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DOI:

10.4103/jehp.jehp_448_25

Exploring the reasons stroke patients do not use emergency medical services: A qualitative study

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Abstract:

BACKGROUND: Despite the well-established benefits of using Emergency Medical Services (EMS) in the management of stroke, the rate of EMS usage among stroke patients remains significantly low. This study was undertaken to explore and elucidate the underlying reasons for the underutilization of EMS by individuals experiencing stroke.

MATERIALS AND METHODS: This qualitative content analysis was conducted in 2025 in hospitals affiliated with Lorestan University of Medical Sciences and Shahid Beheshti University of Medical Sciences, Iran, with 17 participants, including stroke patients and their family members. Participants were purposively selected, and data were collected through semi-structured interviews. The data were analyzed using Graneheim and Lundman's conventional content analysis approach. To ensure the trustworthiness of the findings, the recommendations of Lincoln and Guba were followed. MAXQDA version 18 software (VERBI Software, Berlin, Germany) was used for data management.

RESULTS: After the analysis of the interviews, the findings were categorized into three main themes: deficiency in awareness, inappropriate organizational context, and attitudes and misconceptions. Seven subcategories were also identified, namely, lack of knowledge of EMS, symptom underestimation, negative experiences with EMS, limited access to EMS services, secrecy, fatalism, and high threshold for seeking help.

CONCLUSION: The findings indicate that patients often lack sufficient knowledge about stroke and the benefits of using EMS. Factors such as limited awareness of EMS, inadequate access, and various cultural and social influences contribute to the underutilization of these services. It is recommended that targeted community education initiatives be implemented to enhance public awareness of stroke symptoms and emphasize the critical role of EMS in the prehospital management of stroke patients.

Keywords:

Cerebral infarction, emergency medical services, stroke

Introduction

Stroke is one of the most prevalent and critical neurological disorders, with approximately 80% of strokes being ischemic, while 20% are hemorrhagic.^[1] It is the second leading cause of death and the primary cause of disability in developing countries, and the third leading cause of disability globally.^[2] The global burden of stroke is rising, with projections indicating it will become the second leading cause of

death worldwide by 2030.^[3] According to the World Stroke Organization (WSO) (2025), approximately 12 million new strokes occur annually, nearly 94 million people live with stroke-related disabilities, and stroke-related deaths are projected to reach 9.7 million by 2050—a 50% increase compared with current figures.^[4] In Iran, epidemiological studies over the past three decades have shown a substantial rise in the incidence and prevalence of stroke, with an age-adjusted incidence rate of 185.2 cases per 100,000 individuals annually.^[5]

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How to cite this article: Moradi B, Darvishpoor Kakhki A, Khankeh HR, Zandi M. Exploring the reasons stroke patients do not use emergency medical services: A qualitative study. J Edu Health Promot 2026;15:210.

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Received: 09-03-2025

Accepted: 06-06-2025

Published: 29-05-2026

Stroke, as a growing global health challenge, not only results in long-term complications such as disability, emotional disorders, depression, and reduced quality of life, but also imposes a substantial economic burden on health systems and societies.^[6] According to the WSO, the global annual cost of stroke exceeds \$722 billion, which is approximately 0.66% of the global GDP. This includes medical expenses, disability-related costs, and indirect costs such as home care and rehabilitation.^[4] In Iran, although the number of studies is limited, existing research demonstrates the significant economic impact of stroke, with a high proportion of patients requiring ongoing rehabilitation, physiotherapy, and home nursing services after discharge, further intensifying the financial burden on both households and the healthcare system.^[7]

In stroke patients, the primary determinant of survival is the timely restoration and maintenance of cerebral blood flow.^[8] Currently, treatment options, including supportive care, thrombolytic therapy, and endovascular interventions, are available.^[9] The administration of tissue plasminogen activator (tPA) is approved for patients who present within 4.5 h of symptom onset.^[10] However, despite advancements in treatment, delays in patient arrival at medical centers and insufficient utilization of emergency medical services (EMS) significantly diminish therapeutic efficacy.^[11] Consequently, EMS plays a pivotal role in minimizing delays and optimizing treatment outcomes.

Although the use of EMS in acute stroke patients reduces prehospital delays, facilitates rapid and safe transfer to specialized centers, and minimizes hospital-related delays,^[12] the rates of EMS utilization remain critically low. Reported rates include 12.5% in China,^[13] 22.98% in Iran,^[14] and 25.1% in Spain.^[15] Evidence indicates that this underutilization is primarily due to multiple barriers, such as lack of awareness, misconceptions, and cultural factors.^[16]

These data, coupled with the increasing aging population in Iran, underscore the growing burden of stroke on the national healthcare system.^[17] In this context, the prehospital phase, particularly the performance of emergency services, plays a critical role in reducing time to treatment, improving clinical outcomes, and mitigating the overall impact of stroke. Therefore, identifying challenges in the prehospital phase and proposing evidence-based strategies to enhance early care and increase EMS utilization among stroke patients are essential steps toward more effective stroke management at both national and global levels.

Given the challenges within Iran's healthcare system and the limited evidence regarding the low utilization

of EMS by acute stroke patients, a qualitative study was conducted to identify and analyze the contributing factors. The findings were expected to provide valuable insights for policymakers and healthcare professionals, thereby enabling the development of targeted interventions to enhance EMS utilization and improve stroke management outcomes.

Materials and Methods

Study design and setting

This study adopted a qualitative research design based on conventional content analysis, which is particularly appropriate in areas where theoretical frameworks and existing literature are limited.^[18] This study used a qualitative content analysis with a conventional approach and was conducted in Iran in 2025. The study was conducted in the neurology and emergency departments of four major hospitals affiliated with Lorestan University of Medical Sciences, located in Lorestan Province (Shohada Ashayer and Shahid Rahimi Hospitals), and Shahid Beheshti University of Medical Sciences, located in Tehran Province (Imam Hossein and Shohada Tajrish Hospitals). These two provinces were purposefully selected due to their distinct cultural, social, and economic differences. Tehran, as Iran's capital, has higher public awareness, better access to EMS, and greater cultural diversity. By contrast, Lorestan, located in western Iran, has lower public awareness and more limited EMS access. This diversity allowed for a broader understanding of the factors affecting EMS utilization among acute stroke patients.

Study participants and sampling

Participants were purposively selected from among eligible individuals, including patients in the recovery phase following an acute stroke and their relatives. Depending on the severity of symptoms and the general condition of each patient, interviews were conducted at different time points, starting a few hours after admission once the patient had been clinically stabilized and continuing throughout the hospital stay. Participants were eligible for inclusion if they met the following criteria: age above 18 years, diagnosis of acute stroke confirmed by a neurologist, provision of informed consent to participate in the interview, and absence of EMS utilization at the time of stroke onset. Exclusion criteria encompassed refusal to provide consent for the interview, unwillingness to continue participation in the study, and insufficient knowledge or awareness of the prehospital phase of stroke care by either the patient or their accompanying person.

Data collection tool and technique

Data for this study were gathered through semi-structured interviews conducted via direct

engagement with patients who had experienced a stroke and, when necessary, with their family members. To ensure the inclusion of a wide range of perspectives and experiences, maximum variation sampling was employed to select participants with diverse demographic and clinical characteristics, including age, gender, marital status, educational attainment, type of stroke, place of residence (urban or rural), and timing of stroke onset. The researcher was present during various shifts in the emergency and neurology departments of the hospital and initiated interviews only after confirming the stabilization of the patients' clinical conditions. In cases where patients were unable to participate due to physical conditions or communication impairments, interviews were conducted with their respective family members.

The interviews were scheduled in advance in coordination with the participants, and the timing remained fully flexible. Interview locations were carefully selected to provide a calm, safe, and appropriate environment that facilitated open communication without disrupting medical care or patient rest. For hospitalized patients, interviews were conducted either in the patient's room or in quiet consultation spaces within the hospital. When interviewing family members, designated areas such as visiting rooms or similar facilities were used. Before each interview, the study objectives were clearly explained to the participants, and written informed consent was obtained. It was also emphasized that all collected information would be treated confidentially and that participant anonymity would be maintained throughout all stages of the research.

At the beginning of each interview, a demographic questionnaire was completed by the researcher. The interview then commenced with a broad, open-ended question regarding the participant's initial experience of symptom onset; for example: "Please describe your experience when the symptoms first appeared." The interview process remained flexible and was guided by the participants' responses. To enrich the data and further elucidate emerging concepts, probing and clarifying questions such as "Could you elaborate further?" or "What exactly do you mean by that?" were employed. At the conclusion of each interview, participants were invited to share any additional thoughts or comments. Each interview lasted approximately 40 to 45 min, and, with the participants' informed consent, all sessions were audio-recorded.

The data collection process continued until thematic saturation was achieved, defined as the point when no new information or themes emerged and additional interviews failed to generate further conceptual insights. To minimize potential bias during data collection, the

researcher underwent prior training in conducting neutral and nonleading qualitative interviews.

Data analysis

Data were analyzed using Graneheim and Lundman's (2004) qualitative content analysis, involving transcription, repeated reading, coding of condensed meaning units, categorization, and theme development to capture latent content.^[19] In this study, the interviews were transcribed verbatim and treated as units of analysis. Meaning units were identified from semantically related text segments, condensed, and coded. Similar codes were grouped into categories and subcategories through constant comparison, leading to the identification of overarching latent themes. MAXQDA (version 18; VERBI Software, Berlin, Germany) was used to facilitate the coding process, organize meaning units, and manage categories and themes during the qualitative content analysis.

Data trustworthiness

To ensure trustworthiness, the four criteria proposed by Guba and Lincoln—credibility, dependability, transferability, and confirmability—were systematically applied throughout the research process.^[20] Credibility was enhanced through prolonged engagement with the data, allowing the researcher to deeply immerse in the interview transcripts. Member checks were conducted by returning preliminary findings to several participants, who were invited to review and confirm the interpretations or suggest modifications; their feedback was incorporated into the final analysis. Peer debriefing among the research team further contributed to the refinement of codes and themes. To ensure dependability, the research process was carefully documented, including decisions made during data collection and analysis, allowing for a clear audit trail. Transferability was addressed through purposive sampling with maximum variation in participant characteristics and clinical backgrounds, as well as by providing rich, contextual descriptions of the setting and participants. Confirmability was ensured by maintaining reflexivity during data analysis, reviewing all codes and categories collaboratively within the research team, and preserving all raw data, field notes, and analytical memos for external review.

Ethical considerations

This study was conducted as part of an approved research project by the Research Ethics Committee of Shahid Beheshti University of Medical Sciences (Approval Code: IR.SBMU.PHARMACY.REC.1402.197). The project was also registered in the Iranian National Research System (Pajouhan) under Project ID: 43008138. Written informed consent was obtained from all participants before data collection. To ensure ethical integrity, all data were collected and stored anonymously. Participant confidentiality was strictly maintained at

every stage of the research, with particular attention to privacy protection and adherence to ethical standards throughout the study process.

Results

Seventeen participants were enrolled, including 11 patients (five women, six men) and six family members (three women, three men). The mean ages were 71.73 ± 10.05 years for patients and 35.67 ± 8.31 years for family members [Tables 1 and 2].

In this study, a total of 2,137 conceptual codes were extracted from 17 interviews using content analysis. These initial codes were systematically categorized based on conceptual similarities and differences into three main categories and seven subcategories. The main categories identified were: deficiency in awareness, inappropriate organizational context, and attitudes and misconceptions. The corresponding subcategories included: Lack of knowledge of EMS, symptom underestimation, negative experiences with EMS, limited access to EMS services, secrecy, fatalism, and high threshold for seeking help [Table 3]. These categories and their corresponding subcategories are depicted in the conceptual figure [Figure 1]. The extracted categories and subcategories pertaining to the causes of EMS underutilization are discussed in detail in the following sections.

Deficiency in awareness

One of the main categories extracted from the findings was deficiency in awareness, encompassing

two subcategories: lack of knowledge of EMS and underestimation of symptoms. These subcategories reflect the participants' limited understanding of stroke symptoms and appropriate actions in emergency situations.

Lack of knowledge of EMS

Several participants demonstrated limited knowledge of when and how to activate EMS in the event of a stroke. For example, Participant 9 stated: "I was standing in line at the bakery when my left arm became heavy and I couldn't speak properly. I rushed home, and my wife took me to the hospital with a neighbor's car." This account highlights a significant gap in participants' knowledge regarding the appropriate timing for contacting EMS. Such misconceptions can cause delays in obtaining timely medical care, emphasizing the urgent need for public education on stroke recognition and the role of EMS.

Symptom underestimation

Participants frequently underestimated the severity of their initial symptoms, often attributing them to benign causes. They interpreted the symptoms based on prior experiences and existing health conditions, failing to recognize them as signs of stroke. In this regard, Participant 7 described: "My diabetic mother sometimes gets confused and weak, usually resolving on its own. We thought it was just blood sugar again." This underestimation resulted in a reduced perception of threat, ultimately delaying the decision to seek emergency assistance. The findings suggest that downplaying early symptoms of stroke can significantly impact the urgency of individuals' responses to acute stroke events.

Table 1: Demographic characteristics of patients

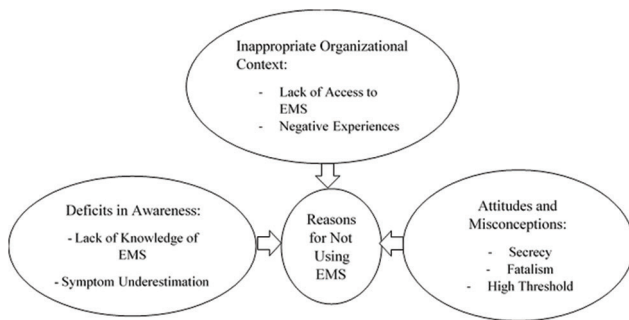
Participant	Age (years)	Gender	Education Level	Residence	Living With	Delay to Hospital (hours)
1	59	Male	Bachelor's Degree	City	Wife and children	24
2	68	Male	Diploma	City	Wife and children	16
3	81	Female	Illiterate	Village	Alone	12
6	63	Male	Doctorate	City	Wife and children	8
8	89	Male	Illiterate	Village	Alone	72
9	72	Female	Middle School	City	Wife	1
12	77	Female	Illiterate	City	Children	0.5
13	81	Male	Illiterate	Village	Alone	168
14	74	Female	Middle School	City	Alone	48
15	56	Female	Bachelor's Degree	Village	Children	96
17	69	Male	Diploma	City	Alone	24

Table 2: Demographic characteristics of patients families

Participant	Age (years)	Gender	Marital status	Residence	Relationship with the patient	Education Level
4	28	Male	Single	Village	Child	Illiterate
5	47	Male	Married	City	Nephew	Bachelor's Degree
7	39	Female	Single	City	Child	Diploma
10	32	Female	Married	Village	Niece	Master's Degree
11	42	Male	Married	City	Child	Diploma
16	26	Female	Single	City	Child	Postgraduate Diploma

Table 3: Categories and subcategories

Categories	Subcategories
Deficiency in Awareness	Lack of knowledge of EMS Symptom Underestimation
Inappropriate Organizational Context	Limited Access to EMS Services Negative Experiences with EMS
Attitudes and Misconceptions	Secrecy Fatalism High Threshold

**Figure 1:** Conceptual framework of the causes of EMS underutilization

Inappropriate organizational context

The organizational context emerged as a significant factor influencing participants' decisions to engage EMS during stroke events. Two main subcategories were identified: negative experiences with EMS and limited access to EMS services.

Negative experiences with EMS

A number of participants reported refraining from using EMS despite acknowledging its vital role in emergencies. This avoidance was primarily attributed to previous negative experiences, including unsanitary ambulance conditions, absence of medical personnel, unprofessional behavior exhibited by EMS staff, and inadequacies in available equipment.

Participant 5 recounted: *"Last year, my brother attempted suicide by ingesting a large number of acetaminophen tablets. I called 115, but no ambulance was dispatched."* Such encounters appeared to erode trust in EMS services, fostering a reluctance to seek prehospital emergency assistance in subsequent critical situations, including stroke.

Limited access to EMS services

Beyond dissatisfaction with prior experiences, systemic barriers further restricted participants' access to EMS. Key obstacles identified included poor mobile network coverage, delayed or failed dispatch responses, and residence in geographically isolated or rural regions.

As articulated by Participant 13: *"We live in a village, and because of the long distance to the city, 115 does not dispatch*

an ambulance for us." Another participant similarly noted: *"I called 115 twice but remained on hold each time and was unable to speak to the operator."* These challenges compelled individuals to rely on alternative, often slower, methods of transportation, potentially delaying access to definitive care during time-sensitive emergencies such as stroke.

Attitudes and misconceptions

The findings of the present study indicated that patients experiencing stroke and their families often refrained from contacting EMS due to misconceptions and attitudes rooted in their cultural and social contexts. This main category comprised three subcategories: secrecy, fatalism, and high threshold for help-seeking.

Secrecy

Some participants reported that, in order to preserve privacy and prevent neighbors from becoming aware of the illness, they avoided contacting EMS. Concerns such as causing disturbances to neighbors due to the ambulance's presence, as well as a reluctance to trouble EMS personnel, played significant roles in this decision-making process.

In this regard, Participant 11 stated: *"My father is a drug user, and we had previously called 115 for symptoms related to his drug use, and an ambulance arrived. However, this time we decided not to call again to prevent the neighbors from finding out."* These findings illustrate that fear of social judgment contributed to the emergence of secretive behaviors regarding stroke symptoms, ultimately resulting in delays in seeking emergency medical assistance.

Fatalism

Belief in fate and predestination was another factor that reduced motivation to seek EMS assistance. Some patients and their families perceived the outcomes of stroke as inevitable, particularly in elderly patients, and consequently regarded medical intervention as futile.

Participant 4 reflected: *"Ultimately, everyone is born one day and must die one day. My father is already 86 years old, and we have to accept this reality."* This fatalistic attitude diminished the perceived urgency of obtaining medical care, leading to reluctance to contact EMS even in critical situations.

High threshold

Participants exhibited a high threshold for requesting EMS assistance, often considering its use necessary only in life-threatening conditions. Mild or ambiguous symptoms of stroke were not regarded as requiring emergency intervention.

In this context, Participant 6 explained: *"I was at work and experienced a headache and a feeling of heaviness in my*

tongue. Although I was fully aware of 115 and its services, I did not feel justified in calling 115 for such minor symptoms." This finding suggests that misinterpretation of symptom severity and a narrow definition of what constitutes an "emergency" played a significant role in delaying the utilization of EMS during stroke events.

Discussion

This study explored the reasons why patients did not use free EMS services. The findings revealed three main categories: deficiency in awareness, inappropriate organizational context, and attitudes and misconceptions. Understanding these factors is essential for improving prehospital care utilization and designing targeted interventions.

In this study, lack of awareness was identified as one of the major barriers to timely access to EMS services in stroke patients. The findings revealed that many participants had limited understanding of stroke symptoms, the importance of early detection, and the need for immediate contact with EMS. This aligns with the findings of Zhang *et al.*,^[21] who highlighted the lack of public awareness as a key factor in delayed EMS contact in stroke patients. Moreover, many patients did not perceive the initial signs as urgent, due to factors such as mild symptoms, absence of underlying disease, or the lack of pain or motor symptoms. As a result, they often sought care at nonurgent treatment centers.

Another critical aspect of this lack of awareness was the insufficient understanding of the nature, benefits, and scope of services provided by EMS. Many participants were unaware of the existence of this system, the complete free-of-charge nature of its services, and its vital role in timely stroke management. In contrast, misconceptions such as the belief that using personal vehicles was more cost-effective and faster negatively impacted patients and their families' decision-making. These findings are consistent with the results of Xirasagar *et al.*,^[22] who reported that more than 75% of respondents were unaware of the positive impact of EMS services on treatment outcomes. Based on these findings, there is a clear need for the design and implementation of comprehensive public education programs and multimedia awareness campaigns that not only teach how to identify classic stroke symptoms but also clearly explain the dangerous consequences of delayed treatment.

In addition to lack of awareness, negative prior experiences with EMS services were also among the factors contributing to patients' hesitation to seek immediate help. Even when there was some awareness of stroke symptoms, negative experiences with poor-quality

EMS services had eroded patients' trust in the system. Participants reported that exposure to unhygienic ambulances, untrained staff, unprofessional behavior from personnel, and lack of equipment were among the main reasons for their distrust. This finding aligns with the study by Skaffari *et al.*,^[23] which emphasized the crucial role of patients' initial experiences with EMS in shaping their future behaviors. A reduction in trust towards emergency services not only delays rapid EMS contact but also leads patients to rely on alternative, often ineffective, methods of patient transport, such as using personal vehicles. These approaches can result in adverse clinical outcomes.

Apart from individual and systemic factors, structural challenges were also identified as significant barriers to accessing EMS services in stroke patients. Weak coverage of communication networks, delays in response times from dispatch centers, and failure to send ambulances to remote areas were problems that were clearly reflected in participants' responses. Specifically, issues such as lack of access to mobile networks in rural areas and nondeployment of ambulances to remote rural areas were highlighted as discouraging experiences that prevented patients from using EMS services. These findings align with the study by Weeks *et al.*,^[24] which emphasized that limitations in communication and transportation infrastructure in underserved areas play a determining role in creating inequalities in access to EMS services.

In addition to individual and systemic determinants, this study underscores the influence of cultural beliefs in contributing to delays in EMS utilization among stroke patients. Prominent cultural barriers identified included social concealment, underestimation of symptom urgency, and fatalistic attitudes. Participants frequently refrained from contacting EMS during social occasions to avoid drawing attention or causing inconvenience. These observations are consistent with findings by Zhu *et al.*,^[25] who emphasized the impact of prevailing social norms on EMS engagement. These insights highlight the necessity for culturally tailored interventions to enhance timely EMS access.

Furthermore, many patients in our study only contacted EMS when they perceived symptoms as severe or life-threatening. This decision-making pattern, which can be termed as "high threshold for perceived urgency," was previously identified by Bakke *et al.*^[26] as a key barrier to early recognition of stroke symptoms and seeking timely medical assistance. This finding underscores the crucial role of individual perception of symptom severity in determining the timing of medical intervention.

On the other hand, fatalism, particularly prevalent among elderly participants, also emerged as a critical

impediment to seeking timely help. Many participants considered death an inevitable and predetermined event and viewed therapeutic interventions as interfering with divine will. This attitude, which aligns with the findings of Bakke *et al.*^[26] in Malaysia, is more pronounced in cultures with deep religious beliefs. Interestingly, unlike findings from some Western studies, where fear of death increased the likelihood of immediate EMS contact,^[27] in our study, this fear led to a form of passive acceptance instead. These differences highlight the importance of cultural context in analyzing health-related behaviors.

These findings underscore that raising awareness of stroke symptoms alone is insufficient; instead, effective strategies must adopt a culturally informed, community-based approach to enhance timely EMS utilization.

Limitations and recommendations

One limitation of this study was participant selection limited to Lorestan and Tehran provinces. Since cultural and social factors influence decision-making in acute stroke prehospital phases, future research should include diverse provinces across Iran. Differences in rural versus urban mindsets, traditional beliefs, and EMS access may impact EMS use decisions. A broader sample would improve generalizability. Future studies could also explore public health education, prior EMS experiences, and healthcare provider influence on EMS utilization decisions.

Conclusion

A significant gap in knowledge and awareness among patients and their families regarding acute stroke and appropriate emergency responses leads to delayed hospital presentation. Consequently, patients with acute stroke are frequently transported by private vehicle without receiving timely and appropriate emergency care, potentially resulting in serious harm. To address this, it is crucial to implement educational campaigns, community workshops, and media outreach that emphasize recognizing stroke symptoms, understanding the limited therapeutic window, appreciating the risk of irreversible complications, and being aware of new stroke treatments.

Given the vital role of EMS in the prehospital management of stroke, informing the public about the benefits of EMS and enhancing access through expanding service centers, particularly in underserved areas, will increase public satisfaction and encourage greater utilization of EMS services. Improvements such as staff training, better response times, and updated equipment are essential for ensuring timely and effective care.

Acknowledgment

This article is derived from a doctoral dissertation in Nursing at the School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences. The authors extend their sincere gratitude to all stroke patients and their families for their invaluable participation and support throughout the study. Minimal use (<8%) of ChatGPT (OpenAI) was limited to minor language refinement. All intellectual, conceptual, and scientific content was independently developed and authored by the research team.

Author's contributions

BM and ADK conceptualized and designed the study. BM and HRK performed validation, analysis, and investigation. MZ managed resources, data curation, and visualization. BM drafted the manuscript, and ADK, HRK, and MZ reviewed and edited it. ADK supervised and administered the project.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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