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Knowledge, Attitude, and Practice of Stroke Among Hypertensive Patients in Selected Hospitals, Mogadishu: A Cross-Sectional Study

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ABSTRACT

Background and Aim: Stroke is a leading cause of death and disability globally, with hypertension identified as the main risk factor. Therefore, the knowledge, attitudes, and practices (KAP) of hypertensive patients are crucial for the early recognition and timely intervention needed to prevent strokes and minimize their long-term complications. This study aimed to evaluate the knowledge, attitudes, and practices regarding stroke among hypertensive patients.

Methods: The study used a cross-sectional design and enrolled 289 hypertensive patients. A consecutive sampling technique was employed to select the participants. Data were collected through an interviewer-administered questionnaire and analyzed using SPSS software (version 26). A significance level of 0.05 was established for the study.

Results: 70.6% of participants identified stroke as an interruption in blood flow to the brain. The majority of respondents (94.5%) identified hypertension and diabetes as risk factors for stroke. Sudden loss of vision or double vision is the most prominent indicator of stroke (75.8%). In terms of stroke complications, chronic headaches (89.3%) were widely recognized. Only 41.9% of the patients checked their blood pressure, and 37% took their medications regularly. The knowledge level significantly differed only with sex. However, significant differences were observed in the mean scores for attitudes based on age, education, and income, and in the practice mean score based on sex, education, employment status, and income. A weak positive correlation was found between patients' knowledge and attitude, but no significant correlation between knowledge and practice, or attitude and practice.

Conclusion: The study demonstrated that respondents had good knowledge about stroke but struggled to convert it into a positive attitude and practice. These findings suggest the need for targeted interventions to improve attitudes and practices towards stroke prevention.

1 | Introduction

A stroke, or cerebrovascular accident, is defined as the sudden occurrence of a neurological impairment due to a blockage in blood flow to the brain [1]. Ischemic stroke is the most frequent type, caused by decreased blood flow to the brain, while hemorrhagic stroke is due to blood vessel ruptures in the brain [2]. Modifiable risk factors and warning signs should be addressed

to prevent and treat the condition. Individuals with high blood pressure have a four times greater risk of experiencing a stroke compared to those with regular blood pressure [3].

Patients' insufficient compliance with medical advice and treatment is partially due to their lack of understanding of warning signs and risk factors for future strokes [4]. In contrast, treating hypertension patients and preventing strokes both benefit from knowledge of

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stroke risk factors and warning signs [5]. Strokes are more likely to occur in patients with long-term, non-communicable conditions like hypertension [6]. The increasing risk of stroke in many nations was caused by insufficient care, incorrect diagnosis, and a lack of understanding of hypertension [7]. Many studies were conducted to evaluate the level of knowledge among patients who were admitted for stroke and were reported because they lacked understanding about stroke illness and how to prevent it [8–10]. Lack of knowledge and inadequate self-care practices not only make HTN more severe but also pose significant obstacles to its management [11]. Stroke never happens randomly to anyone. For this reason, everyone should be aware of the risk factors to prevent it [12]. Raising awareness of stroke contributes to early hospital presentation, which lowers the disease's long-term complications [13].

In 2019, there were 12 million new cases of stroke worldwide, with an additional 100 million individuals who had previously experienced a stroke. These figures show that there was a 71% rise in new cases and an 82% increase in existing cases reported each year during the 1990s [14]. Approximately one stroke will occur in every four adult lifetimes worldwide [15]. Low-income countries have the highest amount of years lost due to stroke, while high-income countries have the lowest [16]. It ranks as the second highest cause of mortality, resulting in 6.5 million deaths, and is the third leading cause of mortality when considering disabilities along with neonatal disorders and ischemic heart disease, leading to 143 million disability-adjusted life years [17]. It is estimated that over 7 million stroke deaths will happen each year by 2030 because of the global impact of stroke [18].

In the African continent, recent data indicate that stroke affects up to 316 out of 100,000 individuals annually, with a prevalence of up to 1460 per 100,000 people [19], and a 3-year fatality rate exceeding 80% [20]. Moreover, a large number of Africans are affected by stroke in the 40–60 age group, posing considerable consequences for the person, family, and community [19]. In Sub-Saharan Africa such as Somalia, stroke accounts for a substantial portion of the burden of chronic diseases [21], with rates increasing from 53 to 88 cases per 100,000 population between 1973–1991 and 2003–2011, respectively [22]. A hospital-based study in Mogadishu, Somalia, revealed that the prevalence of ischemic stroke was 66.8%, whereas hemorrhagic stroke accounted for 33.2% of cases, with hypertension identified as a significant risk factor [23]. Despite the increasing prevalence of hypertensive-related stroke in Somalia, there is limited understanding of stroke knowledge, attitudes, and practices among hypertensive patients. Assessing hypertensive patients' knowledge, attitudes, and behaviors is crucial for preventing stroke and associated burdens. Therefore, this study aimed to investigate the knowledge, attitude, and practice towards stroke among hypertensive patients attending medical outpatient departments at selected hospitals in Mogadishu, Somalia.

2 | Methods

2.1 | Study Design, Setting, and Participants

The study utilized a cross-sectional design to examine the knowledge, attitude and practice towards stroke among hypertensive

patients between April 13 and May 4, 2024 at Aden Abdulle Hospital and Kaafi Hospital. The two hospitals are located in Soobe Village, which is part of the Wadajir District in Mogadishu, Somalia. These hospitals are multi-specialist, private, non-profit facilities that play a crucial role in serving the local community. Every day, numerous patients from the area visit these hospitals for medical examinations and treatment for various health conditions, including hypertension.

The eligibility criteria for this research encompassed adults aged 18 years and above who had been diagnosed with hypertension and were admitted to the medical outpatient departments of the selected hospitals, demonstrating a willingness to engage in the study. Conversely, individuals with a previous history of stroke or transient ischemic attack, those who were physically incapable of participating in interviews, and patients with intellectual disabilities were excluded from the study.

2.2 | Sample Size Determination and Procedure

The calculation of the sample size was based on the prevalence of hypertension, a significant risk factor for stroke. Prior research demonstrated that 22.6% of the population had hypertension [24]. Fisher's formula was used to calculate the sample size: $n = z^2 \times p(1 - p) / e^2$. With a prevalence rate of 0.226, an error rate of 0.05, and a z-value of 1.96, the sample size needed was 269. An additional 10% was included for rejections. There were 296 participants in total in the sample. The sample size was evenly distributed between the two hospitals, with 148 for each. Nonrandom consecutive sampling was conducted in the two hospitals until the desired sample size was obtained.

2.3 | Data Collection and Measurements

The researchers developed a questionnaire based on an adjusted form of knowledge, attitude, and practice (KAP) regarding stroke from research done in Saudi Arabia [25]. Patients were interviewed utilizing a structured format, ensuring that no cues were provided to the participants that might suggest specific answers. The questionnaire was specifically designed to assess KAP related to stroke and required either a “yes” or “no” answer. Modifications to the study instrument were made following the recommendations of research experts. A pilot study involving 30 participants was conducted to refine the questionnaire, ensuring its feasibility and relevance. Participants from the pilot study were not included in the main research. The study demonstrated satisfactory reliability, achieving a Cronbach alpha coefficient of 0.78 for the KAP assessment.

The survey instrument was composed of 38 items organized into four distinct sections, each with established scoring guidelines. The first section contained seven questions about sociodemographic characteristics, including age, gender, marital status, education, employment status, and income level. The second section featured 19 questions designed to evaluate the participants' understanding of stroke, encompassing the definition of stroke (item 1), risk factors associated with stroke

(items 2–7), signs and symptoms of stroke (items 8–13), and potential complications arising from stroke (items 14–19). The third section included six items aimed at determining attitudes towards stroke prevention. Finally, the fourth section comprised six items that examined the practices related to stroke prevention.

Knowledge scores varied from 0 to 19 in total. Any score below 9 is labeled as insufficient knowledge, whereas any score 9 or above is deemed sufficient knowledge. Conversely, the attitudes were rated on a scale of 0 to 6. A score of 0–3 shows a negative attitude, while a score of 4–6 shows a positive attitude. A 6-point questionnaire was utilized to evaluate performance, where scores below 3 represented poor practice, while scores above 3 indicated good practice.

2.4 | Data Analysis

Data analysis was conducted utilizing the Statistical Package for Social Sciences (SPSS) Version 26.0. A Simple statistical analysis was executed, encompassing counts and percentages. The *t*-test was employed to assess the presence of significant differences among the sociodemographic variables in relation to the respondents' knowledge, attitudes, and practices. The Spearman correlation coefficient was also used by the researchers to evaluate the associations between the variables in the study. A significance threshold of $p < 0.05$ was established for the statistical analyses.

2.5 | Ethical Considerations

Approval for the study protocol was granted by the Research Ethics Committee of the Faculty of Health Sciences at Moga-dishu University (Reference No: 17/2024). Permission letters were also secured from the hospital administrators of both hospitals involved in the study. This research adheres to the ethical principles specified in the Declaration of Helsinki. The study objectives and their complete right to participate, refuse, or withdraw without consequences were communicated to the participants. All the answers were provided without revealing the participants' identities, were treated as private, and were exclusively used for research purposes. The findings did not disclose the identities of the participants. Informed consent was obtained from all individuals before their participation in the survey.

3 | Results

3.1 | Sample Characteristics

Out of the 296 selected patients, 289 took part in the research, resulting in a response rate of 97.6%. More than half of the respondents 181 (62.6%) were 45 years of age or older, 150 (51.9%) were female, and 201 (69.6%) were married. Additionally, 154 (53.3%) of the respondents were illiterate, and 152 (52.6%) were employed. In terms of monthly income, 145 (50.2%) had insufficient income (Table 1).

TABLE 1 | Sociodemographic characteristics of the participants.

Variable	Frequency (N = 289)	%
Age group		
< 45 years	108	37.4
≥ 45 years	181	62.6
Sex		
Male	139	48.1
Female	150	51.9
Marital status		
Married	201	69.6
Unmarried	88	30.4
Educational level		
Illiterate	154	53.3
Literate	135	46.7
Employment status		
Employed	152	52.6
Unemployed	137	47.4
Income level		
Sufficient	144	49.8
Insufficient	145	50.2

3.2 | Evaluation of Knowledge, Attitude, and Practice Related to Stroke

Two hundred and four (70.6%) of the respondents correctly defined stroke as an interruption of blood flow to the brain, 60 (20.8%) thought that stroke is the same type of heart disease, 21 (7.3%) incorrectly understood it as a condition affecting the blood vessels within the kidneys, and four (1.4%) attributed it to a type of cancer. According to the survey, 273 (94.5%) of respondents accurately recognized high blood pressure and diabetes mellitus as significant risk factors for stroke, with 266 (92%) noting obesity as well. The most recognized signs or symptoms of stroke among the participants included sudden loss of vision or double vision (219, 75.8%), and paralysis on one side of the body (189, 65.4%). Additionally, 258 (89.3%) of the respondents accurately indicated that stroke may result in chronic headaches, while 216 (74.7%) knew it could result in coma and death (Table 2).

We also presented that 198 (68.5%) of the participants believed that stroke is preventable. With respect to attitudes towards stroke prevention, it was found that 256 (88.6%) of the participants recognized early stroke diagnosis as crucial for preventing further complications. Furthermore, a total of 249 respondents, accounting for 86.2%, acknowledged that monitoring blood pressure regularly is an effective preventive strategy against stroke (Table 2).

The results concerning practices regarding stroke prevention revealed that less than two-thirds (56.1%) consistently attempted to lose weight. Additionally, 134 (46.4%) of respondents controlled their blood cholesterol levels to prevent stroke, and 121 (41.9%) checked their blood pressure regularly. Only 118 (40.8%) of the respondents avoided extra salt in their diets (Table 2).

TABLE 2 | Knowledge, attitude, and practice towards stroke ($N = 289$).

Item	<i>N</i> (%) (Positive responses)
Knowledge	
Risk factors	
Smoking	262 (90.7)
High cholesterol levels	258 (89.3)
High blood pressure	273 (94.5)
Obesity	266 (92)
Advancement in age	268 (92.7)
Diabetes mellitus	273 (94.5)
Signs and symptoms	
Weakness/numbness of one side of the body	163 (56.4)
Sudden loss of balance	164 (56.7)
Sudden loss of speech	160 (55.4)
Difficulty in swallowing	164 (56.7)
Sudden loss of vision or double vision	219 (75.8)
Paralysis on one side of the body	189 (65.4)
Complications	
Deep vein thrombosis (DVT)	182 (63)
Depression	214 (74)
Aphasia and other speech disorders	176 (60.9)
Spasticity	167 (57.8)
Chronic headaches	258 (89.3)
Coma and death	216 (74.7)
Attitude	
Do you believe that stroke is preventable?	198 (68.5)
Do you believe that stroke affects only rich people?	176 (60.9)
Do you believe that monitoring blood pressure is essential to prevent stroke?	249 (86.2)
Do you believe that lifestyle changes, such as diet and exercise, can help prevent stroke?	41 (14.2)
Do you believe that heart disease should be treated to prevent stroke?	30 (10.4)
Do you believe that early diagnosis is vital to prevent further complications of a stroke?	256 (88.6)
Practice	
Do you perform physical exercise routinely?	101 (34.9)
Do you try to lose weight?	162 (56.1)
Do you check your blood pressure regularly?	121 (41.9)
Do you avoid extra salt in your diet regularly?	118 (40.8)
Do you control your blood cholesterol levels?	134 (46.4)
Do you take the prescribed hypertensive medications regularly?	107 (37)

3.3 | Classification of KAP Levels Regarding Stroke

To assess the level of KAP concerning stroke, the researchers divided the total scores into two distinct categories. The findings from the categorization indicated that the majority of participants demonstrated sufficient knowledge (79.6%), negative attitudes (70.9%), and poor practices (69.2%) related to stroke prevention (Table 3).

3.4 | Comparison Between KAP of Stroke and Sociodemographic Characteristics

The findings show that knowledge level was not significantly different across all sociodemographic variables except for gender. Females had a notably higher average score of knowledge ($M = 1.69$, $p = 0.002$) than males (Table 4). Furthermore, the analysis indicated significant disparities in attitude mean scores based on the respondents' age, educational background, and

income levels. Patients who were 40 years old and older had a higher average rating of attitudes ($M = 1.67, p = 0.025$) towards stroke prevention compared to participants in younger age categories. Respondents who can read and write had greater mean attitude scores towards stroke prevention ($M = 1.51, p = 0.031$) when contrasted with those who had no formal education or were illiterate. In addition, participants who had enough income showed noticeably higher average attitude scores ($M = 1.54, p = 1.57$) than those with insufficient income (Table 4).

Furthermore, there was a notable difference in the average practice score based on sex, educational attainment, employment status, and income level. Males exhibited a significantly higher average practice score ($M = 1.61, p = 0.046$) than females.

TABLE 3 | Classification of KAP Scores of hypertensive patients towards stroke.

Item	Frequency (N = 289)	%
Knowledge		
Sufficient	230	79.6
Insufficient	59	20.4
Attitude		
Positive	84	29.1
Negative	205	70.9
Practice		
Good	89	30.8
Poor	200	69.2

The illiterate participants demonstrated greater adherence to stroke prevention practices ($M = 1.67, p \leq 0.001$) compared to the literate individuals. Unemployed respondents reported a significantly higher level of practice in stroke prevention ($M = 1.55, p \leq 0.001$) than their employed counterparts. Finally, respondents with adequate income demonstrated a significantly higher level of practice ($M = 1.66, p \leq 0.001$) compared to those lacking sufficient income (Table 4).

3.5 | Correlation Between Knowledge, Attitude, and Practice of Stroke

A Spearman's rho test was conducted to assess the degree of correlation between the KAP study domains. The findings in (Table 5) showed a significant weak positive relationship between knowledge and attitude ($r = 0.192, p = 0.001$). Nevertheless, there was no notable association discovered between knowledge and practice ($r = 0.040, p = 0.495$), or attitude and practice ($r = -0.047, p = 0.423$). This suggests an increase in knowledge level tends to positively influence attitude, but may not necessarily impact practice.

4 | Discussion

The study was carried out on hypertensive individuals at the medical outpatient departments of hospitals in Mogadishu, Somalia to assess the hypertensive patientss KAP of stroke. Good awareness of stroke is crucial for ensuring timely and appropriate medical intervention for hypertensive patients,

TABLE 4 | Independent *t*-test to examine the differences in KAP about stroke among respondents.

Variable	Knowledge		Attitude		Practice	
	Mean (SD)	<i>p</i> value	Mean (SD)	<i>p</i> value	Mean (SD)	<i>p</i> value
Age group						
< 45 years	1.60 (0.49)	0.057	1.52 (0.50)	0.025	1.62 (0.49)	0.846
≥ 45 years	1.73 (0.45)		1.67 (0.47)		1.63 (0.48)	
Sex						
Male	1.47 (0.50)	0.002	1.52 (0.50)	0.917	1.61 (0.49)	0.046
Female	1.69 (0.46)		1.52 (0.50)		1.48 (0.50)	
Marital status						
Married	1.70 (0.46)	0.744	1.65 (0.48)	0.337	1.69 (0.47)	0.804
Unmarried	1.68 (0.47)		1.71 (0.45)		1.70 (0.46)	
Educational level						
Illiterate	1.46 (0.50)	0.477	1.37 (0.49)	0.031	1.67 (0.47)	< 0.001
Literate	1.51 (0.50)		1.51 (0.50)		1.38 (0.49)	
Employment status						
Employed	1.47 (0.50)	0.764	1.51 (0.50)	0.411	1.30 (0.46)	< 0.001
Unemployed	1.49 (0.50)		1.46 (0.50)		1.55 (0.50)	
Income level						
Sufficient	1.49 (0.50)	0.449	1.39 (0.49)	0.021	1.66 (0.48)	< 0.001
Insufficient	1.54 (0.50)		1.54 (0.50)		1.43 (0.50)	

TABLE 5 | Correlation between KAP (*N* = 289).

Item	Rho
Knowledge and attitude	0.192*
Knowledge and practice	0.040
Attitude and practice	−0.047

**p* = 0.001

ultimately preventing morbidity and mortality. In this investigation, the majority of participants were female, elderly, married, employed, illiterate, and lacking adequate income. This is similar to the results of previous studies in Korea [26] and Bangladesh [27]. The higher number of females in this research could be attributed to the acknowledgment of females for their better health-seeking habits in comparison to males [28].

The investigation has reported that 79.6% of participants possessed adequate knowledge regarding stroke awareness, including its risk factors, symptoms, and complications, exceeding the results from earlier research in India, 24% [29], and Ethiopia, 40.7% [17]. The variations in the prevalence of stroke knowledge among hypertensive individuals may stem from the differing criteria employed to assess stroke knowledge. In Ethiopia, stroke knowledge was evaluated based on the recognition of warning signs and risk factors, while in India, it was assessed through stroke prevention practices in a study. Another possible reason is the cultural and historical context of Somalia, where stroke is perceived as a more prominent and feared condition due to the high mortality rate and devastating consequences of stroke. Our study results are similar to those conducted in Cameroon [30], and Nigeria [31], which reported high levels of knowledge about stroke risk factors and warning symptoms. Our research also found that the majority of participants had negative views on monitoring blood pressure, early diagnosis, making lifestyle changes, and treating heart disease to prevent strokes. This finding aligns with research carried out in Saudi Arabia [25]. Conversely, it contrasts with findings from India, which indicated a relatively positive attitude towards stroke prevention approaches [32].

Although the respondents in this study showed a good understanding of stroke, their implementation of stroke prevention measures was inadequate. They don't have preventive measures like attempting weight loss, working out, following dietary plans, taking medications consistently, and monitoring blood cholesterol and blood pressure levels routinely. These findings align with research conducted in Pakistan [33] and Nigeria [31]. Additionally, a systematic review highlighted the insufficient level of stroke prevention measures in place for hypertensive individuals, suggesting a lack of awareness and preventive actions, demonstrating that stroke prevention practices were not optimal [13].

This study analyzed the mean scores of stroke knowledge, attitudes, and practices based on sociodemographic factors to identify any variations among the variables. The average knowledge scores varied significantly based on the sex of the participants. Females had a better grasp of knowledge compared to males. This result coincides with another similar study conducted in Iraq [34], which addressed that females had a

higher knowledge of stroke among hypertensive patients. This is due to women are more likely to be primary caregivers within their families, leading to increased exposure to health-related information. On the other hand, a study in China found that males had a strong understanding of stroke, which differs from the current finding [35].

The study findings highlighted significant trends in attitudes about stroke prevention among different age groups. Participants aged 40 years and older exhibited a greater average score in their attitudes towards stroke prevention compared to younger cohorts. This result corresponds with the study [36] which revealed that older individuals, particularly those over 40, generally possess more favorable attitudes towards stroke prevention. There was also a significant difference between the mean score of attitudes and education status, where literate individuals had more protective attitudes than their counterparts. This study is consistent with the studies [37, 38]. Furthermore, individuals with higher income levels were found to be more inclined to adopt positive attitudes toward stroke prevention, a finding that is consistent with similar studies [39–41].

Our study further indicated that there are significant sex-specific differences in stroke prevention practices. Males were more likely to adopt preventive measures than females. The reason is that males are attributed to various factors, such as differences in lifestyle habits, cultural and societal expectations, and hormone levels. This is in disagreement with a previous study [42], which showed that males and females did not show a significant difference in stroke prevention practices according to the study's findings. Moreover, education level influenced the participants' stroke practices. Those who were illiterate showed higher stroke prevention practice levels than literate. This highlights that being illiterate does not necessarily mean a lack of understanding or ability to prevent stroke. This may be because illiterate individuals often rely more on word-of-mouth and community-based knowledge, which may be more effective in promoting stroke prevention practices. A previous study [43] reported that illiterate patients showed improved outcomes with a guideline-based program, suggesting higher adherence to prevention practices than those with higher education levels.

In addition, employment status had an impact on practices towards stroke prevention. Unemployed respondents had a significantly higher adherence than those employed. This could be due to multiple reasons, including the increased availability of time for health-related activities, reduced stress levels, or a sense of purpose to prioritize one's health during periods of unemployment. Such an outcome contradicts the results of previous research conducted by Alhowaymel et al. [25]. Finally, respondents who had sufficient income had a significantly higher practice level than those who had no financial stability. Other studies showed that individuals with higher socioeconomic status tend to have better stroke prevention practices due to access to resources, potentially leading to a significantly better practice level compared to those with lower income [44–46].

A significant limitation of the current research lies in the use of a consecutive non-probability sample. This means that there was a deficiency of mandatory data to implement accurate recruiting. Secondly, the respondents were only recruited from

two selected hospitals. Therefore, the study results may not apply to the broader population residing in the Banadir region. Lastly, the research was quantitative and employed structured questions with binary answers. This restricted the opportunity to explore the factors influencing patients' outlook on stroke.

5 | Conclusion and Recommendations

The research showed that participants were well-informed about stroke, yet lacked positivity towards their attitudes and practices for stroke prevention. 79.6% of the participants were reported to possess sufficient knowledge regarding stroke, but 70.9% displayed unfavorable attitudes, and 69.2% exhibited poor practices related to stroke prevention. Therefore, to address these misconceptions and enable the patients to take proactive measures for preventing stroke, health education campaigns should concentrate on this issue. Healthcare providers should educate hypertensive patients about the significance of preventive measures, including regular exercise and a healthy diet. Patients should also be encouraged to limit their sodium intake and avoid processed foods high in salt and unhealthy fats. Moreover, patients must be encouraged to regularly monitor their blood pressure and blood cholesterol levels at home for any irregularities that may require urgent attention. Additionally, patients should adhere to their prescribed medications. Furthermore, future studies should aim to develop and implement health education programs targeting hypertensive patients and the broader community, as well as evaluating their impact.

Author Contributions

Walid Abdulkadir Osman: conceptualization, methodology, data curation, formal analysis, writing—original draft, writing—review and editing. **Hassan Muse Ahmed:** methodology, formal analysis, writing—review and editing. **Maryam Mukhtar Abdullahi:** conceptualization, data curation, writing—original draft. **Amal Adam Kuule:** conceptualization, data curation, writing—original draft. **Qaali Barre Hassan:** conceptualization, data curation, writing—original draft.

All authors have read and approved the final version of the manuscript. Corresponding Author Walid Abdulkadir Osman had full access to all of the data in this study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Transparency Statement

The lead author Walid Abdulkadir Osman affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and

that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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