



A Systematic Review on the Prevalence and Management of Diabetes and Hypertension in Zanzibar

Salum Seif Salum *

Department of Microbiology & Immunology, School of Health and Medical Sciences, State University of Zanzibar, Zanzibar, Tanzania.

GSC Advanced Research and Reviews, 2025, 22(02), 164-170

Publication history: Received on 06 January 2025; revised on 18 February 2025; accepted on 21 February 2025

Article DOI: <https://doi.org/10.30574/gscarr.2025.22.2.0052>

Abstract

Introduction : In Zanzibar, the increasing prevalence of Non-Communicable Diseases (NCDs) poses significant challenges to the healthcare system. This review aims to assess the epidemiology, risk factors, and existing preventive and management strategies for diabetes and hypertension in Zanzibar.

Methods: This review was conducted in line with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Studies on diabetes and hypertension in Zanzibar published from January 2020 to January 2025 were searched from PubMed, Google Scholar, and ResearchGates databases. All studies outside Zanzibar or lacking epidemiological data were excluded.

Results: A total of 20 articles legible for review was evaluated, 14 of them were later disqualified as were published beyond 2020. The systematic review was conducted on 5 studies that met study criteria. Among them, 2 studies were mainly focus on prevalence of diabetes mellitus and hypertension, and the remaining 3 were focused on monitoring and management. Both studies were observational. Population based studies reported a rising trend in diabetes by 4.4% and hypertension by 33.5% while in hospital based study reported diabetes by 16.6% and hypertension by 75.0% among adults. Old age, education, obesity, and raised fasting blood glucose were significantly independently associated with hypertension. Reported high case-fatality rate 59.0% (CI 55.2-62.8) and socioeconomic health disparities in the patients diagnosed with acute stroke. Studies reported suboptimal diabetes and hypertension management, scarcity of staff with specialised knowledge in managing diabetic patients and multifaceted challenges facing them.

Conclusion Diabetes and hypertension are growing public health concerns in Zanzibar. Addressing these issues requires a multi-sectoral approach, including better healthcare infrastructure, public education, and policy-driven interventions. This review provides informative message in regards to the status of diabetes and hypertension in Zanzibar Island. It provides significant scientific evidence on burden of diabetes and hypertension, their risk factors and valuable information in the management, monitoring and control strategies to the policy makers and care providers.

Keywords: Prevalence; Diabetes; Hypertension; Non-Communicable Diseases and Management

1 Introduction

Non communicable diseases (NCD) burden is now increasing in all part of the world (1). The world is experiencing shift of diseases burden from infection diseases to NCD which lead to high mobility and mortality rate (2). This shift is accelerated by common transition factors such as trade, foreign investment and urbanization (3). The transition factors lead to economic stability in many countries and hence may influence unhealthy behaviors to the societies (4). The burden of NCD is increasing due to a large consumption of highly refined and processed foods, foods rich of sugar, saturated

* Corresponding author: Salum Seif Salum.

fats, salt and sedentary lifestyle (1). Raised Low Density Lipoprotein and triglyceride blood levels, abnormal waist circumference, overweight/obesity and advanced age (i.e. >40 years) were among identified risk factors (2). In low- and middle-income countries, diabetes and hypertension are among most prevalent NCDs including Tanzania (5–7). Diabetes Mellitus is regarded when Fasting blood glucose (FBG) is ≥ 5.6 mmol/L and < 6.1 mmol/L. In 2019, the global prevalence of diabetes among adults was estimated at 9.0%, which consequently resulted in 1.5 million deaths, where over 80% reported in developing countries. Diabetes manifests in two main types: Type 1 Diabetes Mellitus (T1DM), where the pancreas fails to produce insulin, and Type 2 Diabetes Mellitus (T2DM), characterised by reduced insulin production and the body's resistance to insulin's action. T2DM accounts for approximately 90% of all diabetes cases, with T1DM representing the remaining 10% (5). Overweight and obesity were reported to be among modifiable risk factors for hypertension. Salt intake is another important risk factor for development of hypertension. Hypertension classified if individual systolic blood pressure is greater than or equal to 140 mmHg and the diastolic pressure greater than or equal to 90 mmHg (8). The pattern of epidemiology for Diabetes and hypertension may varies from country to country based on stage of health transition. Therefore, it is important to understand diseases burden and their associated risk factors (9). For better management and prevention of diabetes and hypertension, data on disease prevalence, risk factors, and health service performance is essential (9). For that, the Zanzibar Government has already put in place public and health service preventive measures to mitigate the diseases (10)

Availability of incidence and prevalence of diabetes hypertension comprehensive data across Zanzibar Archipelago remains limited. Hence, there is high need for precise, evidence-based epidemiological data necessary for planning and facilitate the formulation of bespoke healthcare interventions. This study intended to review the available evidence on diabetes and hypertension prevalence and associated risk factors published in Zanzibar from 2020-2025.

2 Methodology

2.1 Methods

This review was conducted in line with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Studies on diabetes and hypertension in Zanzibar published from January 2020 to January 2025 were searched from PubMed, Google Scholar, and ResearchGates databases. All studies outside Zanzibar or lacking epidemiological data were excluded. The search was conducted from 1st January 2025 to 1st Feb 2025, using search terms to identify relevant studies: "[MeSH Terms] OR "diabetes and hypertension in Zanzibar"[Title/Abstract] Title/Abstract] OR "Prevalence of diabetes and its associated risk factors. Diabetes"[Title/Abstract] "Prevalence"[MeSH Terms] OR "Period Prevalence" [Title/Abstract] OR "Point Prevalence"[Title/Abstract] "Incidence"[MeSH Terms]

Two reviewers screened articles of potentially relevant studies and any disagreement were resolved through discussion. The online screening tool Covidence (<https://www.covidence.org/>) was used to manage the screening process, pre-populate inclusion and exclusion criteria, and remove duplicate records. The third reviewer was engaged to resolve any disagreement through discussion. Information on study identification, study design, characteristics of the participant, data collection methods, outcome measures, and results were extracted. The quality assessment was performed independently by two reviewers, and any disagreements were resolved by consensus or through consultation with a third reviewer. Studies with a high risk of bias were excluded. PRISMA flow diagram was used to summarised whole selection process and tables of individual studies was used to summarise quantitative data. The quality scores of biases for each eligible study were reported accordingly.

3 Results

Total of 30 articles were found during initial database search. 10 articles were left after duplicates. After the eligibility of the remaining 20 articles' entire texts was evaluated, 14 of them were later excluded for failing to meet the inclusion requirements. Lastly, the systematic review contained 5 papers. A PRISMA flow diagram provides a summary of the screening procedure (Figure 1). The prevalence of diabetes mellitus and hypertension and their management in Zanzibar were examined in 5 studies. Of them, 2 studies were mainly focus on prevalence of these two diseases, and 3 studies were focused on monitoring and management. Both studies were observational.

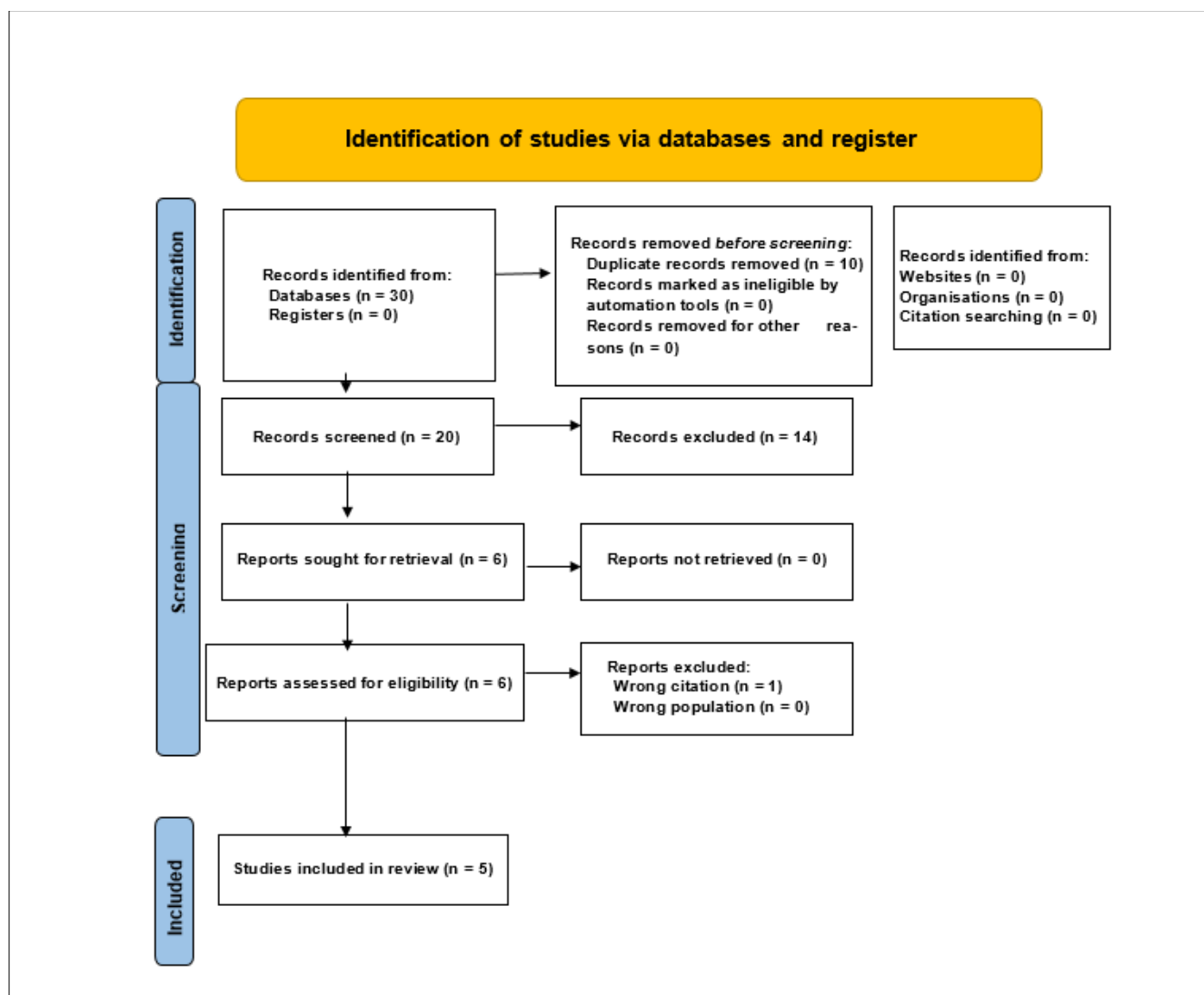


Figure 1 PRISMA flow chart shows the selection of studies on the prevalence and management of diabetes mellitus and hypertension in Zanzibar

3.1 Prevalence of Hypertension and Diabetes in Zanzibar

Jorgensen et al (2020) assessed prevalence and antecedent factors and care access for cardiovascular risk factors, hypertension and diabetes, to support health system improvements in Zanzibar. It was a population based cross-sectional survey conducted in 2011. 2772 households were initially sampled for the survey. Prevalence of hypertension was reported to be 33.5% whereby old age, education, obesity, and raised fasting blood glucose were significantly independently associated with hypertension. The prevalence of diabetes was 4.4%. It was also associated with old age and almost significantly with obesity. Apart from observed high prevalence of hypertension, study uncovered suboptimal management along the care cascades.

Mohamed Ali et al. (2024) conducted a survey on hypertension and diabetes so as to improve awareness, treatment and control of these two non-communicable diseases in Archipelago. A total of 213 patients, underwent standard transthoracic echocardiography for clinical reasons during outpatient attendances at Mnazi Mmoja Hospital. The overall hypertension prevalence was 75.0%, obesity 40.3% (BMI ≥ 30 kg/m²), diabetes was 16.6%. The survey, found high prevalent of hypertension and hypertension-mediated target organ damage. The hypertension was poorly controlled partly due to affordability, availability of antihypertensive medications, and partly due to lack of awareness. Women were on average 10 years younger than men and were more likely to be obese, while men had higher burden of established cardiovascular disease (CAD, stroke, chronic kidney disease, and atrial fibrillation).

3.2 Monitoring, Management and Control of Hypertension and Diabetes in Zanzibar

Juma et al.; 2020 estimated the cardiovascular risk factors and their correlation with type 2 diabetes mellitus (T2DM) in Zanzibar, hypothesizing that early detection and treatment of lipid abnormalities can minimize the risk for atherogenic cardiovascular disorders and cerebrovascular accident in patients with T2DM. The study populations were those patients who presented themselves at Mnazi Mmoja Hospital with T2DM, and who are within the age of 18 to 45 years. Fasting blood glucose (FBG), total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), and triglyceride (TG) levels were evaluated. The findings reveals that females were at high risk of cardiovascular diseases. The TC, TG, LDL-C mean levels were significantly higher in diabetics compared with the control subjects $p < 0.05$. The HDL-C was however lower in diabetics compared with the controls. Also, the mean FBG, TC, TG, and LDL-C were significantly higher in female diabetic subjects compared to the male counterparts $p < 0.05$.

Muki et al.; ((2023) aimed at the staff capacity and management of diabetic patients in Zanzibar. The findings from this study revealed that about 38.6% of the staff were found to have specialised knowledge in managing diabetic patients, while 61.4% had general knowledge, however, only 36.3% of diabetic health workers were available for the management of diabetic patients. The study highlighted the challenges faced by the staff and also emphasised the critical importance of hospital management in recruiting staff with expertise in diabetic treatment and care.

Jørgensen et al 2023 conducted study in Unguja Island, Zanzibar intended to characterise mortality and functional outcome and their relationships with socioeconomic deprivation for women and men in Zanzibar. It was a prospective observational study of patients admitted to hospital with diagnosis of acute stroke. The patients followed up were made for 12 consecutive months almost one year after the stroke. The study reported high rate of Case-fatality and socioeconomic disparities. At the first 28 days, an overall mortality rate was 38.2%, while at 12 months the rate rose to 59.0%. In order to reduce an observed significant health disparities, comprehensive policies, evidence-based interventions, and promotion of equitable access to stroke care and rehabilitation are strongly needed in Zanzibar health setup.

Table 1 Characteristics of studies included in systematic review

Study	Year	Type of study	Targeted population	Sample size	Major finding of the study
Jorgensen et al.,	2020	Cross-sectional observation survey	General Zanzibar population	2,146	High prevalence of hypertension, suboptimal hypertensive management and unmet need for hypertension and diabetes care in Zanzibar
Juma et al	2020	Laboratory based cross-section study	Diabetic patients	186	TC, TG, LDL-C mean levels were significantly higher in diabetics compared with the control subjects $p < 0.05$ and Females were at high risk of cardiovascular diseases.
Jørgensen et al.,	2023	Prospective observational study	Strokes hospitalization patient		High rate of stroke Case-fatality and significant Health socioeconomic disparities.
Muki et al.,	2023	Observational study desing	Diabetes health workers	205	Availability of small number of diabetic health workers for the better management of diabetic patients. Presence of multifaceted challenges that facing the diabetic health workers in relation to availability of equipment, relatives, psychotherapy treatment, and drug adherence and compliance.

Mohamed Ali et al.,	2024	Observational study	Outpatient at Mnazi Mmoja hospital who attended tot transthoracic and echocardiography for clinical	213	High prevalent of hypertension and hypertension-mediated target organ damage. The hypertension was poorly controlled partly due to affordability, availability of antihypertensive medications, and lack of awareness.
---------------------	------	---------------------	---	-----	--

4 Discussion

This review aims to assess the epidemiology, risk factors, and existing preventive and management strategies for diabetes and hypertension in Zanzibar using PRISMA guidelines to identify and synthesize the available evidence on the prevalence, monitoring and management of diabetes and hypertension in Zanzibar. Total of 5 studies were included in the analysis, where by two studies was mainly in prevalence and three studies were focused on monitoring and management of diabetes and hypertension.

Study done by Jorgensen et al., 2020 reported prevalence of diabetes and hypertension were 4.4% and 33.5% respectively. Second study done by Mohamed Ali et al., 2024, reported an overall hypertension prevalence of 75.0% where by female were 77.1% and male 72.3%. For diabetes prevalence of 16.6% whereby female were 11.5% and male were 22.9% for outpatient who seeking care at Mnazi Mmoja Hospital. The results from these two studies indicated a significance increase of prevalence diabetes and hypertension among Zanzibari and results are similar to many studies conducted in various regions all over the world (1,8,11–13). Both studies revealed the most associated risk factors which are mainly based on lifestyle behavioral smoking, age and high Body Mass Index (BMI). These risk factors are modifiable and mainly associated with changing in economic status from poor to middle class where by people able to afford luxury life material like transport entertainment like private cars, television and smart phone which lead to sedentary life style together with unhealthy diet contributed by too much oil, fast food and snacks with high salt (14).

Another three studies which were included in this systematic review focuses on control, monitoring and management strategies of diabetes and hypertension in order to treat and control the severity hence finally to prevent damage of vital organ include hearts, blood vessel liver and other which could lead to serious adverse effects and finally death (6,15,16).

Study done by Juma et al.; 2020 aimed is to estimate the cardiovascular risk factors and their correlation with type 2 diabetes mellitus in Zanzibar the study reported that TC, TG, LDL-C mean levels were significantly higher in diabetics compared with the control subjects $p < 0.05$. The authors identify there is association between glucose high glucose level and lipid profile among diabetes patients and female gender is more closely with dyslipidemia. He suggested that there is a need for control of plasma cholesterol and triglyceride levels to have lower LDL levels and elevated HDL levels. By doing so, it can mitigate the risk for atherogenic cardiovascular disorders and cerebrovascular accident in patients with T2DM.

Muki et al., 2023 reported the study on the capacity of the staff and management of diabetic patients in Zanzibar. The findings of the study revealed 38.6% of staff to specialize in the management of diabetes patients, and 61.4% had a general knowledge. This result is significant important and it gives the hope to the public health on management and control among patients. However, study revealed understaffing where by only 36.3% of diabetes health workers were available which may lead to poor management, finally will lead to more prognosis.

Study of Mohamed Ali et al., 2024 reported an overall mortality rate of 38.2% at 28 days, which rose to 59.0% at 12 months. Author concluded that case-fatality rates were high, and socioeconomic disparities were evident even during the acute stroke phase. He suggested that policies are needed to minimize the adverse health effect and adapt evidence-based interventions, finally to enhance reasonable access to stroke care and rehabilitation.

The three-studies aligned with the National Strategic Plan on reduction of the burden and finally control their consequences in Tanzania(7) which is going together with the call from International Organizations with the aim of reducing the death and disability associated with Non communicable diseases (1,2,12,17).

5 Conclusion

This review provides informative message in regards to the status of diabetes and hypertension in Zanzibar. It provides significant scientific evidence on burden of diabetes and hypertension, their risk factors and valuable information in the management, monitoring and control strategies to the policy makers and care providers.

The review also highlighted the need for more in-depth studies in diabetes and hypertension in Zanzibar so as to reduce the burden and health effects associated with NCD.

Study limitation

The study includes a few number of studies which were only conducted in the Unguja island of Zanzibar.

Compliance with ethical standards

Acknowledgments

Author would like to acknowledge his fellow staff for their technical assistance.

References

- [1] Bennett JE, Stevens GA, Mathers CD, Bonita R, Rehm J, Kruk ME, et al. NCD Count-down 2030: worldwide trends in non-communicable disease mortality and progress to-wards Sustainable Development Goal target 3.4 NCD Countdown 2030 collaborators* [Internet]. 2018. Available from: www.thelancet.com/NCD-Countdown2030
- [2] Srinath Reddy K. Regional roadmaps for reducing premature deaths from NCDs. Lancet Glob Heal [Internet]. 2015 [cited 2024 Sep 1];3:e725–6. Available from: www.thelancet.com/lancetgh
- [3] Mboera LE, Kashimanawe C, Rumisha SF, Chiduo MG, Kimaro E, Bwana VM. Patterns and trends of in-hospital mortality due to non- communicable diseases and injuries in Tanzania, 2006–2015. 2023 PLOS Glob Public Health 3(7): e0000281. <https://doi.org/10.1371/journal.pgph.0000281>
- [4] Sando D, Sachin S, Moshi | Grace, Sando MM, Yussuf M, Mwakitalima | Anyitike, et al. School health and nutrition services for children and adolescents in Tanzania: A review of policies and programmes. 2023; Available from: <https://onlinelibrary.wiley.com/doi/10.1111/mcn.13544>,
- [5] Lucy A, Mrema E, Mapunda A, Sylvester P, Olomi W. Type 1 Diabetes Mellitus in Tanzania : a systematic review of prevalence and incidence Abstract : 2024;
- [6] Juma MS, Okafor CJ, Dida FA, Yusuf SA, Salum SS. Estimation of Cardiovascular Risk Factors & Their Relative Impact in Diabetic Mellitus-2 Adult Patients' in Mnazi Mmoja Hospital - Zanzibar. Int J Trop Dis Heal. 2020;41(9):75–83.
- [7] Ministry of Health and Social Welfare. National Noncommunicable Diseases Strategy. Minist Heal Soc Welf. 2015;(June):1–16.
- [8] Nyangasa MA, Buck C, Kelm S, Sheikh MA, Brackmann KL, Hebestreit A. Association between cardiometabolic risk factors and body mass index, waist circumferences and body fat in a Zanzibari cross-sectional study. BMJ Open. 2019;9(7):1–11.
- [9] Jorgensen JMA, Hedt KH, Omar OM, Davies JI. Hypertension and diabetes in Zanzibar - Prevalence and access to care. BMC Public Health. 2020;20(1):1–14.
- [10] Muki SK, Haroonah N, Hemed IM. Staff Capacity and Management of Diabetic Patients at Mnazi Mmoja Hospital in the Urban District of Unguja, Zanzibar. Asian J Med Heal. 2023;21(12):76–82.
- [11] Kavishe B, Biraro S, Baisley K, Vanobberghen F, Kapiga S, Munderi P, et al. High prevalence of hypertension and of risk factors for non-communicable diseases (NCDs): A population based cross-sectional survey of NCDs and HIV infection in Northwestern Tanzania and Southern Uganda. BMC Med. 2015;13(1):1–21.
- [12] Non- N, Disease C, Factor R. NCD Survey Report. 2012;(July).

- [13] Pengpid S, Peltzer K. Trends in Behavioral and Biological Non-Communicable Diseases Risk Factors among Adults in Mongolia: Results from National Cross-Sectional Surveys in 2005, 2009, 2013 and 2019. *Iran J Public Health*. 2023;52(7):1447–56.
- [14] Kontis V, Mathers CD, Rehm J, Stevens GA, Shield KD, Bonita R, et al. Contribution of six risk factors to achieving the 25×25 non-communicable disease mortality reduction target: A modelling study. *Lancet*. 2014;384(9941):427–37.
- [15] Jørgensen JMA, Nielsen KK, Petersen JH, Sadiq HS, Kelly ZF, Walker RW, et al. Socio-economic inequities in mortality and functional outcome after stroke in Zanzibar: A prospective cohort study. *J Stroke Cerebrovasc Dis* [Internet]. 2023;32(5):107081. Available from: <https://doi.org/10.1016/j.jstrokecerebrovasdis.2023.107081>
- [16] Rashid M. Assessment of Depression and Associated Factors Among Diabetic Patients At Mnazi Mmoja Referral Hospital in Zanzibar, Tanzania. 2019;(October).
- [17] Ngaruiya C, Wambua M, Mutua TK, Owambo D, Muchemi M, Rop K, et al. The last frontier for global non-communicable disease action: The emergency department—A cross-sectional study from East Africa. *PLoS One* [Internet]. 2021;16(4 April):1–20. Available from: <http://dx.doi.org/10.1371/journal.pone.0248709>