segers P, Akers SR, Townsend RR, Zamani P. Impact of diabetes mellitus on ventricular structure, arterial stiffness, and pulsatile hemodynamics in heart failure with preserved ejection fraction. *J Am Heart Assoc*. 2019;8:e011457.
- Myat A, Redwood SR, Qureshi AC, Spertus JA, Williams B. Resistant hypertension. *BMJ* 2012;345:e7473.
- de la Sierra A, Banegas JR, Segura J, Gorostidi M, Ruilope LM. Ambulatory blood pressure monitoring and development of cardiovascular events in high-risk patients included in the Spanish ABPM registry: the CARDIORISC Event study. *J Hypertens* 2012;30:713-719.

Author Contributions:

SS wrote the first draft of the article which was revised by **AMA, MAM and PMN**.

All authors approved the final submission.