


ORIGINAL ARTICLE

Uncontrolled blood pressure among the established hypertensive elderly people in Jashore, Bangladesh: A cross-sectional type of observational study

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Abstract

Objectives: Hypertension is one of the major modifiable risk factors for cardiovascular mortality and morbidity throughout the world. Increased life expectancy leads to increase prevalence of non-communicable diseases among the elderly people including Bangladesh. However, different studies reported high prevalence of uncontrolled hypertension ranging from 52.6% to 67.9% among the elderly people in different countries. With this view, we aimed to assess the frequency of uncontrolled blood pressure (BP) among the elderly hypertensive people and its associated risk factors and treatment pattern in Bangladesh.

Methodology: This cross-sectional type of observational study recruited 246 eligible hypertensive elderly patients attending in 250 Bedded General Hospital, Jashore, Bangladesh dated from 1st July to 31st December 2022. A structured questionnaire was developed and data on associated risk factors, treatment pattern and current blood pressure (BP) measurement were collected by face-to-face interview for the purposive sampling technique.

Results: The mean age of our study patients was 72 ± 7 years with a male and female ratio nearly 1:1. Of the total hypertensive patients aged over 65 years or more, 56.5% remained with uncontrolled hypertension even on their prescribed antihypertensive medications. The mean systolic (SBP) and diastolic (DBP) blood pressure were significantly high ($P < 0.001$) as 167 ± 22 mm Hg and 95 ± 11 mm Hg, respectively, among the uncontrolled hypertensive patients. However, we noticed the mean SBP and DBP among the total hypertensive patients were also significantly high ($P < 0.001$) as 148 ± 27 mm Hg and 87 ± 13 mm Hg, respectively. In this study, we reported that the mean number of last prescribed antihypertensive medications used by the total patients was 2 ± 1 ($P = 0.224$) which was similar among the controlled and uncontrolled hypertensive patient groups. Among the elderly hypertensive patients, the most commonly prescribed antihypertensive medications were Amlodipine 39.8% ($P = 0.006$),

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Olmesartan 29.3% ($P = 0.186$), Losartan 24.4% ($P = 0.127$), Bisoprolol 15.0% ($P = 0.266$) and Atenolol 14.6% ($P = 0.224$).

Conclusion: We noticed high frequency of uncontrolled blood pressure among the elderly hypertensive patients, despite of using multiple antihypertensive medications in Jashore, Bangladesh.

KEYWORDS

hypertension of elderly people, risk factors, treatment and uncontrol BP

1 | INTRODUCTION

High blood pressure or hypertension is now regarded as “silent killer” because it develops gradually without producing significant signs or symptoms finally leading to different organ damage silently.¹ Hypertension (The Silent Killer) is one of most common modifiable risk factors for cardiovascular mortality and early morbidity. HTN leading to cardiovascular diseases is a major global public health issue both in the developed and developing countries.² It is significantly causing a lot of chronic disabling diseases including cardiovascular, cerebrovascular and renal disorders in a silent manner that the patients cannot realize earlier. Therefore, optimum compliant to prescribed antihypertensive medications and BP control at the target level are highly appreciated to mitigate the risks of premature mortality.³

Of the total population of Bangladesh, more than 13 million people include aged over 60 which accounted 8% as per the record of 2019. The expected elder people would be doubled to 21.9% or 36 million by the year of 2050. This literally means that one of every five Bangladeshi would be treated as a senior citizen in the near future. Impairment of immune system with increased age leads to the development of degenerative, communicable and non-communicable diseases among the elder people. Also, the demand for the health services and using of health resources reciprocally increases with the growing of an aging population group.⁴

Although hypertension affects all age group, but it is invariably seen among the elderly population. Various specific underlying mechanisms including arterial stiffness, neuro-hormonal and autonomic dysregulation; and the aging kidney are related to the development of hypertension among the older population.⁵ Some other structural changes such as arterial stiffness, fracturing of the elastic lamella and intimal hyperplasia are also evident in the arterial vasculature of the aged people. Ultimate result of the arterial stiffness causes decreased arterial capacitance and limited elastic recoil which subsequently leads to the impedance of accommodation of changes occurring in the cardiac cycle.⁵⁻⁷ Therefore, the upsurge of both systolic blood pressure (SBP) and diastolic blood pressure (DBP) occurs among the elderly people.⁶ On the other hand, some elderly people show high SBP due to arterial stiffness mostly caused by arteriosclerotic changes, whereas high DBP shown by the other elderly people is due to the loss of arterial elastic recoil.⁸

The Framingham Heart Study reported that more than 90% people after 55-year-old turn into hypertensive status in their later years who accounted previously as of normotensive status.⁹ Cardiovascular events and mortality are highly related to hypertension in the elder population.² Hypertension is noticed 69%, 74% and 77% of population with first myocardial infarction, stroke and congestive cardiac failure patients, respectively.¹⁰ Hypertension is also one of the major risk factors of many other disease including peripheral vascular disease, sudden cardiac death, dissecting aortic aneurysm, angina pectoris, left ventricular hypertrophy, thoracic and abdominal aortic aneurysm, chronic kidney disease, atrial fibrillation, diabetes mellitus, metabolic syndrome, vascular dementia, Alzheimer's disease and ophthalmological diseases.¹¹ Therefore, holistic approach to the elder population with control of hypertension and maintain the target level of BP plays a pivotal role to alleviate the risk of many diseases and eventually reduces the risk of early morbidity and mortality. Although a lot of reports regarding hypertension had been published previously irrespective of age, but a very few reports regarding hypertension especially among the elder age group noticed earlier. Different frequency of uncontrolled hypertension among the elderly hypertensive people had been reported ranging from 52.6 to 67.9% earlier by the various studies across the world.¹²⁻¹⁶

As the elder population is gradually increasing in the developing country such as Bangladesh, so the high time comes forward to pay a special attention to this portion of the total population. However, there is still scarcity data regarding non-communicable diseases including hypertension among the elder population in Bangladesh. Therefore, this cross-sectional type of observational study aims to reveal the frequency of uncontrolled BP among the hypertensive elder population in Bangladesh. We also assess the factors related to the uncontrolled BP and the treatment pattern of hypertension among the elder population in the same arena.

2 | METHODOLOGY

2.1 | Study design and settings

The cross-sectional type of observational study was conducted from 1st July 2022 to 31st December 2022 in Medicine Outpatient Department of 250 Bedded General Hospital, Jashore, Bangladesh.

2.2 | Study sample and participants

We recruited the established hypertensive population aged 65 years or more who were being treated with antihypertensive medication by the registered physician within our time frame. The patients who had not given written consent, mental illness or chronic disabled patients were excluded from our study.

2.3 | Study questionnaire and data collection

A well-structured questionnaire was developed both in English and native language Bengali for those who were not good at English. During building up the questionnaire, we used modified and validated WHO stepwise approach to the chronic disease risk factors surveillance (STEPS) for data collection for the study. The preformed questionnaire used socio-demographic characteristic, life style pattern, physical examination, existing comorbidities and data related to hypertension. The socio-demographic characteristics data concerned with age (65 years and above), sex (male and female), residence (urban and rural), marital status (single, married, separated widow/loss of wife and divorce), occupation (housewife, farmer, day laborer, service holder, business man and unemployed), family status (nuclear and joint family). Life style pattern issued with smoking status (current, ex-smoker and non-smoker), added salt (yes or no), physical activity (active or inactive) and daily intake of fruits (yes or no). We measured height, weight, BMI and on spot blood pressure as a part of physical examination. Family history of hypertension, self-reported established diabetes mellitus, ischemic heart disease, myocardial infarction, stroke, chronic kidney disease and dyslipidemia were used as features of existing comorbidities of hypertension. Data regarding to hypertension, eligible patients were asked about their duration of hypertension and last medications they were using. Blood pressure of every patient was measured by the registered physician after providing their optimum rest arriving at the outpatient department. Data were collected by face-to-face interview; the quality control and cross check of each data had been performed by every author involving in this study.

2.4 | Anthropometric measurement

Body weight was measured to the nearest 0.1 kg by using an electronic weighing scale (Sinbe Model No, SBS 4414, and made in People's Republic of China) with light clothing without having footwear. Standing height of the participants without footwear was measured by the stadiometer scale to its nearest millimeter. Body Mass Index (BMI) was calculated as weight in kilogram divided by the square of body height in meter. The participants were classified by BMI (weight in kg/height in m²) groups as obesity (BMI = 30), overweight (BMI = 25–29.9), healthy weight (BMI = 18.5–24.9) and

underweight (BMI = <18.5) according to the Partial update of CG43 London: National Institute for Health and Care Excellence (UK), National Clinical Guideline Centre, 2014.

2.5 | Blood pressure measurement

Registered physicians were involved to measure blood pressure using well-validated aneroid sphygmomanometer with standard sized arm cuffs. The enrolled participants were asked for having complete rest for 10 minutes before measuring blood pressure. These were also cross checked that they had not had taken part in strenuous exercise, tea, coffee or smoking within 30 min before checking blood pressure. The participants were allowed to seat comfortably on chair resting arm at the level of their heart during measuring blood pressure. Subsequently two measurements were recorded between 2 min interval. The average of the two recording was considered as ultimate blood pressure of each patient.

2.6 | Ethical clearance and institution approval

During enrollment of the patients, we explained the details about the purpose of the study and their role in the study. This was also ensured that their data would only be used in the study purpose and it would not be handed over to the third party at any quest. The study was completed after getting institutional approval from 250 Bedded General Hospital, Jashore, Bangladesh. The memorandum number from 250 Bedded General Hospital, Jashore, Bangladesh was 250 Bedded GH Jashore/Approval/Sh-7/2022/437 dated on 21/05/2022.

2.7 | Patients and public involvement

After briefing everything about the purpose of the study and their role in the study, informed written consent was acquiesced from the patients themselves or their next keen. The patients were also informed that they had no role in the conceptualization, designing, validation, data collection, analysis and result of the study. However, the result of the study could be provided by the correspondent author through email if anyone of the participants shows interest to get it.

Operational case definition:

- Hypertensive patients of Study Subjects: The participants aged 65-year-old or above who were diagnosed as hypertension patients and treated regularly with antihypertensive medications by the registered physicians for at least 6 months.
- Uncontrolled Hypertension: Uncontrolled hypertension was defined as systolic blood pressure at least 140 mm Hg and/or diastolic blood pressure at least 90 mm Hg, despite of having anti-hypertensive medication during the study period.⁹

2.8 | Statistical analysis

Chi-square test and one-way analysis of variance (ANOVA) were used to extract *p*-value and logistic regression analysis was used to evaluate risk factors analysis among the different groups of the study population.

3 | RESULTS

Of the total 246 hypertensive participants aged over 65 years or more were enrolled in our study where we noticed 56.5% hypertensive patients remained uncontrolled even on their antihypertensive agents. The mean age of our study population was 72 years with a standard deviation of 7 and the male–female ratio was nearly similar to 1:1. Approximately two third of the study population (62.6%) came from the rural area. In our study, 4.9% participant were unmarried but 45.5% lost their partner. The participants were 65 years or more, so the maximum (91.1%) portion of them were unemployed and rest of them constituted from housewife (2.8%), farmer (1.6%), service holder (1.6%) and business man (2.8%). Of the total population, 84.1% hypertensive patients lived in the joint family and 49.2% used added salt in their meal and 53.5% patients used to intake fruits daily. According to the smoking status 4.9% still smoked, ex-smoker and non-smoker constituted 27.6% and 67.5%, respectively. Most of the hypertensive patients in our study did not practice regular physical activity (87.8%). In this study, 53.7% hypertensive patients had positive family history of hypertension, whereas self-reported diabetes, ischemic heart disease, old myocardial infarction, stroke, chronic kidney disease and dyslipidemia were reported 30.5%, 24.8%, 4.9%, 25.6%, 6.9% and 8.5%, respectively. The mean BMI of our study population was 24.2 ± 4.6 where over-weight and obese participants were 31.7% and 16.7%, respectively (Table 1).

In Table 2, the overall mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) were 148 ± 27 mm Hg and 87 ± 13 mm Hg, respectively, whereas the mean SBP and DBP among the uncontrolled hypertensive patients were significantly 167 ± 22 mm Hg and 95 ± 11 mm Hg, respectively. The mean duration of hypertension of the total participants was 8.1 ± 7.3 years which was 8.6 ± 8.1 years among the uncontrolled hypertensive patients. In our study, we noticed the mean number of using prescribed antihypertensive medications was similar 2 ± 1 among the controlled, uncontrolled and overall hypertensive participants. The most commonly used antihypertensive medications among the hypertensive patients in our study were Amlodipine (39.8%), Olmesartan (29.3%), Losartan (24.4%), Bisoprolol (15.0%) and Atenolol (14.6%).

3.1 | Discussion

The “silent killer” hypertension, the most common non-communicable disease is treated as an important determinant of long-term morbidity and early mortality in both the developed and

developing countries including Bangladesh.¹ Many of the vascular and nonvascular events such as stroke, myocardial ischemia and infarction, heart failure, chronic kidney disease, eye or retinal diseases and peripheral vascular diseases are related to hypertension and its consequences.^{2,3,8,10,11,15} The management of hypertension among the elderly population is challenging due to a lot of issues including patients' age, medical, physical, social, and mental or cognitive factors are directly related to it.¹⁷

This study reported that the frequency of uncontrolled hypertension among the elderly population aged after 65 years or more was 56.5% in Jashore, Bangladesh. Very recently published different studies from the different corners across the globe reported variable frequency of uncontrolled hypertension among the elderly people such as 52.6% in Indonesia,¹² 61.7% in Brazil¹³ and 62.5% in Iran.¹⁴ The high frequency of uncontrolled hypertension as 67.9% despite of receiving antihypertensive medication had been reported among the rural people above 60 years in Bangladesh.¹⁵ In our study, the elderly hypertensive patients aged over 65 years had shown high frequency of uncontrolled hypertension despite of receiving prescribed medications which was more or less similar to the other studies mentioned above.

Age is an independent risk factors for the development of hypertension and uncontrolled hypertension. A lot of issues including arterial stiffness, presence of other comorbid conditions, potential drug interaction, drug adherence, cognitive impairment, financial constraints, familial and social factors are related to uncontrolled hypertension among the elder people.^{13,14,17} Therefore, many of the demographic factors might not be associated with the demographic issues related to uncontrolled hypertension among the elder cohort. Factors such as sex,^{12,18–20} residence,¹⁸ marital status,^{14,18–20} economic status,^{14,18} and smoking status^{14,19,20} were not associated with uncontrolled hypertension among the elderly hypertensive patients from different parts of the world. Even age is not a predictor of uncontrolled hypertension among the elderly hypertensive patients in different published articles from the different parts across the globe.^{13,19,20} Even some factors such as added salt intake in the meal¹⁹ and physical activity¹² had not found any association with uncontrolled hypertension among the hypertensive patients like our study. It is usually thought that educated people are health conscious and they are aware of the effect of non-communicable diseases on health. Although some studies were pertinent with this theory,^{19,20} but a lot of studies did not support this factor like our study.^{12–14} According to our study, overweight or obesity had no significant relationship with uncontrolled hypertension among the elderly hypertensive patients in our study which was consistent with other study published recently from Iran.¹⁴ This happened in our study possibly due to sampling biasness or method, whereas another recently published studies from Afghanistan, China had shown a significant relationship with obesity or overweight and uncontrolled hypertension among the older people.^{18,20}

This study revealed that the overall mean systolic and diastolic pressure were high where both of them among the uncontrolled group were also significantly higher compared with the controlled group

TABLE 1 Socio-demographic, anthropometric, lifestyle and clinical characteristics of elderly hypertensive patients (n = 246).

Characteristics	Controlled HTN 107 (43.5)		Uncontrolled HTN 139 (56.5%)		Overall 246 (100%)		P-Value
	mean ± SD	n (%)	mean ± SD	n (%)	mean ± SD	n (%)	
Age (years)	73 ± 6		72 ± 7		72 ± 7		0.365 ^{ns}
Gender							
Female		49 (19.9)		76 (30.9)		125 (50.8)	0.167 ^{ns}
Male		58 (23.6)		63 (25.6)		121 (49.2)	
Residence							
Urban		43 (17.5)		49 (19.9)		92 (37.4)	0.428 ^{ns}
Rural		64 (26.0)		90 (36.6)		154 (62.6)	
Marital status							
Single		6 (2.4)		6 (2.4)		12 (4.9)	0.332 ^{ns}
Married		58 (23.6)		64 (26.0)		122 (49.6)	
Widow/wife less		43 (17.5)		69 (28.0)		112 (45.5)	
Occupation							
Housewife		4 (1.6)		3 (1.2)		7 (2.8)	0.378 ^{ns}
Farmer		0 (0.0)		4 (1.6)		4 (1.6)	
Service		2 (0.8)		2 (0.8)		4 (1.6)	
Business		4 (1.6)		3 (1.2)		7 (2.8)	
Unemployed		97 (39.4)		127 (51.6)		224 (91.1)	
Family status							
Nuclear family		22 (8.9)		17 (6.9)		39 (15.9)	0.076 ^{ns}
Joint family		85 (34.6)		122 (49.6)		207 (84.1)	
Smoking status							
Current		7 (2.8)		5 (2.0)		12 (4.9)	
Ex-smoker		31 (12.6)		37 (15.0)		68 (27.6)	0.485 ^{ns}
Non-smoker		69 (28.0)		97 (39.4)		166 (67.5)	
Eat added salt		56 (22.8)		65 (26.4)		121 (49.2)	0.386 ^{ns}
Physical activity							
Active		11 (4.5)		19 (7.7)		30 (12.2)	0.421 ^{ns}
Inactive		96 (39.0)		120 (48.8)		216 (87.8)	
Daily intake of fruits		59 (24.5)		70 (29.0)		129 (53.5)	0.654 ^{ns}
Family H/O HTN		50 (20.3)		82 (33.3)		132 (53.7)	0.056 ^{ns}
Co-morbidities							
Self-reported DM		34 (13.8)		41 (16.7)		75 (30.5)	0.700 ^{ns}
IHD		25 (10.2)		36 (14.6)		61 (24.8)	0.648 ^{ns}
OMI		3 (1.2)		9 (3.7)		12 (4.9)	0.185 ^{ns}
Stroke		37 (15.0)		26 (10.6)		63 (25.6)	0.005 ^s
CKD		6 (2.4)		11 (4.5)		17 (6.9)	0.480 ^{ns}
Dyslipidemia		9 (3.7)		12 (4.9)		21 (8.5)	0.951 ^{ns}
BMI (kg/m ²)	23.5 ± 4.5		24.7 ± 4.6		24.2 ± 4.6		0.051 ^{ns}
Under weight		9 (3.7)		12 (4.9)		21 (8.5)	0.113 ^{ns}
Normal		54 (22.0)		52 (21.1)		106 (43.1)	
Over-weight		32 (13.0)		46 (18.7)		78 (31.7)	
Obese		12 (4.9)		29 (11.8)		41 (16.7)	

Abbreviations: %, percentage; BMI, body mass index; H/O, history of; HTN, hypertension; n, number; ns, nonsignificant; p-value, probability value; s, significant; SD, standard deviation.

TABLE 2 Blood Pressure and Medications used among the study population (n=246).

Treatment-related informations	Controlled HTN 107 (43.5)		Uncontrolled HTN 139 (56.5%)		Overall 246 (100%)		P-Value
	mean ± SD	n (%)	mean ± SD	n (%)	mean ± SD	n (%)	
SBP (mm Hg)	123 ± 7		167 ± 22		148 ± 27		<0.001 ^s
DBP (mm Hg)	77 ± 6		95 ± 11		87 ± 13		<0.001 ^s
Duration of Hypertension in years	7.6 ± 6.2		8.6 ± 8.1		8.1 ± 7.3		0.289 ^{ns}
Number of last prescribed anti-hypertensive medication	2 ± 1		2 ± 1		2 ± 1		0.199 ^{ns}
Atenolol		19 (7.7)		17 (6.9)		36 (14.6)	0.224 ^{ns}
Metoprolol		0 (0.0)		1 (0.4)		1 (0.4)	0.379 ^{ns}
Bisoprolol		13 (5.3)		24 (9.8)		37 (15.0)	0.266 ^{ns}
Amlodipine		53 (21.5)		45 (18.3)		98 (39.8)	0.006 ^s
Cilnidipine		5 (2.0)		9 (93.7)		14 (5.7)	0.545 ^{ns}
Ramipril		3 (1.2)		3 (1.2)		6 (2.4)	0.745 ^{ns}
Losartan potassium		21 (8.5)		39 (15.9)		60 (24.4)	0.127 ^{ns}
Olmesartan		36 (14.6)		36 (14.6)		72 (29.3)	0.186 ^{ns}
Telmisartan		4 (1.6)		1 (0.4)		5 (2.0)	0.096 ^{ns}
Hydrochlorothiazide		8 (3.3)		15 (6.1)		23 (9.3)	0.376 ^{ns}
Indapamide		2 (0.8)		4 (1.6)		6 (2.4)	0.611 ^{ns}
Nebivolol		0 (0.0)		4 (1.6)		4 (1.6)	0.077 ^{ns}
Perindopril		1 (0.4)		5 (2.0)		6 (2.4)	0.180 ^{ns}
Diltiazem		4 (1.6)		4 (1.6)		8 (3.3)	0.706 ^{ns}
Lisinopril		4 (1.6)		4 (1.6)		9 (3.7)	0.953 ^{ns}

Abbreviations: %, percentage; DBP, diastolic blood pressure; n, number; ns, nonsignificant; p-value, probability value; s, significant; SBP, systolic blood pressure; SD, standard deviation.

among the elderly hypertensive patient. This evidence was supported by the other published article where blood pressure was not controlled among the elder population despite of getting two or more antihypertensive medications.²¹ In our study, the most frequently used anti-hypertensive medication was calcium channel blockers out of which amlodipine, cilnidipine and diltiazem were at a rate of 79.6%, 11.4% and 6.5%, respectively. Among them amlodipine was the significantly highest commonly used medicine among all the antihypertensive agents used in our study. The second most commonly used antihypertensive medication was angiotensin receptor blockers in our study. The frequency of Olmesartan, Losartan potassium and Telmisartan were 58.5%, 48.8% and 4.0%, respectively used among the elderly hypertensive patients in our study. Similar findings related to using of antihypertensive medication among the elderly hypertensive patients were reported in the recently published article,²¹ whereas diuretics and angiotensin II antagonists were the most frequently used antihypertensive medications in another study.¹³

4 | HIGHLIGHTS OF THIS STUDY

We noticed high frequency (56.5%) of uncontrolled blood pressure among the elderly established hypertensive patients even who were on their prescribed anti-hypertensive medication.

Non-communicable diseases (NCDs) including hypertension are progressively increasing among the rural people (62.6%) compared with the urban residents in our study.

Among the established hypertensive elderly people, 87.8% patients are leading their life without doing proper physical activities which should be addressed and encouraged.

There is significantly high systolic (167 ± 22 mm Hg) and diastolic (95 ± 11 mm Hg) blood pressure among the uncontrolled hypertensive elderly patients even who are on the multiple anti-hypertensive medication. This may attribute the final morbidity and mortality in the limited resources country like Bangladesh.

This manuscript is conducted among the older hypertensive people in the East-southern part of Bangladesh where there is practically limited data on this issue.

This data will help the national policy maker for the initiation of management of non-communicable diseases and allocation of health resources for the elderly people in Bangladesh.

5 | STRENGTH AND LIMITATION

- The strength of our study is completely conducted among the geriatric hypertensive population in Jashore, Bangladesh.

- However, this study was conducted in a single center of Bangladesh which may not reflect the whole geriatric people of the country.
- The study was completed without the information of dosage of the drugs and compliance to the antihypertensive medications among the elderly people.
- Biochemical variables were not evaluated due to lack of funding availability in our study

5.1 | Conclusion

This study revealed significantly high frequency uncontrolled blood pressure among the older hypertensive patients. This was also evident that both systolic and diastolic blood pressure were significantly higher compared with the controlled or overall elderly hypertensive groups. More than one of the two elderly hypertensive patients had shown uncontrolled blood pressure even despite of multiple antihypertensive medications which is really alarming for the future morbidity and mortality. Therefore, more efforts should be paid by the health care workers at different levels and national policy makers for the better controlling of blood pressure among the elderly hypertensive patients in Bangladesh. We are also recommending to conduct a large-scale study recruiting more elderly hypertensive population from the multiple centers in Bangladesh representing the national data.

AUTHOR CONTRIBUTIONS

GKA: Design, concept, data interpretation, literature review, drafting and critical review. MA: Data analysis and critical review. KT: Data collection, drafting, literature review and critical review. MTI, MSR, MSA, MZH, DB and SS: Data interpretation and literature review. NA: Critical review.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest of any author.

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