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## Contents

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*RESEARCH ARTICLE*

# Frequency, Clinical Profile, and Patterns of Coronary Artery Disease in Patients Undergoing Percutaneous Intervention at Tertiary Care Hospital in Somalia

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**Abstract**:

***Introduction*:** Coronary artery disease, the most common cause of death in the general population, is responsible for about one-third of all deaths in people over 35.

***Methods*:** This prospectively cross-sectional study was obtained from adult (≥30 years) patients those underwent angiography in Mogadishu Somali Türkiye Training and Research Hospital from June 2022 to December 2022. Individuals with significant coronary lesions angiography with angiography other than coronary, less than 70% lesion, refusal to consent, and those with missed data. data were analyzed using univariate descriptive statistics. The frequencies and percentages, Cas well as the mean ± (SD), were presented. Cross-tabulations were used to determine the association between the variables.

***Result***: From June to December 2022, 127 patients underwent angiography, and 102 of them met the inclusion criteria for significant coronary lesions. Among these patients, 35 (34.3%) presented with unstable angina, 34 (33.3%) with NSTEMI, 13 (12.7%) with stable angina, and 20 (19.6%) with other forms of NSTEMI. The mean age was 58.4 ± 12.8 years, with the highest prevalence in the 51-60 age group (41, 40.1%). There was a predominance of males (84.3%, n=86), of whom 35.3% (n=36) were smokers.

Regarding atherosclerotic cardiovascular disease (ASCVD) risk factors, hypertension was the most common (61.8%, n=63), followed by diabetes mellitus (53.9%, n=55), and dyslipidemia (50%, n=51). Typical chest pain was the most frequent initial symptom, occurring in 69.6% (n=71) of patients.

Angiographic findings revealed single vessel disease in 36.2% (n=37) of patients, double vessel disease in 32.4% (n=33), and triple vessel disease in 31.4% (n=32). The left anterior descending artery (LAD) was the most commonly affected artery. In terms of management, 78.4% (n=80) of patients were treated with percutaneous coronary intervention (PCI), while 21.6% (n=22) were recommended for coronary artery bypass grafting. Complications of PCI were rare, with hyperacute stent thrombosis and iatrogenic coronary artery dissection occurring in only 1.9% of cases.

***Conclusions*:** This study found a high prevalence of coronary artery disease (CAD) among middle-aged males with ASCVD risk factors at Mogadishu Somali Türkiye Training and Research Hospital. Unstable angina, NSTEMI, and LAD involvement were common, with most patients effectively managed through percutaneous coronary intervention and minimal complications.

**Keywords:** Percutaneous intervention, Angiogrpahy, Coronay artery disease, Risk factors.

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## 1. INTRODUCTION

Coronary heart disease is a major cardiovascular disease (CVD) and is the most common cause of death in the general population. It remains responsible for about one-third of all deaths in people over 35 [1]. 80% of deaths of CVD worldwide occur in low- and middle-income nations and affect men and women almost equally [2]. Despite the fact that mortality from acute MI has decreased by up to 50% from the 1990s to the 2000s, the incidence of coronary artery disease is expected to increase due to the increasing prevalence of obesity, diabetes, and metabolic syndrome, as well as global population aging [3,4]. According to reports, the prevalence of coronary artery disease (CAD) is rising in Sub-Saharan Africa, and the absolute number of cardiovascular deaths (CVD) has increased by more than 50% over the last three decades [5,6]. There were substantial differences in prevalence across sub-sahara countries, which reflect discrepancies in diagnostic criteria and methods available between SSA nations as well as the population's degree of understanding of the signs of coronary disease [7]. About 5.5% of all deaths from CVD happen in Sub-Saharan Africa (SSA), and that number is expected to double by 2030(8). Coronary artery disease (CAD) manifestations differ between the sexes; as a result, men are more likely than women of the same age to develop CAD [9]. Women are more likely than men to have an unrecognized myocardial infarction. Similarly, sudden death is more common in males than females [10]. Younger individuals and women are more likely to have MI with non-obstructive coronary arteries (MINOCA [50% stenosis]) [11]. Age, sex, ethnicity, and a family history of CAD are non-modifiable risk factors [12]. While High blood pressure, high blood cholesterol levels, diabetes, smoking, high alcohol consumption, obesity, lack of physical activity, an unhealthy diet, and stress are all modifiable factors [13]. The pattern of CAD is essential to understand because it affects the treatment options and disease outcomes. However, the impacts of such socio-demographic factors, clinical profile, prevalence of risk factors, and pattern distribution of CAD patients in Somalia remain unclear. Our study aimed to determine the clinical profile, prevalence of risk factors, and distribution of the Somali population's acute coronary syndrome (ACS) patients.

## 2. METHOD

This study is a prospective cross-sectional study of patients those underwent angiography in Mogadishu Somali Türkiye Training and Research Hospital. The data was collected through a structured questionnaire containing close-ended questions. One of our authors completed the survey to increase the accuracy of the data. Individuals with significant coronary lesions angiography with angiography other than coronary, less than 70% lesion, refusal to consent, and those with missed data.

The addressed characteristics included age, Gender, history of smoking, history of chronic disease such as; diabetic Milletus, hypertension, cholesterol, complaint of the first presentation, and angiographic findings.

Ischemic heart disease can be classified into acute coronary syndrome (unstable, Non-ST, and ST-Elevation myocardial infarction) and stable coronary artery disease (chronic coronary syndrome).

STEMI was considered myocardial ischemia associated with persistent ST-segment elevation or new left bundle-branch block on an electrocardiogram. Diagnostic ST-segment elevation was defined as new ST-segment elevation at the J point in at least two contiguous leads in the absence of left ventricular hypertrophy as follows: leads V2 and V3 and/or other contiguous chest leads or limb leads, with new ST-segment elevation of 2 mm (0.2 mV) for men or 1.5 mm (0.15 mV) for women, and/or 1 mm (0.1 mV) in other contiguous chest leads or limb leads. Whether cardiac biomarkers were increased or not in the absence of ST-segment elevation indicated NSTE-ACS, including NSTEMI and UA.

Unstable patients were recommended directly for angiography, while those with stable coronary artery disease were recommended for angiography after positive non-invasive stress test testing.

Hyperlipidemia was a history of dyslipidemia that had been medically diagnosed and/or treated, total cholesterol above 200 mg/dl, low-density lipoprotein above or equal to 130 mg/dl, or high-density lipoprotein below 40 mg/dl. The hypertension criteria were those with a history of previous hypertension, treated with lifestyle changes, and those with a blood pressure greater than 140 mmHg systolic or 90

mmHg diastolic on at least two occasions. Diabetes was defined as a fasting blood sugar level of 126 mg/dl or higher or a history of diabetes diagnosed and/or treated with medication and/or lifestyle change. In our study, smokers were defined as current smokers or those who had recently quit smoking.

Coronary angiography involves imaging the coronary anatomy under fluoroscopy, which is made possible by the direct injection of contrast material into the pericardial coronary arteries through a catheter advanced from a peripheral artery to the aortic root and into the coronary Ostia.

Visual or quantitative coronary angiography was used as it is a simple, easy, and quick way to measure how bad a lesion is. We didn't use other methods to measure the lesion, like anatomical by using intravascular ultrasound and physiological by using coronary flow reserve or fractional flow reserve, because they weren't available in our hospital.

Coronary stenosis was classified as mild if the visible narrowing was less than 50%, moderate between 50% and 70%, and severe with a diameter loss of 70% or greater. A 70% or more stenosis in the pericardial coronary artery or 50% in the left main coronary artery was seen as anatomically significant lesions [14,15]. Only those with a lesion of more than 70 were included in our study.

Patients were classified as having a single-vessel disease (SVD), double-vessel disease (DVD), or triple-vessel disease (TVD) accordingly.

Patients provided informed consent, and this study did not disclose personal information. The analysis was performed in line with the principles of the Helsinki Declaration contents. The research ethics board committee of Mogadishu Somalia Turkiye Recep Tayyip Erdoğan Training and Research Hospital approved the study (Ref: MSTH/10580).

The data were analyzed using univariate descriptive statistics. The frequencies and percentages, as well as the mean ± (SD), were presented. Cross-tabulations were used to determine the association between the variables.

## 3. RESULTS

The angiographic findings of 127 coronary artery disease patients with angiography were analyzed. The prevalence of coronary artery disease was 80.3% (102/127) among patients underwent percutaneous coronary intervention. Their mean age was 58.4±12.8 years.Regarding the age distribution of the cases, the most predominant age group was 51-60 years (40.2%), followed by 61-70 years (21.6%), 41–50 years (17.5%), 71 years and above (16.7), and the least predominant age group was under 30-20 years (6.9%)**.** On Gender distribution, a high predominance of males was found and constituted 84.3% (n=86) of the total patients, while 15.7% of the participants were female. In terms of co-morbidities, hypertension was the most common co-morbidity of the study participants (61.8%, n=63), followed by diabetic Miletus (53.9%, n=55), and hyperlipidemia (50%, n=51**).** Smokers were present in 35.3% (n=36) with no female smokers (Table **1**).

In our study, majority of the patients (69.6%, n = 71) had chest pain, 21 patients (20.5%) had dyspnea, and 10 (9.8%) non specific features.

Based on the clinical presentations, electrocardiogram, and cardiac enzymes, patients were categorized into four groups; most of the patients had unstable angina (n=35, 34.3%), flowed by those with NSTEMI (n=13, 12.7%), those with STEMI (n=34, 33.3%), and others (n=20, 19.6%) (Figure **1**).

The patients those underwent percutaneous coronary intervention their angiographic findings were categorized into three groups: single vessel disease (about 36.2%, n=37), double vessel disease (about 32.4 %, n=33), and triple vessel disease (about 31.4 %, n=32). LAD was the most overall involved artery, followed by circumflex artery, right coronary artery, and left main vessel disease, 82.4 %, 55.8 %, 54.9 %, and 12.7%, respectively (Table **2**).

Regarding to the lesion involved site of each artery, the most commonly involved site of LAD was found to be the proximal LAD (53.7%, n = 44), followed by the mid-LAD (40.2%, n = 33), and more than two site lesions (6.1%, n = 5). In CX, the proximal and distal lesions were almost equal: 50.9% (n = 29)

**Table 1. Socio-demographic characteristics and clinical presentations among patients underwent coronary artery intervention**

| Parameters | | Frequency (%) |
|---|---|---|
| Gender | Male | 86 (84.3%) |
| | Male | 16 (15.7%) |
| Age group | 30-40 | 7 (6.9%) |
| | 41-50 | 15 (14.7%) |
| | 51-60 | 41 (40.1 %) |
| | 61-70 | 22 (21.6%) |
| | >70 | 17 (16.7%) |
| Smoking | Yes | 36 (35.3%) |
| | No | 64 (62.7%) |
| Physical inactivity | Yes | 68 (66.7%) |
| | No | 34 (33.3%) |
| Comorbidities | HTN | 63 (61.8%) |
| | DM | 55 (53.9%) |
| | Hyperlipidemia | 51 (50%) |
| - | Obesity | 2 (1.9%) |
| Clinical presentations | Chest pain | 71 (69.6%) |
| | Shortness of breath | 54 (42.9%) |
| | Non specific features | 30 (29.4%) |

**Abbreviations:** HTN: Hypertension, DM: Diabetic Milletus, CAD: Coronary Artery Disease, ACS: Acute Coronary Syndrome, STEMI: -ST Elevation Myocardial Infarction, NSTEMI: -Non-ST Elevation Myocardial infraction.

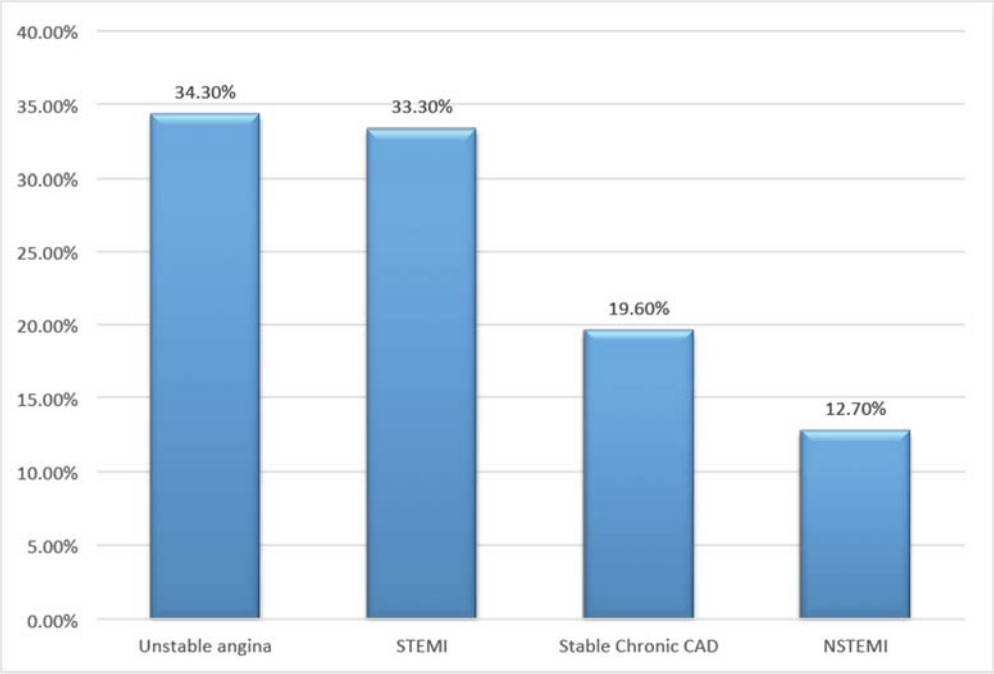


**Figure 1.** Clinical diagnosis among patients undergone coronary angiography.

and 49.1% (n = 28), respectively. In the RCA, the proximal lesion was 39.3% (n = 22), the mid-RCA was 35.7% (n = 20), the distal RCA was 17.9% (n = 10), and involvement at more than one site was 7.1% (n = 4). In terms of lesions of the artery due to different types of CAD, the LAD was the most common artery among these patients (Table **3**).

According to dominant systems, the RCA was the most dominant system with 81.4% (n = 83), followed by the circumflex artery was 14.7% (n = 15) and 4% (n = 3) as a co-dominant system (Figure **2**). In terms of management, 80 (78.4%) had a percutaneous intervention, while 22 (21.6%) of them had been recommended for coronary artery bypass grafting.

Hyper acute stent thrombosis 0.98 %(n=1) and iatrogenic coronary artery dissection 0.98%(n=1) were the only coronary complications among studied group. Doppler ultrasound at the puncture site was done before discharge. Local hematomas (8%, n = 8.2), pseudoaneurysms (2%, n = 2.04), and arteriovenous fistulas (0.8%, n = 0.816) were the most frequent puncture site complications (Table **4**)

**Table 2. Extent of coronary artery involvement among patients underwent coronary angiography.**

| Parameters | | | Frequency (%) |
|---|---|---|---|
| No of vessel | Single vessel | | 37 (36.2 %) |
| | Double | | 33 (32.4 %) |
| | Triple | | 32 (31.4 %) |
| | LMCA | | 13 (12.7%) |
| Site of occlusion of Target vessel | LAD | | 82(80.4%) |
| | | Proximal LAD | 44(53.7%) |
| | | Mid-LAD | 33(40.2%) |
| | | More than two site lesions | 5 (6.1%,) |
| | CX | | 57(55.8%) |
| | | Proximal CX | 29 (50.9%) |
| | | Distal | 28 (49.1%) |
| | RCA | | 56(54.9%) |
| | | Proximal RCA | 22 (39.3%) |
| | | Mid RCA | 20 (35.7%) |
| | | Distal RCA | 10 (17.9%) |
| | | Involvement more than one site | 4 (7.1%) |

**Abbreviations:** LAD; Left anterior descending artery, CX; Circumflex artery, RCA; Right Coronary Artery, LMCA; Left Main Coronary Artery,

**Table 3. Characteristics of angiography findings in terms of different types of CAD.**

| Angiography findings | Unstable | NSTEMI | STEMI | STABLE CAD | Total |
|---|---|---|---|---|---|
| LAD | 29(35.4%) | 11(13.4%) | 27(32.9%) | 15(18.3%) | 82(80.4%) |
| CX | 24(42.1%) | 9(15.8%) | 15(26.3%) | 9(15.8%) | 57(55.8%) |
| RCA | 16(28.6%) | 8(14.3%) | 20(35.7%) | 12(21.4%) | 56(54.9%) |

**Abbreviations:** CAD: coronary artery disease, STEMI: -ST Elevation Myocardial Infarction, NSTEMI: -Non-ST Elevation Myocardial infarction, LAD:- Left anterior descending artery , CX: Circumflex artery, RCA:- Right Coronary Artery.

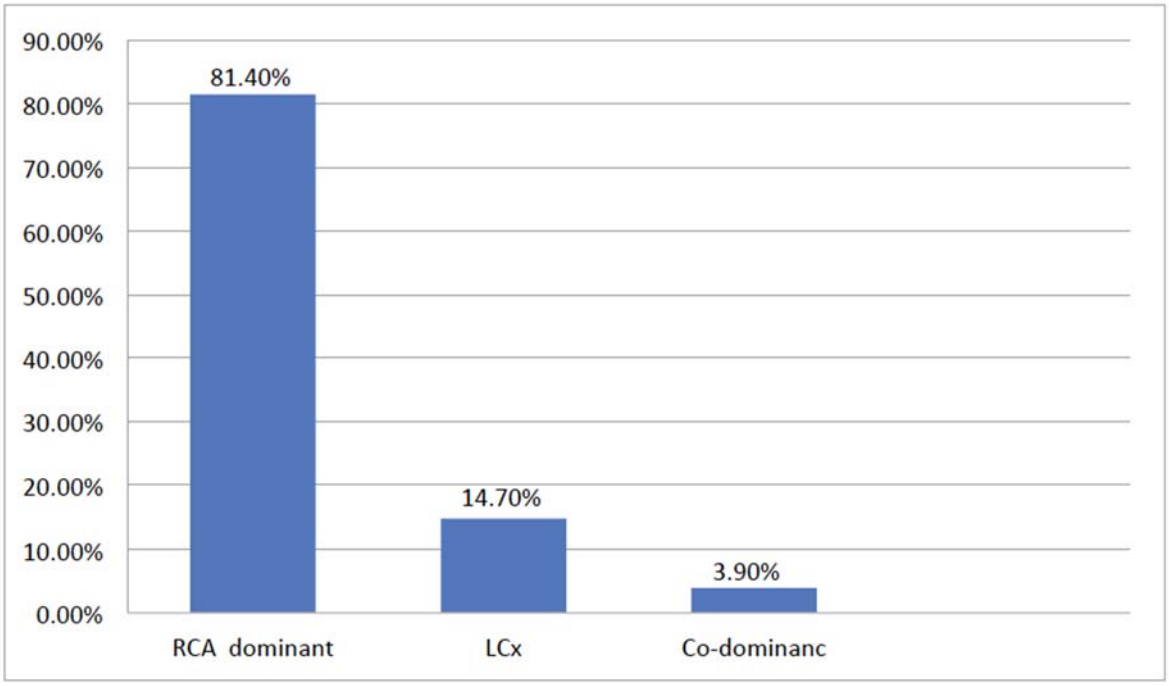


**Figure 2.** Dominant artery in patients who have undergone coronary angiography.

**Table 4. Procedure related complications among patients underwent coronary artery intervention.**

| | |
|---|---|
| **Vascular (puncture site) complication** | 10.8% |
| • Hematomas | 8% |
| • Pseudoaneurysms | 2% |
| • Arteriovenous Fistulas | 0.8% |
| **Coronary complications** | 1.9% |
| • Hyper acute stent thrombosis | 0.98% |
| • İatrogenic coronary artery dissection | 0.98% |

## 4. DISCUSSION

Over one-third of all deaths are caused by coronary artery disease, which is the primary cause of mortality and morbidity in both men and women [16]. It has more than a 20-fold variation in mortality rates between countries, which is higher in low- and middle-income countries than in high-income countries [17, 18]. Although the epidemiology of heart disease in Africa, which focuses primarily on hospitalized patients, may not accurately reflect the actual distribution of heart disease on the continent, it does point to a significant burden of undertreated conditions like tuberculous pericarditis, cardiomyopathies, and rheumatic vascular disease [19].

Over the last decades, coronary heart disease (CHD) mortality has gradually decreased in Western countries. However, it still accounts for roughly one-third of all deaths in people over the age of 35 [20].

Although it has a different presentation, most patients experience chest pain before a severe MI [21]. Even though CAD is more among women, there is a persistent misconception that CAD is a man's disease and more than one-third of all deaths from CAD are female in India ([22, 23]. The attributable factors include atypical presentation of coronary artery disease, less smoking, eating healthy foods, endogenous es-

trogen, lower low-density lipoprotein (LDL) cholesterol levels in women than men, and higher high-density lipoprotein (HDL) cholesterol levels [24, 25].

Coronary artery disease may be attributed to smoking, physical inactivity, dietary habits, alcohol consumption, and obesity [26]. Each year, 1.3 million deaths worldwide result from physical inactivity [**27**]**.** Although obesity was not prevalent in our studied group, 2/3 of the patients [66.7%) have not participated in physical activity.

The frequency of risk factors for coronary artery disease varies with the geographical area. One study conducted in Africa showed that in Kenya, hypertension was the most common risk factor in 50% of patients and smoking in 25% of patients; one-third of patients had type 2 diabetes. [28]. It has presentations ranging from no symptoms to sudden cardiac death. Although chest pain was the most common symptom in our study, approximately 32% of patients with ACS did not experience chest pain [29]. Females were more affected by atypical or angina equivalent, which is more related to the poor prognosis [30]. A prospective cohort study in UK primary care found that SOB symptoms were more common than chest pain [31].

Coronary angiography is the gold standard test for determining the existence and severity of atherosclerotic coronary artery disease [32]. The left anterior descending coronary artery (LAD) had a slightly higher prevalence of coronary lesions in all clinical presentations compared to the right coronary artery (RCA) and left circumflex artery (Cx) [33]. In our study, the LAD was the most involved artery.

## CONCLUSION

Due to a lack of well-established health centers in the last three decades in Somalia, there are now few catheterization laboratory centers. This was the first study of angiography findings at a tertiary care level that focused on patterns of ischemic heart disease and risk factors to develop preventive and management strategies. Due to the high prevalence of the disease among these populations and lack of awareness, we suggest that the disease should be evaluated with significant prospective research.

## AUTHORS' CONTRIBUTIONS

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

## CONSENT FOR PUBLICATION

Not applicable.

## FUNDING

None.

## DATA AVAILABILITY

This data is available from the corresponding author upon request.

## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest regarding the publication of this paper.

## ACKNOWLEDGEMENTS

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## REFERENCES

[1] Writing Group Members, Roger VL, Go AS, Lloyd-Jones DM, Benjamin EJ, Berry JD, Borden WB, Bravata DM, Dai S, Ford ES, Fox CS. Executive summary: heart disease and stroke statistics—2012 update: a report from the American Heart Association. Circulation. 2012 Jan 3;125(1):188-97.

[2] Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, De Ferranti SD, Floyd J, Fornage M, Gillespie C, Isasi CR. Heart disease and stroke statistics—2017 update: a report from the American Heart Association. circulation. 2017 Mar 7;135(10):e146-603.

[3] Khan MA, Hashim MJ, Mustafa H, Baniyas MY, Al Suwaidi SK, AlKatheeri R, Alblooshi FM, Almatrooshi ME, Alzaabi ME, Al Darmaki RS, Lootah SN. Global epidemiology of ischemic heart disease: results from the global burden of disease study. Cureus. 2020 Jul 23;12(7).

[4] Shao C, Wang J, Tian J, Tang YD. Coronary artery disease: from mechanism to clinical practice. Coronary Artery Disease: Therapeutics and Drug Discovery. 2020:1-36.

[5] Akinboboye O, Idris O, Akinkugbe O. Trends in coronary artery disease and associated risk factors in sub-Saharan Africans. Journal of human hypertension. 2003 Jun;17(6):381-7..

[6] Yuyun MF, Sliwa K, Kengne AP, Mocumbi AO, Bukhman G. Cardiovascular diseases in Sub-Saharan Africa compared to high-income countries: an epidemiological perspective. Global heart. 2020;15(1).

[7] Hertz JT, Madut DB, Tesha RA, William G, Simmons RA, Galson SW, Sakita FM, Maro VP, Bloomfield GS, Crump JA, Rubach MP. Perceptions of chest pain and healthcare seeking behavior for chest pain in northern Tanzania: A community-based survey. PloS one. 2019 Feb 12;14(2):e0212139.

[8] Yao H, Ekou A, Niamkey T, Hounhoui Gan S, Kouamé I, Afassinou Y, Ehouman E, Touré C, Zeller M, Cottin Y, N'Guetta R. Acute Coronary Syndromes in Sub-Saharan Africa: A 10-Year Systematic Review. Journal of the American Heart Association. 2022 Jan 4;11(1):e021107.

[9] Pathak LA, Shirodkar S, Ruparelia R, Rajebahadur J. Coronary artery disease in women. Indian heart journal. 2017 Jul 1;69(4):532-8.

[10] Lerner DJ, Kannel WB. Patterns of coronary heart disease morbidity and mortality in the sexes: a 26-year follow-up of the Framingham population. American heart journal. 1986 Feb 1;111(2):383-90.

[11] Smilowitz NR, Mahajan AM, Roe MT, Hellkamp AS, Chiswell K, Gulati M, Reynolds HR. Mortality of myocardial infarction by sex, age, and obstructive coronary artery disease status in the ACTION Registry–GWTG (Acute Coronary Treatment and Intervention Outcomes Network Registry–Get With the Guidelines). Circulation: Cardiovascular Quality and Outcomes. 2017 Dec;10(12):e003443.

[12] Brown JC, Gerhardt TE, Kwon E. Risk factors for coronary artery disease.

[13] AKSU, Feyza; AHMED, Said Abdirahman. Gensini Score's Severity and Its Relationship with Risk Factors for Coronary Artery Disease Among Patients Who Underwent Angiography in Somalia's Largest PCI Centre. *International Journal of General Medicine*, 2024, 187-192..

[14] Katz D, Gavin MC. Stable ischemic heart disease. Annals of internal medicine. 2019 Aug 6;171(3):ITC17-32.

[15] Mehran R, Dangas GD. Coronary angiography and intravascular imaging. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 11th ed. Philadelphia, PA: Elsevier. 2019.

[16] Kreatsoulas C, Sloane D, Pogue J, Velianou JL, Anand SS. Referrals in acute coronary events for CARdiac catheterization: the RACE CAR trial. Canadian Journal of Cardiology. 2010 Oct 1;26(8):e290-6.

[17] Finegold JA, Asaria P, Francis DP. Mortality from ischaemic heart disease by country, region, and age: statistics from World Health Organisation and United Nations. International journal of cardiology. 2013 Sep 30;168(2):934-45.

[18] Wang L, Wu X, Du J, Cao W, Sun S. Global burden of ischemic heart disease attributable to ambient PM2. 5 pollution from 1990 to 2017. Chemosphere. 2021 Jan 1;263:128134.

[19] Mocumbi AO, Ferreira MB. Neglected cardiovascular diseases in Africa: challenges and opportunities. Journal of the American College of Cardiology. 2010 Feb 16;55(7):680-7.

[20] Sanchis-Gomar F, Perez-Quilis C, Leischik R, Lucia A. Epidemiology of coronary heart disease and acute coronary syndrome. Annals of translational medicine. 2016 Jul;4(13).

[21] Zachariah G, Harikrishnan S, Krishnan MN, Mohanan PP, Sanjay G, Venugopal K, Thankappan KR. Prevalence of coronary artery disease and coronary risk factors in Kerala, South India: a population survey–design and methods. indian heart journal. 2013 May 1;65(3):243-9.

[22] Pathak LA, Shirodkar S, Ruparelia R, Rajebahadur J. Coronary artery disease in women. Indian heart journal. 2017 Jul 1;69(4):532-8.

[23] Krishna V, Wal P, Pandey U, Wal A, Rawat P, Kumar V. The Role of Lifestyle Choices among Female Patients for Prevention of Coronary Artery Disease.

[24] Bello N, Mosca L. Epidemiology of coronary heart disease in women. Progress in cardiovascular diseases. 2004 Jan 1;46(4):287-95.

[25] Rossouw JE. Hormones, genetic factors, and gender differences in cardiovascular disease. Cardiovascular research. 2002 Feb 15;53(3):550-7.

[26] Puddu PE, Menotti A. The impact of basic lifestyle behaviour on health: How to lower the risk of coronary heart disease, other cardiovascular diseases, cancer and all-cause mortality. E-Journal of Cardiology Practice. 2015;13(32).

[27] Deaton C, Froelicher ES, Wu LH, Ho C, Shishani K, Jaarsma T. The global burden of cardiovascular disease. European Journal of Cardiovascular Nursing. 2011 Jun 1;10(2_suppl):S5-13.

[28] Keates AK, Mocumbi AO, Ntsekhe M, Sliwa K, Stewart S. Cardiovascular disease in Africa: epidemiological profile and challenges. Nature Reviews Cardiology. 2017 May;14(5):273-93.
[29] DeVon HA, Vuckovic K, Ryan CJ, Barnason S, Zerwic JJ, Pozehl B, Schulz P, Seo Y, Zimmerman L. Systematic review of symptom clusters in cardiovascular disease. European Journal of Cardiovascular Nursing. 2017 Jan 1;16(1):6-17
[30] Dorsch MF, Lawrance RA, Sapsford RJ, Durham N, Oldham J, Greenwood DC, Jackson BM, Morrell C, Robinson MB, Hall AS. Poor prognosis of patients presenting with symptomatic myocardial infarction but without chest pain. Heart. 2001 Nov 1;86(5):494-8.
[31] Barnett LA, Prior JA, Kadam UT, Jordan KP. Chest pain and shortness of breath in cardiovascular disease: a prospective cohort study in UK primary care. BMJ open. 2017 May 1;7(5):e015857.
[32] Tavakol M, Ashraf S, Brener SJ. Risks and complications of coronary angiography: a comprehensive review. Global journal of health science. 2012 Jan;4(1):65.
[33] Gudnadottir GS. Beyond Randomized Clinical Trials: Multi-morbidity, Age and Sex Impact on the Treatment of Coronary Artery Disease.

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*RESEARCH ARTICLE*

# Interplay of Physical Activity and Insomnia: A Cross-Sectional Study of University Students in Somalia

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**Abstract:**

***Objective*:** Physical activity (PA) positively impacts health, enhancing well-being, life satisfaction, and sleep quality. This study examined the associations between PA levels and insomnia in a university student sample in Somalia.

***Methods*:** A total of 268 volunteer students aged 18–30 from the Health Sciences University Mogadishu Somalia Türkiye Recep Tayyip Erdogan School of Health Sciences participated in the study. Exclusion criteria included refusal to participate or contraindications for PA. PA levels were assessed using the International Physical Activity Questionnaire-Short Form (IPAQ-SF), and insomnia severity was evaluated using the Insomnia Severity Index (ISI). Data were analyzed with SPSS version 26.0.

***Results*:** The majority of participants were women (88.1%), non-smokers (99.6%), and coffee consumers (61.6%). PA levels were categorized as inactive/low (44%), moderate (43.3%), and vigorous (12.7%). Insomnia prevalence included subthreshold insomnia (36.2%) and clinically significant insomnia (8.6%). ISI scores were significantly correlated with musculoskeletal pain, pain localization, pain duration, VAS scores, energy drink consumption, economic status, and frequency of stressful situations ($p < 0.05$). However, hierarchical regression analysis revealed that gender, BMI, and IPAQ-SF scores were not significant predictors of ISI scores.

***Conclusions*:** Nearly half of the participants were physically inactive, with a substantial proportion reporting subthreshold or clinically significant insomnia. Insomnia scores were influenced by musculoskeletal pain, stress, and lifestyle factors such as energy drink consumption and economic status, highlighting the multifactorial nature of sleep disturbances in this population.

**Keywords:** Physical activity, insomnia, sleep disorders, university students, Somalia.

## 1. INTRODUCTION

Insomnia, a pervasive sleep disorder, affects about 30% of the global adult population and is associated with significant physical, psychological, and societal consequences [1, 2]. It is characterized by persistent difficulties in initiating or maintaining sleep or waking up too early, leading to daytime impairment. Chronic insomnia has been linked to an increased risk of cardiovascular disease, metabolic disorders such as diabetes, and mental health challenges like depression and anxiety [3, 4]. This condition not only diminishes individual well-being but also burdens healthcare systems due to its associated comorbidities and reduced productivity.

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The university years present unique challenges to maintaining healthy sleep patterns, particularly due to academic demands, irregular schedules, and heightened stress levels. Research highlights that students experiencing insomnia often report impaired memory, difficulty concentrating, and reduced academic performance [5, 6]. Additionally, social media use and screen exposure before bedtime exacerbate sleep disturbances by delaying melatonin release and increasing physiological arousal, particularly in younger populations [7, 8].

Physical activity (PA) is widely acknowledged as a key determinant of sleep quality. Regular engagement in moderate-to-vigorous PA enhances sleep by reducing the time required to fall asleep, increasing slow-wave sleep duration, and improving overall sleep efficiency [9, 10]. The physiological mechanisms underpinning this relationship include reduced arousal, improved thermoregulation, and beneficial changes in mood and stress levels [11, 12]. However, the positive impact of PA on sleep is contingent on factors such as exercise timing and intensity. For instance, engaging in vigorous exercise close to bedtime may delay sleep onset due to elevated core body temperature and increased cortisol levels [13, 14].

The bidirectional nature of the relationship between PA and sleep is also noteworthy. While regular PA promotes better sleep, adequate sleep enhances an individual's motivation and ability to engage in physical activity, creating a virtuous cycle of improved health behaviors [15]. However, despite these benefits, sedentary behavior is becoming increasingly prevalent among university students, leading to significant reductions in PA levels [7]. This trend is especially concerning given the concurrent rise in stress and mental health issues during these formative years.

Despite the growing body of evidence on the interplay between PA and sleep, there is a scarcity of research exploring these dynamics in low-resource settings. Students in countries like Somalia face unique sociocultural and environmental challenges that may influence both PA and sleep behaviors. Factors such as limited access to recreational facilities, cultural norms regarding exercise, and economic pressures may significantly impact health outcomes in this population [16, 17]. Furthermore, the lack of public awareness and infrastructure to support healthy lifestyles underscores the need for context-specific research to inform interventions.

This study examined the relationship between physical activity levels and insomnia symptoms among university students in Somalia. By focusing on this understudied population, it aimed to explore potential strategies for improving sleep health and overall well-being in resource-limited settings. This research contributes to a broader understanding of sleep-related challenges in culturally unique and economically constrained environments.

## 2. METHODS

### 2.1. Participants

Participants were recruited voluntarily from the Health Sciences University Mogadishu Somalia Türkiye Recep Tayyip Erdogan School of Health Sciences. Eligibility criteria included university students aged 18–30 without contraindications for physical activity. A total of 268 students participated in the study out of 320 eligible students, yielding a response rate of 83.8%. Students who refused to participate or did not meet the inclusion criteria were excluded. The study adhered to ethical standards and was approved by the hospital's ethics review board, with reference number [MSTH/9852, Date: 11/04/2022]. All participants provided informed consent before participating, and their confidentiality was ensured throughout the study. Ethical guidelines outlined in the Declaration of Helsinki were strictly followed. Data collection was carried out using several tools: the International Physical Activity Questionnaire-Short Form (IPAQ-SF) for assessing physical activity levels [18], the Insomnia Severity Index (ISI) to evaluate insomnia symptoms [19], and a custom questionnaire developed after reviewing relevant literature. Demographic data collected included age, gender, body mass index (BMI), and additional lifestyle factors such as marital status, substance use (*e.g.*, smoking, alcohol, khat, and energy drink consumption), as well as the presence of musculoskeletal pain and various lifestyle habits.

## 2.2. Psychometric Scales

### *2.2.1. Sociodemographic Data Form*

A custom-designed questionnaire was utilized to collect sociodemographic and clinical information relevant to participants' health and lifestyle. This form included items about personal characteristics such as age, gender, education level, marital status, and employment status. In addition, questions were included to capture data on participants' current and previous psychiatric conditions, ongoing treatments, and medication usage. The form also covered substance use behaviors, including cigarette smoking, alcohol consumption, and drug use, alongside inquiries about any psychiatric treatments received in the past or present. These details were aimed at providing a comprehensive understanding of the participants' medical and psychological background.

### *2.2.2. The International Physical Activity Questionnaire-Short Form (IPAQ-SF)*

The IPAQ-SF is a self-reported tool aimed at evaluating physical activity levels in individuals aged 15 to 69. It consists of seven items, focusing on vigorous-intensity activities (such as running or cycling), moderate-intensity activities (*e.g.*, swimming or recreational cycling), and walking. Additionally, it asks participants about sedentary behaviors, specifically the time spent sitting. Physical activity levels are calculated in MET-minutes per week, by multiplying the MET value (vigorous: 8 MET, moderate: 4 MET, walking: 3.3 MET) by the frequency of the activity over the past week. The PA levels were categorized into three groups: high, moderate, and low [18]. The Turkish version of the IPAQ-SF was used, which has been validated for use in the Turkish population [20].

### *2.2.3. The Insomnia Severity Index (ISI)*

The ISI is a self-report measure that evaluates the severity of insomnia. It consists of seven questions, rated on a Likert scale from 0 (not at all) to 4 (very much). The total score ranges from 0 to 28, with higher scores indicating more severe insomnia symptoms [19]. The Turkish version of the ISI was used in this study, which has been psychometrically validated for Turkish-speaking populations [21].

## 3. STATISTICAL ANALYSIS

Data were analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY). Descriptive statistics summarized categorical variables as frequencies and percentages, while continuous variables were presented as medians and interquartile ranges (P25, P75) due to non-normal data distribution. Spearman's rank-order correlation was used to assess associations between variables. Hierarchical regression analysis was conducted to explore the predictive relationships between gender, BMI, physical activity levels (IPAQ- SF scores), and insomnia severity (ISI scores). Predictors were included in the regression model to provide a holistic understanding of their relationships with insomnia, even if their individual significance levels were limited. For instance, predictors like gender and BMI were retained to allow comparisons with prior literature and to ensure comprehensive data interpretation. Statistical significance was set at $p < 0.05$.

## 4. RESULTS

A total of 268 participants were involved in the study, with a predominance of female participants (88.1%) and a smaller proportion of males (11.9%). A large majority (95.9%) of the participants were single, and 82.4% reported a moderate-to-fair income level, reflecting a typical socioeconomic distribution in university student populations. The study also found that 30.2% of participants experienced musculoskeletal pain, which aligns with prior studies indicating that physical discomfort is prevalent in student populations [22]. Regarding lifestyle habits, 99.6% of the participants were non-smokers, which is consistent with the health-conscious behavior typically observed in academic settings [23]. Coffee consumption was common, with 61.6% of participants drinking coffee, and 22.8% consumed energy drinks—highlighting the increasing trend of caffeine consumption among young adults, often to combat fatigue associated with academic pressure [24]. Alcohol use was reported by 3% of the participants, and 2.6% used khat, which is a less common substance but is notable in certain regional contexts [25]. Moreover, 42.5% of the participants

reported experiencing stressful situations on a frequent basis, ranging from several times a month to daily, which reflects the stress levels typically experienced by university students due to academic and personal pressures [26]. Sociodemographic characteristics of the study participants are shown in Table **1**.

**Table 1. Sociodemographic characteristics of the study participants (n = 268).**

| - | - | *M* | *SD* |
|---|---|---|---|
| Body mass index (BMI) | - | 21.69 | 3.24 |
| Variable | Category | *n* | % |
| Gender | Female | 236 | 88.06 |
| | Male | 32 | 11.94 |
| Marital Status | Married | 11 | 4.10 |
| | Single | 257 | 95.90 |
| Economic Status | Low Income | 9 | 3.36 |
| | Moderate Income | 148 | 55.22 |
| | Fair Income | 73 | 27.24 |
| | High Income | 38 | 14.18 |
| Living Place | Village | 9 | 3.36 |
| | City < 100K | 44 | 16.42 |
| | City > 100K | 215 | 80.22 |
| Musculoskeletal Pain | Present | 81 | 30.22 |
| | Absent | 187 | 69.78 |
| Pain Localization | None | 185 | 69.03 |
| | Lower Back | 10 | 3.73 |
| | Neck | 19 | 7.09 |
| | Upper Back | 23 | 8.58 |
| | Shoulder | 6 | 2.24 |
| | Other Areas | 25 | 9.33 |
| Pain Duration | None | 186 | 69.40 |
| | 1 Month | 29 | 10.82 |
| | 3 Months | 7 | 2.61 |
| | > 3 Months | 46 | 17.16 |
| Coffee Consumption | Present | 165 | 61.57 |
| | Absent | 103 | 38.43 |
| | None | 207 | 77.24 |
| Energy Drink Consumption | Several times a week | 38 | 14.18 |
| | Several times a month | 23 | 8.58 |
| | Present | 8 | 2.99 |
| Alcohol Use | | - | - |
| - | Absent | 259 | 96.64 |

| | | | |
|---|---|---|---|
| - | Present | 7 | 2.61 |
| Khat Use | | - | - |
| Frequency of Stressful Situations | Absent | 260 | 97.01 |
| | Rarely | 154 | 57.46 |
| | Several times a month | 54 | 20.15 |
| | Several times a week | 46 | 17.16 |
| | Every day | 14 | 5.22 |

Regarding physical activity, the results indicated a relatively low level of regular exercise. Approximately 44% (118 participants) reported low or inactive physical activity, while 43.3% (116 participants) were moderately active, and only 12.7% (34 participants) reported engaging in vigorous physical activity. These findings are consistent with studies in other regions that highlight the prevalence of insufficient physical activity among university students [27]. In terms of insomnia, 36.2% (97 participants) exhibited subthreshold insomnia, and 8.6% (23 participants) reported clinically significant insomnia, ranging from moderate to severe, aligning with the rates observed in previous studies focusing on sleep disturbances in university student populations [28].

Table **2** summarizes the significant correlations observed in the study. A positive correlation was found between IPAQ-SF scores and gender ($r_s = 0.234$, $p < 0.01$), indicating that gender differences may influence physical activity levels. However, no significant correlations were found between IPAQ-SF scores and other sociodemographic variables. In contrast, ISI scores, which measure insomnia severity, were positively correlated with stressful situations ($r_s = 0.267$, $p < 0.01$), musculoskeletal pain localization ($r_s = 0.265$, $p < 0.01$), and pain duration ($r_s = 0.309$, $p < 0.01$), suggesting that both stress and physical pain contribute to sleep disturbances. ISI scores were negatively correlated with musculoskeletal pain ($r_s = -0.314$, $p < 0.01$), which may indicate a complex interaction between the subjective experience of pain and sleep quality [22]. Economic status was also negatively correlated with ISI scores ($r_s = -0.159$, $p < 0.01$), suggesting that individuals facing economic stress may be more vulnerable to sleep disorders, a finding consistent with the work of Lund *et al.* [29]. Additionally, energy drink consumption was positively associated with ISI scores ($r_s = 0.133$, $p < 0.05$), which aligns with emerging research indicating that high- caffeine beverages can interfere with sleep quality [24; 30].

Finally, hierarchical regression analysis revealed that variables such as gender ($\beta = -0.160$, $t = -1.224$, $p = 0.222$), BMI ($\beta = 0.014$, $t = 1.112$, $p = 0.267$), and IPAQ-SF scores ($\beta = 0.009$, $t = 0.143$, $p = 0.886$) were not significant predictors of ISI scores, suggesting that while these factors might be correlated with insomnia, they do not provide significant explanatory power when predicting insomnia severity in this sample. Further analysis, possibly with additional variables or longitudinal data, could help clarify these relationships (see Table **3**).

## 5. DISCUSSION

Insomnia remains a global health issue, affecting diverse populations across varying demographics and cultural contexts. In this study, 36.2% of participants experienced subthreshold insomnia, while 8.6% reported clinically significant insomnia, aligning with findings from other countries. For instance, a study conducted among medical students in India found a 33% prevalence of insomnia [31], and a Polish study reported a similar prevalence of 37% [32]. However, other cultural contexts report higher rates. Studies in Hong Kong and Ethiopia found insomnia prevalence rates of 68.8% and 61.6%, respectively [33, 34]. These discrepancies highlight the influence of cultural, social, and environmental factors, such as academic stress, living conditions, and access to healthcare resources, which may mediate the prevalence and perception of insomnia. The findings underscore the need for culturally tailored strategies to address sleep disturbances in university populations, particularly in low-resource settings like Somalia. Studies in Sub-Saharan Africa and Ethiopia have shown that socio-cultural factors such as social disparities and mental health issues (*e.g.*,

living with HIV/AIDS) exacerbate insomnia, indicating that contextual factors must be considered when addressing sleep disorders in these regions [35].

**Table 2. Spearman's Rank-Order Test Correlations (rs) between sleep quality measures and demographics.**

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. IPAQ-SF | 1 | | | | | | | | | | | | | |
| 2. ISI | -.025 | 1 | | | | | | | | | | | | |
| 3. VAS | -.001 | ** .317 | 1 | | | | | | | | | | | |
| 4. BMI | .061 | .062 | .101 | 1 | | | | | | | | | | |
| 5. Gender | ** .234 | -.076 | -.004 | .048 | 1- | | | | | | | | | |
| 6. Economical Status | .067 | ** -.159 | * -.140 | -.088 | -.014 | 1 | | | | | | | | |
| 7. Stresful Situations | -.048 | ** .267 | ** .195 | .073 | -.036 | * -.187 | 1 | | | | | | | |
| 8. Musculoskelatal Pain | .003 | ** -.314 | ** -.955 | -.081 | .017 | * .152 | - ** .173 | 1 | | | | | | |
| 9. Pain Localization | -.003 | ** .265 | ** .949 | .101 | .009 | * -.135 | ** .160 | ** -.944 | 1 | | | | | |
| 10. Pain Duration | .013 | ** .309 | ** .969 | .082 | -.004 | * -.133 | ** .178 | ** -.964 | ** .957 | 1 | | | | |
| 11. Coffee Consumption | -.038 | -.028 | .020 | -.050 | -.007 | * -.179 | -.092 | .002 | .027 | .007 | 1 | | | |
| 12. Energy Drink Consumption | -.008 | * .133 | * .150 | .017 | .088 | .003 | ** .189 | * -.151 | * .143 | * .135 | * -.135 | 1 | | |
| 13. Alcohol Use | .030 | .052 | -.010 | .018 | * -.138 | -.067 | -.045 | -.004 | -.028 | .031 | .113 | -.023 | 1 | |
| 14. Khat Use | .067 | .013 | .058 | -.063 | * -.154 | -.087 | -.042 | -.038 | .047 | .057 | .058 | .011 | ** .579 | 1 |

**Abbreviations:** IPAQ-SF: International Physical Activity Questionnaire Short Form, ISI: Insomnia Severity Index. VAS: Visual Analog Scale; BMI: Body Mass Index.

The significant correlation observed between insomnia severity and stressful situations ($rs = 0.267$, $p < 0.01$) aligns with prior research demonstrating that stress exacerbates sleep disturbances [35]. Stressors related to academic demands, familial obligations, and personal challenges are particularly prevalent among university students and have been shown to disrupt sleep patterns [37, 38]. This is consistent with evidence that academic settings often foster environments of heightened stress, with limited resources available to manage these pressures effectively. Implementing stress management interventions, such as mindfulness-based practices or counseling services, could mitigate this burden and improve sleep outcomes. Physical discomfort also plays a crucial role in sleep disturbances, as indicated by positive correlations between insomnia severity and musculoskeletal pain localization ($rs = 0.265$, $p < 0.01$) and pain duration ($rs = 0.309$, $p < 0.01$). These findings corroborate previous studies that link chronic pain with disrupted sleep patterns.

McBeth and Jones [39] highlighted that pain not only contributes to difficulty falling and staying asleep but also perpetuates a cycle where inadequate sleep exacerbates the perception of pain. Addressing pain through appropriate management strategies, including physiotherapy or pain- relief interventions, could help improve sleep quality in this population.

**Table 3. Hierarchical Regression Analysis for Variables Predicting ISI Score.**

| Variable | *B* | *SE* | β | *t* | *p* |
|---|---|---|---|---|---|
| **Step 1** | - | - | - | - | - |
| (Intercept) | 1.405 | 0.310 | 0.00 | 4.529 | <0.001 |
| Gender | -0.155 | 0.126 | -0.075 | -1227 | 0.221 |
| BMI | 0.014 | 0.013 | 0.069 | 1.126 | 0.261 |
| **Step 2** | - | - | - | - | - |
| (Intercept) | 1.398 | 0.315 | 0.00 | 4.436 | <0.001 |
| Gender | -0.160 | 0.130 | -0.077 | -1.224 | 0.222 |
| BMI | 0.014 | 0.013 | 0.068 | 1.112 | 0.267 |
| IPAQ-SF | 0.009 | 0.062 | 0.009 | 0.143 | 0.886 |

**Abbreviations:** IPAQ-SF: International Physical Activity Questionnaire Short Form, ISI: Insomnia Severity Index. BMI: Body Mass Index
**Note:** Model 1: $F$ (2, 265) = 1.367, $p$ = .257, $\Delta R^2$ = .00; Model 2: $F$ (2, 265) = 0.915, $p$ = .434, $\Delta R^2$ = .00.

Interestingly, our study found a negative correlation between insomnia severity and musculoskeletal pain ($rs = -0.314$, $p < 0.01$), a finding that may initially seem contradictory. However, this can be interpreted through the lens of individual pain tolerance, type of pain, and variability in pain perception. For instance, Chung *et al.* [40] suggest that localized or less intense pain might not significantly disrupt sleep compared to widespread or chronic pain. Future studies should differentiate between acute and chronic pain to better understand its complex relationship with insomnia. The association between insomnia severity and lifestyle factors, such as energy drink consumption ($rs = 0.133$, $p < 0.05$), reflects the growing body of evidence linking stimulants to poor sleep outcomes [41, 42]. Energy drinks, often consumed by students to manage academic demands, contain high levels of caffeine and other stimulants that delay sleep onset and reduce overall sleep quality. Public health initiatives should address the risks associated with excessive energy drink consumption and promote healthier alternatives for maintaining alertness during study periods.

Regarding physical activity (PA), our study found that 44% of participants were physically inactive, 43.3% engaged in moderate PA, and 12.7% reported vigorous PA. These findings align with research conducted in other regions, such as Turkey, where Demirer and Erol [43] reported high rates of inactivity among university students. Additionally, Bloemhoeff *et al.* [44] noted that male students generally engage in higher PA levels than females, a trend also observed in our study, where IPAQ-SF scores correlated positively with gender ($rs = 0.234$, $p < 0.01$). Despite strong evidence linking PA with improved sleep quality, our study found no significant correlation between PA and insomnia severity. This is consistent with Vancampfort *et al.* [45], who suggested that short-term assessments like the seven-day recall used in our study may not reflect habitual activity. Moreover, other factors, such as diet, mental health, and social support, may have a greater influence on sleep quality than PA alone.

Economic status also emerged as a significant factor, with a negative correlation observed between insomnia severity and economic status ($rs = -0.159$, $p < 0.01$). This finding supports prior research linking financial stress to poor sleep quality [45]. In resource-constrained settings, economic hardships often translate into heightened anxiety and stress, exacerbating sleep disturbances. For example, a study conducted in Lebanon found that students from lower socioeconomic backgrounds reported worse sleep quality [47]. Addressing socioeconomic disparities through targeted interventions, such as financial aid programs or stress reduction workshops, could improve sleep outcomes in these populations.

The lack of significant gender differences in insomnia prevalence in our study contrasts with findings from other settings, where women often report poorer sleep quality than men, particularly in academic environments [48]. However, similar to a study conducted in Turkey [49], this discrepancy may reflect cultural norms and variations in reporting behaviors or measurement tools. Future studies should consider gender-specific factors influencing sleep to clarify these inconsistencies.

The relationship between physical activity and insomnia remains complex. While our study did not find a direct correlation, other studies have demonstrated the positive effects of physical activity on sleep quality. Kredlow *et al.* [50] found that regular physical activity significantly improved sleep in individuals with insomnia. Moreover, long-term engagement in physical activity may help to regulate the body's circadian rhythms, thus promoting better sleep [51]. However, further research is needed to explore how different types of physical activity—whether aerobic, strength training, or flexibility exercises—affect sleep patterns in university students.

Several limitations should be acknowledged in this study. First, its single-center design, limited to a university student population in Somalia, restricts the generalizability of findings to broader or more diverse populations. Expanding future research to include multiple centers or diverse demographic groups could enhance representativeness. Second, the lack of validated tools in Somali cultural contexts, such as the IPAQ-SF and ISI, may have introduced measurement biases. Developing culturally adapted instruments would improve reliability. Third, the cross-sectional nature of the study limits causal inferences. Longitudinal research is needed to clarify temporal relationships between variables like physical activity and insomnia. Additionally, reliance on self-reported data for insomnia symptoms, pain levels, and lifestyle factors may be subject to recall and social desirability biases. Employing objective measures such as actigraphy or polysomnography could provide more accurate assessments. Lastly, while confounders were controlled to some extent, unmeasured variables, including genetic predispositions and medical conditions, may have influenced the results. Addressing these limitations in future research could provide a more robust understanding of the factors influencing insomnia.

## CONCLUSION

In conclusion, our study contributes to the growing body of literature on insomnia among university students by highlighting the role of lifestyle factors such as stress, musculoskeletal pain, and energy drink consumption in sleep disturbances. It underscores the importance of adopting a holistic approach to managing insomnia, incorporating interventions focused on physical activity, stress management, and lifestyle modifications. Future research should employ longitudinal designs to better understand the long-term effects of these factors on sleep quality across diverse cultural contexts, addressing limitations related to single-center designs and cultural adaptations of measurement tools.

## DECLARATIONS

## COMPETING INTERESTS

The authors declare that they have no competing interests.

## AUTHORS' CONTRIBUTIONS

ZS served as the guarantor for the integrity of the study. ZS and SK contributed equally to the study's concept, design, literature review, and statistical analysis. ZS and SK were also responsible for manuscript preparation. All authors reviewed and approved the final manuscript.

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## AVAILABILITY OF DATA AND MATERIALS

The datasets and materials used during the current study are available from the corresponding author upon reasonable request.

## CONFLICT OF INTEREST

The authors declare that this article's content has no conflict of interest..

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## REFERENCES

[1] Roth T. Insomnia: Definition, prevalence, etiology, and consequences. J Clin Sleep Med. 2007;3(5 Suppl):S7-S10.
[2] Morin CM, LeBlanc M, Daley M, *et al.* Epidemiology of insomnia: Prevalence, course, and consequences. Sleep Medicine Reviews. 2015;8(5):285-298.
[3] Tang NKY, Harvey AG. Altering dysfunctional beliefs and attitudes about sleep in insomnia: A cognitive-behavioral approach. Sleep Medicine Reviews. 2004;8(3):223-230.
[4] Liu Y, Wang S, Zhao L, *et al.* The associations between insomnia and cardiovascular diseases. Sleep Medicine. 2018;48: 1-6.
[5] Beers T, Gearing M, MacDougall L, *et al.* The impact of insomnia on university students: A sleep diary study. Sleep Health. 2018;4(4): 310-315.
[6] Harvey AG. A cognitive theory and therapy for chronic insomnia. J Consult Clin Psychol. 2001;69(1): 30-43.
[7] LeBourgeois M, Hale L, Chang A-M, Montgomery-Downs H. Digital media and sleep in childhood and adolescence. Pediatrics. 2017;140(6):e20172513.
[8] Shochat T, Cohen-Zion M, Tzischinsky O. Functional consequences of sleep restriction: Implications for everyday functioning. Sleep Medicine Reviews. 2014;18(2): 139-148.
[9] Kredlow MA, Capron L, Otto MW. The effects of physical activity on sleep: A meta-analytic review. Sleep Med Reviews. 2015;20: 55-67.
[10] McHill AW, Wright KP. Physical activity and sleep: An updated review of the literature. Sleep Med Reviews. 2017;35: 32-45.
[11] Youngstedt SD, Kripke DF. Long sleep and mortality: The Epidemiology of Sleep. Sleep Med Rev. 2004;8(3): 135-149.
[12] Lee D, Park S. Aerobic exercise effects on sleep quality in adults: A systematic review. Sleep Health. 2019;5(1): 42-49.
[13] Buman MP, King AC. Exercise as a treatment to enhance sleep. American Journal of Lifestyle Medicine. 2010;4(6): 484-494.
[14] Driver HS, Taylor SR. Exercise and sleep. Sleep Medicine Reviews. 2000;4(4): 387-402.
[15] Rebar AL, Stanton R, Geard D, *et al.* The influence of physical activity on sleep: A meta-analysis of randomized controlled trials. Sleep Medicine Reviews. 2015;22: 54-60.
[16] Al-Dubai SA, Rampal KG, Al-Mustafa ZH. The relationship between sedentary behavior and physical activity among adolescents in a rural setting. International Journal of Health Sciences. 2014;8(1): 1- 10.
[17] Horne JA. The impact of social stress on the sleep of students in Somali universities: A contextual review. Global Health Journal. 2018;6(1): 25-36.
[18] Craig CL, Marshall AL, Sjöström M, *et al.* International physical activity questionnaire: 12-country reliability and validity. Med Sci Sports Exerc. 2003;35(8):1381-1395.
[19] Bastien CH, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. Sleep Med. 2001;2(4):297-307.
[20] Ünver B, Kılıç M, Yarar A, *et al.* The reliability and validity of the Turkish version of the IPAQ-SF in university students. Turk J Public Health. 2008;6(2):92-100.
[21] Sümer Z, Yılmaz E, Çaylan N. Reliability and validity of the Turkish version of the Insomnia Severity Index. Turk J Psychiatry. 2011;22(4):250-256.
[22] McBeth T, Jones R. Musculoskeletal pain and sleep disturbances in university students. J Pain Res. 2007;8(4):85-92.
[23] Doll R, Peto R, Hall E, *et al.* Mortality in relation to smoking: 50 years' observations on male British doctors. BMJ. 2004;328(7455):1519-1526.
[24] Temple JL. Energy drink consumption and its potential impact on sleep. Psychiatry Res. 2009;171(3):254-258.
[25] Ahmed H. The use of khat and its implications for health in Somalia. J Psychol Stud. 2013;12(2):204- 210.

[26] Misra R, McKean M. College students' health and stress: What factors influence their academic performance? J Health Stud. 2000;10(3):237-249.
[27] Gordon-Larsen P, McMurray R, Popkin B. The relationship of physical activity and sedentary behavior to the health of students. J Am Coll Health. 2004;54(4):193-201.
[28] Patel R, Johnson E, Reeves T, *et al.* Insomnia and its correlates in university students. Sleep Health. 2016;2(4):246-253.
[29] Lund H, Swenson K, Williams D. The impact of socioeconomic status on sleep quality in university students. Sleep J. 2018;41(5):643-654.
[30] Haller M, Shumaker A, Taylor L. The effects of caffeine on sleep quality: An updated review. Sleep Med Rev. 2017;32:85-92.
[31] Patel V, Khandelwal S, Gupta M, *et al.* Prevalence of insomnia among medical students in India. J Clin Sleep Med. 2016.
[32] Borkowski M, Demetrovics Z, Cerny M, *et al.* Prevalence of insomnia among medical students in Poland. Sleep Med Rev. 2019.
[33] Wong M, Tsang H, Liu Y, *et al.* Sleep patterns and prevalence of insomnia among university students in Hong Kong. J Sleep Res. 2018.
[34] Abebe D, Woldemichael K, Alemu S, *et al.* Insomnia and its predictors among university students in Ethiopia. Afr Health Sci. 2020.
[35] Saverio Stranges, William Tigbe, Francesc Xavier Gómez-Olivé, Margaret Thorogood, Ngianga- Bakwin Kandala, Sleep Problems: An Emerging Global Epidemic? Findings From the INDEPTH WHO- SAGE Study Among More Than 40,000 Older Adults From 8 Countries Across Africa and Asia, Sleep, Volume 35, Issue 8, 1 August 2012, Pages 1173–1181, https://doi.org/10.5665/sleep.2012
[36] Morin CM, Beaulieu-Bonneau S, Ivers H, *et al.* Psychological and behavioral treatment for insomnia. Can J Psychiatry. 2011.
[37] Su L, Jiang X, He X, *et al.* The relationship between academic stress and sleep quality among university students. Sleep Med. 2015.
[38] Kelly M, Kline A, Fitzpatrick A, *et al.* Stress, anxiety, and sleep disturbances in university students. Psychiatry Res. 2019.
[39] McBeth J, Jones K. Epidemiology of musculoskeletal pain and sleep disturbances. Best Pract Res Clin Rheumatol. 2007.
[40] Chung F, Yegneswaran B, Liao P, *et al.* Pain and its association with sleep disturbances: An overview of mechanisms and management. Pain Med. 2018.
[41] Temple JL. The impact of energy drinks on sleep: A review. Psychopharmacology. 2009.
[42] Haller CA, Teter CJ, Argo T, *et al.* Caffeine and energy drink consumption and its effect on sleep quality. J Clin Sleep Med. 2017.
[43] Demirer M, Erol R. Physical activity levels of university students in Turkey. Turk J Sports Med. 2015.
[44] Bloemhoeff G, Koster K, Keune K, *et al.* Gender differences in physical activity and health outcomes among university students. J Health Educ Res. 2018.
[45] Vancampfort D, Stubbs B, Schuch F, *et al.* Physical activity and sleep: A review of the literature. Psychiatric Res. 2015.
[46] Lund HG, Reider BD, Whiting AB, *et al.* Financial stress and sleep quality among university students. J Behav Med. 2018.
[47] Elhayek S, Khoury S, Salameh P, *et al.* Socioeconomic status and sleep quality in Lebanese students. Sleep Health. 2019.
[48] Shamsaei F, Cheraghi F, Sadeghian S, *et al.* Gender differences in sleep quality among students. J Sleep Res. 2020.
[49] Güleç M, Aytaç S, Esen E, *et al.* Insomnia and sleep quality among Turkish university students. Anadolu Psikiyatri Dergisi. 2012.
[50] Kredlow MA, Capron L, Hertenstein E, *et al.* Exercise and sleep quality: A review of studies. J Behav Med. 2015.
[51] Kelley GA, Kelley KS, Pate RR, *et al.* Long-term effects of physical activity on sleep. J Sleep Res. 2018.

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*CASE REPORT*

# Kawasaki Disease in Somalia; A Case Report and Literature Review

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**Abstract:** Kawasaki disease (KD) is a prevalent form of vasculitis in childhood, primarily affecting infants and young children. This leads to persistent cardiovascular complications resulting from coronary artery damage. Despite various hypotheses, the exact cause of this disease remains unknown. We present a case of Kawasaki disease in a one-year-old boy who exhibited one week history of high fever, rash, and conjunctivitis. The clinical manifestations progress, beginning with fever during the acute phase. Subsequently, non-purulent bilateral conjunctival redness developed, followed by changes in the mouth, such as red and cracked lips, along with a reddish tongue (strawberry tongue). This was achieved by one-sided cervical lymphadenopathy (with one node exceeding 1.5 cm in diameter), and within five days of fever onset, polymorphous rashes emerged. The patient was diagnosed with typical Kawasaki disease, and treatment was initiated with acetylsalicylic acid at a dose of 50 mg/kg/day and intravenous immunoglobulin (IVIG) at a dose of 2 g/kg.

The diagnostic criteria for Typical Kawasaki disease include both the Japanese working guidelines and the American Heart Association guidelines, which further categorize the disease as typical or atypical. Treatment with intravenous immunoglobulin (IVIG) and aspirin (ASA) during the acute phase significantly reduced the risk of coronary abnormalities by approximately 5%.

In summary, Kawasaki disease is infrequently documented in sub-Saharan countries. The uncommon presentation and rarity of the disease pose challenges for diagnosis, particularly in sub-Saharan Africa, notably Somalia, where no cases have been reported to date.

**Keywords:** Aspirin, Intravenous Immunoglobulin (IVIG), Vasculitis, Mucocutaneous lymph node syndrome, kawasaki disease.

## 1. INTRODUCTION

Kawasaki disease (KD) is a prevalent form of vasculitis in childhood, primarily affecting infants and young children. If not managed properly, it can result in lasting cardiovascular morbidity owing to coronary artery lesions. This condition is the primary cause of acquired heart disease among children in developed nations, with the highest incidence observed in Asia, where nearly 1 in 100 children in Japan experience the disease by the age of five [1, 2].

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Kawasaki disease is predominantly prevalent in the Far East, particularly in countries such Japan, Korea, and China, but its occurrence is relatively rare in Africa, Europe, and the USA. In Africa, the first recorded cases emerged in South Africa in 1980, affecting Caucasian children, while the initial instance in an African child was documented on the Ivory Coast in 1981. While sporadic cases have been recorded in various African countries, primarily in North Africa and the West African region, comprehensive epidemiological data on Kawasaki disease in African nations are limited [4-6].

The cause of the disease remains unidentified, and various hypotheses have been proposed to elucidate its etiology. Epidemiological data indicate that the disease may be triggered by an infectious agent in individuals with a genetic predisposition [7].

According to the American Heart Association guidelines, the diagnosis of Classic Kawasaki Disease is established when there is a fever persisting for at least five days, with the onset day considered the first day of fever, along with the presence of at least four of the five principal clinical features. If there are at least four principal clinical features, particularly redness and swelling of the hands and feet, the diagnosis can be established after four days of fever (Table **1**). However, skilled clinicians well-versed in Kawasaki Disease may, in exceptional cases, diagnose a condition with 3 days of fever. Patients who do not exhibit complete clinical features of classic Kawasaki Disease are often assessed for incomplete KD. Diagnosis of Kawasaki Disease is typically confirmed when coronary artery abnormalities are detected [8].

**Table 1. Diagnostic criteria of typical kawasaki disease outlined by the American Heart Association.**

| | |
|---|---|
| Classic KD is diagnosed in the presence of fever for at least 5 d (the day of fever onset is taken to be the first day of fever) together with at least 4 of the 5 following principal clinical features. | 1. Erythema and cracking of lips, strawberry tongue, and/or erythema of oral and pharyngeal mucosa |
| | 2. Bilateral bulbar conjunctival injection without exudate |
| | 3. Rash: maculopapular, diffuse erythroderma, or erythema multiforme-like |
| | 4. Erythema and edema of the hands and feet in acute phase and/or periungual desquamation in subacute phase |
| | 5. Cervical lymphadenopathy (≥1.5 cm diameter), usually unilateral |

While Kawasaki disease typically resolves on its own, if left untreated, it can lead to the development of coronary artery ectasia and/or aneurysms in 15-25% of children [9,10]. Children who present with complete Kawasaki Disease (manifesting fewer than four of the five clinical characteristics) face an elevated risk of delayed treatment and the subsequent development of coronary artery disease [11,12].

Administering intravenous immunoglobulin (IVIG) and aspirin (ASA) during the acute phase of the illness significantly reduced the risk of coronary abnormalities by approximately 5%. These abnormalities in the coronary arteries pose a potential risk for future conditions, such as ischemic heart disease, myocardial infarction, and sudden death [15].

The epidemiology of Kawasaki disease in developing countries remains largely undefined, with only a few reported cases, creating the perception that the condition is rare. Measles, a common ailment among children with Somalia, poses a close differential to Kawasaki disease, suggesting the possibility of misdiagnosis in some instances. Additionally, the low index of suspicion among physicians and healthcare workers in Somalia may have contributed to underdiagnosis. Notably, there are no previously documented case reports of Kawasaki disease in Somalia. In this report, we present a case of Kawasaki disease observed at our hospital that met the diagnostic criteria outlined by the American Heart Association [3].

## 2. CASE REPORT

A one-year-old male presented with a one-week history of high-grade fever, rash, and conjunctivitis. His medical records indicated that he had undergone a four-day course of ceftriaxone therapy at a different hospital. There were no prior health issues and no family history of the disease. During the physical examination, he displayed signs of fatigue, had a sickly appearance, and recorded an axillary temperature of 38.5°C. Bilateral conjunctival redness was observed, along with hyperemic and crusted lips, red and painful

swollen distal and proximal interphalangeal joints in both upper and lower limbs, as well as both knees. Erythema and edema were noted on the palms and soles. Respiratory and cardiovascular system examinations yielded normal results, and bilateral cervical lymph node enlargement was observed. Abdominal examination revealed no distention, organomegaly, with normal peristalsis.

The results of the blood analysis were as follows: white blood cell (WBC): 23,000/mm*3, hemoglobin (HB): 9.5 g/dl, platelet: 372,000/mm*3 c-reactive protein (CRP): 19mg/dl, aspartate aminotransferase (AST): 22 u/l, alanine aminotransferase (ALT): 34 u/l, gamma-glutamyl transferase (GGT): 32 u/l, total bilirubin: 0.13 mg/dl, direct bilirubin: 0.08 mg/ dl, and albumin: 2,9 g/dl. The abdominal ultrasonography (USG) examination results were normal, Echocardiogram was done which reveals a normal results.

The patient was diagnosed with typical Kawasaki disease according to the diagnostic criteria of typical kawasaki disease outlined by the American Heart Association (Table **1**), and treatment was initiated with acetylsalicylic acid at a dose of 50 mg/kg/day and intravenous immunoglobulin (IVIG) at a dose of 2g/kg for 2 days, after 48 the fever decreased, and the aspirin dose was decreased to 5mg/kg/day. The patient took aspirin for 3 weeks, after normalization of erythrocyte sedimentation rate (ESR), aspirin was stopped, and the patient was discharged.

Follow-up assessments demonstrated a reduction in conjunctivitis and arthritis. At the three-week follow up the patient exhibited an absence of fever and joint pain. Additionally, the results of the complete blood count, C-reactive protein (CRP) level, and erythrocyte sedimentation rate (ESR) was within the normal range. Echocardiographic examination yielded normal results.

## 3. DISCUSSION

Kawasaki Disease is a worldwide illness, and its occurrence rates differ, mainly corresponding to the racial makeup of populations in different countries. The highest reported incidence of Kawasaki Disease is in Japan, showing a consistent rise, reaching an annual rate of 308.0 per 100,000 children under 5 years of age in 2014 [20]. The second-highest reported incidence occurred in South Korea in 2014, 21 with a rate of 199.7 per 100,000 children under 5 years of age, while Taiwan ranked third with a rate of 82.8 per 100,000 in 2010 [22]. In nations where the population is predominantly non- Asian, the typical annual rate is 10–20 per 100,000 children under 5 years of age [23]. The male-to-female ratio among Kawasaki Disease patients is approximately 1.5:1 in nearly all countries [20,23], and severe cardiac complications associated with Kawasaki disease is notably more prevalent in males. The reason behind this male preponderance is not clear but appears to be the parallel patterns observed in numerous infectious diseases.

Kawasaki Disease exhibits a notable age distribution, with nearly all cases affecting children. Approximately 80% of these cases are found in children under 5 years of age, and approximately 50% occur in children under 2 years of age [20].

The cause of Kawasaki Disease is still not well understood, and there is a possibility of an unknown infectious agent, given the clinical and immunological similarities between Kawasaki disease and disorders mediated by staphylococcal and streptococcal superantigens [24].

Moreover, due to the elevated incidence of Kawasaki Disease in the Asian population, its persistence even after migration, and various genetic investigations, genome-wide association studies are recommended. These studies offer the advantage of identifying genes associated with the disease [25,26].

In many low- and middle-income countries, diagnosing Kawasaki Disease is challenging because the resemblance between prevalent infectious diseases and Kawasaki Disease. Diagnostic criteria play a crucial role in identifying Kawasaki Disease, incorporating the Japanese working guidelines and the American Heart Association guideline [27], which further categorizes the disease into typical and atypical forms. In the typical presentation of Kawasaki Disease, the clinical manifestations progress with the onset of fever during the acute phase. Subsequently, non-purulent bilateral conjunctival redness observed. Following this, changes manifest in the oral cavity, characterized by red and cracked lips and a reddish tongue (strawberry tongue) This is followed by one-sided cervical lymphadenopathy, where one node exceeds 1.5 cm in diameter, and then polymorphous rashes emerge within 5 days of the onset of fever.

Additionally, there were alterations in the extremities, including induration and/or erythema of the palms and soles of the feet. Around three weeks after onset, desquamation of the fingers and toes may occur. In the typical course of Kawasaki Disease, clinical characteristics progress with the onset of fever during the acute phase. Subsequently, non-purulent bilateral redness of the conjunctiva developed. Following this, alterations manifest in the oral cavity, including red and cracked lips and a reddish tongue (resembling a strawberry). This is followed by one-sided cervical lymphadenopathy, where one node exceeds 1.5 cm in diameter, and polymorphous rashes emerge within 5 days of fever onset. Changes in the extremities include induration and/or erythema of the palms and soles of the feet. Around three weeks after onset, desquamation of the fingers and toes may occur, marking the sub-acute phase. Kawasaki Disease may also present with other systemic manifestations, such as rheumatologic symptoms (joint pain and swelling), respiratory symptoms (cough and rhinorrhea), and gastrointestinal symptoms (vomiting, diarrhea, and abdominal pain) [27].

Kawasaki disease is categorized as atypical if there is fever persisting for ≥5 days with only ≥2 diagnostic clinical features, and this variant is more frequently observed at the extremes of childhood. In our case, the patient was diagnosed based on these criteria, which included a one-week high-grade fever along with bilateral non-supportive conjunctival injection, dry fissured lips, red tongue, edema, redness of extremities, maculopapular desquamating rash, and right-sided cervical lymphadenopathy.

Treatment of KD involves the use of IVIG and high-dose aspirin, Timely identification is essential, as it directs the clinician to commence swift and targeted treatment, effectively averting the occurrence of complication(s) [28-30]. Our patient was managed with aspirin(50mg/kg/day) and intravenous immunoglobulin (IVIG).

KD complications include carditis (myocarditis and pericarditis), congestive heart failure, coronary arteritis, and sudden death [29,32]. Fortunately, our patient did not exhibit coronary artery complications, as confirmed by echocardiography performed 3 weeks post treatment.

## CONCLUSION

In summary, Kawasaki disease is infrequently documented in sub-Saharan countries. The uncommon presentation and rarity of the disease pose challenges for diagnosis, particularly in Sub-Saharan africa, notably Somalia, where no cases have been reported to date. It is recommended to maintain heightened awareness of Kawasaki disease in cases of prolonged febrile illnesses lasting more than 5 days with mucocutaneous manifestations. Healthcare professionals should familiarize themselves with this condition to effectively diagnose, treat, and prevent severe cardiovascular complications and mortalities. Additionally, there is a need to make intravenous immunoglobulin (IVIG) more accessible at a subsidized and affordable cost, particularly to benefit patients with Kawasaki disease and other autoimmune conditions where its use is indicated.

## AUTHORS' CONTRIBUTIONS

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

## ETHICS APPROVAL

Ethical approval was not required for the case study at Mogadishu Somali Turkey, Recep Tayyip Erdogan Training and Research Hospital.

## CONSENT FOR PUBLICATION

Written informed consent was obtained from the patient's parents/legal guardian for publication and any accompanying images. A copy of the written consent is available for review by the Editor in Chief of this journal on request.

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## CONFLICT OF INTEREST

The author confirms that this article's content has no conflict of interest.

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## REFERENCES

[1] Burns JC, Glodé MP. Kawasaki syndrome. Lancet. 2004;364:533

[2] Nakamura Y, Yashiro M, Uehara R, *et al.* Epidemiologic features of Kawasaki disease in Japan: results of the 2007-2008 nationwide survey. J Epidemiol. 2010;20:302

[3] Genga E, Oyoo O, Adebajo A. Vasculitis in Africa. Current Rheumatology Reports. 2018 Feb;20(2):1-6.

[4] Badoe EV, Neequaye J, Oliver-Commey JO, *et al.* Kawasaki disease in Ghana: case reports from Korle Bu Teaching Hospital. Ghana Med J. 2011;45:38.

[5] Chemli J, Kchaou H, Amri F, Belkadhi A, Essoussi AS, Gueddiche N, Harbi A. Clinical features and course of Kawasaki disease in central Tunisia: a study about 14 cases collected over three years (2000-2002). Tunis Med. 2005;83(8):477–83.

[6] Boudiaf H, Achir M. The clinical profile of Kawasaki disease in Algerian children: a single institution experience. J Trop Pediatr. 2016;62(2):139–43

[7] Kim KY, Kim DS. Recent advances in Kawasaki disease. Yonsei Med J. 2016; 57(1):15–2

[8] McCrindle, B. W., Rowley, A. H., Newburger, J. W., Burns, J. C., Bolger, A. F., Gewitz, M., Baker, A. L., Jackson, M. A., Takahashi, M., Shah, P. B., Kobayashi, T., Wu, M. H., Saji, T. T., Pahl, E., & American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee of the Council on Cardiovascular Disease in the Young; Council on Cardiovascular and Stroke Nursing; Council on Cardiovascular Surgery and Anesthesia; and Council on Epidemiology and Prevention (2017). Diagnosis, Treatment, and Long-Term Management of Kawasaki Disease: A Scientific Statement for Health Professionals from the American Heart Association. Circulation, 135(17), e927–e999.

[9] Kato H, Sugimura T, Akagi T, Sato N, Hashino K, Maeno Y, *et al.* Long-term consequences of Kawasaki disease: a 10- to 21-year follow-up study of 594 patients. Circulation 1996;94:1379–85.

[10] Dajani AS, Taubert KA, Gerber MA, Shulman ST, Ferrieri P, Freed M, *et al.* Diagnosis and therapy of Kawasaki disease in children. Circulation 1993;87:1776–80.

[11] Minich LL, Sleeper LA, Atz AM, McCrindle BW, Liu M, Colan SD, *et al.* Delayed diagnosis of Kawasaki disease: what are the risk factors? Retrospective cohort study. Pediatrics 2007;120:e1434–40.

[12] Qiu H, He Y, Rong X, Ren Y, Pan L, Chu M, *et al.* Delayed intravenous immunoglobulin treatment increased the risk of coronary artery lesions in children with Kawasaki disease at different status. Postgrad Med 2018;130:442–47

[13] Furusho K, Kamiya T, Nakano H, Kiyosawa K, Hayashidera T, Tamura T, *et al.* High-dose intravenous gammaglobulin for Kawasaki disease. Lancet 1984;2:1055–8

[14] Newburger JW, Takahashi M, Beiser AS, Burns JC, Bastian J, Chung KJ, *et al.* A single intravenous infusion of gamma globulin as compared with four infusions in the treatment of acute Kawasaki syndrome. N Engl J Med 1991;324:1633–9.

[15] Taubert KA, Rowley AH, Shulman ST. Nationwide survey of Kawasaki disease and acute rheumatic fever. J Pediatr 1991;119:279–82.7

[16] Ikpatt NW, Ibia EO. Mucocutaneous lymph node syndrome in Calabar--a case report. East Afr Med J 1989;66:776-81.

[17] Sotimehin SA, Ogunlesi TA, Adekanmbi AF, *et al.* Kawasaki Disease in a Nigerian child- a case report. Niger Med Pract 2010;57(4).

[18] Sani UM, Ahmed H. Kawasaki disease: an unusual presentation in a 14-year old boy in Sokoto, northwestern Nigeria. Niger J Paed 2013; 40:422-5.

[19] Eno-Obong EU, Mkpouto UA. Kawasaki Disease in a two-year-old Nigerian child: full recovery with supportive treatment. Ibom Med J 2014;7:40-4.

[20] Makino N, Nakamura Y, Yashiro M, Sano T, Ae R, Kosami K, *et al.* Epidemiological observations of Kawasaki disease in Japan, 2013-2014. Pediatr Int. (2018) 60:581–7.doi: 10.1111/ped.13544

[21] Kim GB, Han JW, Park YW, Song MS, Hong YM, Cha SH, *et al.* Epidemiologic features of Kawasaki disease in South Korea: data from a nationwide survey, 2009-2011. Pediatr Infect Dis J. (2014) 33:24–7. doi: 10.1097/INF.0000000000000010

[22] Lin MC, Lai MS, Jan SL, Fu YC. Epidemiologic features of Kawasaki disease in acute stages in Taiwan, 1997-2010: effect of different case definitions in claims data analysis. J Chin Med Assoc. (2015) 78:121–6. doi: 10.1016/j.jcma.2014.03.009

[23] Holman RC, Belay ED, Christensen KY, Folkema AM, Steiner CA, Schonberger LB. Hospitalizations for Kawasaki syndrome among children in the United States, 1997-2007. Pediatr Infect Dis J. (2010) 29:483–8. doi: 10.1097/INF.0b013e3181cf8705

[24] Yeung RS. Kawasaki disease: Update on pathogenesis. CurrOpinRheumatol. 2010;22:551-60.

[25] Burgner D, Davila S, Breunis WB, Ng SB, Li Y, Bonnard C, *et al.* A genome-wide association study identifies novel and functionally related susceptibility loci for Kawasaki disease. PLoS Genet. 2009;5:e1000319.

[26] Onouchi Y, Ozaki K, Burns JC, Shimizu C, Terai M, Hamada H, *et al.* A genomewide association study identifies three new risk loci for Kawasaki disease. Nat Genet. 2012;44:517-21.

[27] American Heart Association. Diagnostic Guidelines for Kawasaki Disease: Council on Cardiovascular Disease in the Young, Committee on Rheumatic Fever, Endocarditis, and Kawasaki Disease American Heart Association: United States; 2001.

[28] Robert Sundel. Kawasaki Disease: Clinical Features and DiagnosisUpToDate. 2019.

[29] JCS Joint Working Group. Guidelines for diagnosis and management of cardiovascular sequelae in Kawasaki disease (JCS 2008)-digest version. Circ J. 2010;74:1989-2020.

[30] Eleftheriou D, Levin M, Shingadia D, Tulloh R, Klein NJ, Brogan PA. Management of Kawasaki disease. Arch Dis Child. 2014;99:74-83.

[31] Saguil A, Fargo M, Grogan S, Eisenhower DD. Diagnosis and management of Kawasaki disease. Am Fam Physician. 2015;91:365-71.

[32] Newburger JW, Takahashi M, Gerber MA, Gewitz MH, Tani LY, Burns JC, *et al.* Diagnosis, treatment, and long-term management of Kawasaki disease. Circulation. 2004;110:2747-71