A Novel Score: Assessment of Severity of Acute Gastroenteritis in Adults

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ABSTRCT

Gastroenteritis is a common condition affecting adults worldwide. India, being a developing nation, patients's investigations and ongoing follow-ups are greatly influenced by economic factors. An accurate assessment of the severity of gastroenteritis is crucial for appropriate management and treatment decisions. By considering various clinical and laboratory parameters, including symptoms, physical examination findings, and laboratory tests, to develop a standardized framework for evaluation. This article mainly focuses on the assessment of the severity of acute gastroenteritis using innovative summative scoring, specifically designed for adults, which is a cost-effective, readily accessible tool using WHO and other standard guidelines.

KEYWORD: Acute gastroenteritis score, AGE adult Score, Novel AGE Score,

INTRODUCTION

Acute Gastroenteritis is one of the most prevalent infectious diseases and a significant public health concern across the nation among adults. Acute Gastroenteritis manifests as profuse diarrhea along with fever, nausea, and vomiting, with or without abdominal discomfort. Diarrhea is referred to as passing three or more loose or watery stools in 24 hours, resulting in an excessive loss of fluid and electrolytes through the stool.[1]

Diarrhea is the eighth most prevalent cause of mortality worldwide, and in developing countries, it ranks fifth. AGE causes 1.3 million deaths globally every year. The Centers for Disease Control and Prevention (CDC) estimate that there are more than 350 million instances of acute gastroenteritis in the United States yearly, of which 48 million are brought on by food-borne bacteria. In terms of urban India, Mizoram (34%) had the highest incidence of diarrhea among older adults, followed by Bihar (32.1%), Haryana (25.9%), Himachal Pradesh (25.7%), and Madhya Pradesh (24.5%).[2]

Acute gastroenteritis is more common in infants and early childhood, over the last fifty years, there has been significant progress in decreasing the number of early childhood deaths; nevertheless, gastroenteritis morbidity and mortality in older children and adults still remain high, with 5.7 billion cases and 1.1 million deaths nationwide in 2019.[3][4] This is a considerable increase over earlier estimates of the burden of disease.

Diarrheal epidemics are becoming more common in many countries due to mass migration, conflict, and climate change. WHO predicts a significant increase in cholera outbreaks in 2022, with epidemics reported

in 30 countries and a nearly 2% case fatality ratio, the highest in a decade.[5] As per Dr Rommel Tickoo, about 20% of adult cases of gastroenteritis are linked to new COVID strain symptoms.[6]

Accurately assessing and managing dehydration from acute diarrhea is crucial for preventing morbidity and mortality due to its varied severity. Routine clinical laboratory testing of bacterial pathogens requires the use of different culture media. These media selectively grow certain bacteria but may fail to detect other bacteria, particularly when antibiotics are being used. Culture procedures are labor-intensive and time-consuming, with results frequently not available for 48 to 72 hours. [7][8] Despite the importance of accurate and rapid assessment of the severity of symptoms and dehydration status in patients with acute gastroenteritis, currently, no validated tools exist to assess the severity of gastroenteritis, especially in adults.

NEED FOR STUDY

We studied a review of the scientific literatures that addressed the assessment of the severity of gastroenteritis in the adult population. We searched the Google Scholar database, PubMed, and Cochrane Libraries for all published and privately published trials in English using various combinations of the following search terms: "acute gastroenteritis", "validation", "gastroenteritis", "diarrhea", "vomiting", "dehydration assessment", "adults" OR "elderly", "AGE Assessment Tool," "clinical diagnostic models". The literature search revealed a single study involving the Central Council of Research in Homeopathy developed a gastroenteritis symptom score (GSS) for adults as an indicator of the severity of the illness, but it is challenging to assess, complex to design, and difficult to understand. All the guidelines (IMCI, WHO, etc.) and previous existing assessment tools for children under the age of five have never been validated in older children or adults.

A novel and innovative sore system for acute gastroenteritis in adults would be a game changer. This score could aid medical professionals in assessing the severity of the condition more accurately and guiding appropriate treatment decisions. It also prevents under- and over-treatment, saves time and costs of care, and leads to better outcomes.

ASSESSMENT CRITERIA

Episodes of Diarrhoea

The mean frequency of stools (stools/day) was one of the severity outcomes. The rates of mild (1–5 stools/day), moderate(6–9 stools/day), and severe(≥ 10 stools/day) stool frequency were abstracted.[9]

Character of stool

Watery diarrhoea is generally a milder and non-inflammatory symptom of gastroenteritis. It is more likely to promote intestinal secretion without significant disruption in the intestinal mucousa. When it comes to mucus diarrhoea or bloody diarrhoea, it is going to be a more severe disease caused by generally invasive and toxin-producing bacteria, in which more likely mucosal intergrity is disrupted, which leads to tissue invasion and disruption. In this novel score, watery diarrhoea falls into the mild category, mucus under the moderate category, and when blood is present, it falls into the severe category.

Episodes of Vomiting / 24hr

This score uses the previously validated score (the Vesikari Clinical Scoring System) to determine the frequency of vomiting per day. wherein 1-2 vomiting episodes are classified as mild, 2-4 episodes per day as moderate, and more than 5 episodes per day as severe, as increased frequency results in increased fluid loss and consequent severe dehydration.[10]

Abdominal pain

The most prevalent symptom of gastroenteritis, occurring in most cases, is abdominal pain. When there is no abdominal pain, it marks 0; when there is, it marks 1.

Fever

Using recent standard criteria, fever is classified into three categories based on severity: low-grade fever (37.3–38°C), moderate-grade fever (38.1–39°C), and high-grade fever (39.1–41°C).[11]

Dehydration

For the dehydration assessment, we used a 14-point simplified Nirudak score, which is designed especially for adults. It is easy to comprehend and evaluate by merely subjectively and clinically examining the patient under five categories (skin pinch, eye level, respiration depth, urine output, and radial pulse). It is more reliable than the standards established by the WHO for adults.

In the Novel AGE Score, 0 indicates no dehydration, 1-4 scoring represents mild dehydration, 4-6 indicates moderate dehydration, and > 6 indicates severe dehydration.[4] Tab.1

	Points
Skin pinch	
Rapid	0
Slow	2
Very slow	4
Eye level	
Normal	0
Sunken	2
Respiration depth	
Normal	0
Deep	2
Urine output	
Normal	0
Decreased or dark	1
Minimal or none	2
Radial pulse	
Strong	0
Decreased	1
Absent	4

Suggested scoring: <4=no dehydration, 4-6=some dehydration, >6=severe dehydration.

Table 1: 14-point simplified NIRUDAK score

Treatment

The POAC (Primary Options for Acute Care) guideline and the World Health Organisation's standard criteria are the primary sources of treatment guidelines. For mild cases, oral rehydration alone is sufficient; for moderate cases, oral rehydration combined with 60 minutes of observation is necessary; and for severe cases, hospitalisation with intravenous fluid therapy is advised.[12]

ASSESSMENT OUTCOMES

For this new innovation, the lowest possible score is zero, and the highest possible score is 19. A score of less than or equal to 7 is considered mild; a score between 8 and 13 is considered moderate; and a score between 14 to 19 as severe.

NEW AGE SCORE (tab.2)
Minimum score-0 maximum score - 19
MILD CATEGORY –up to 7 score
MODERATE CATEGORY –   8 - 13 score
SEVERE CATEGORY –   14 - 19 score

S. NO	SYMPTOMS	CATEGORY (As per severity)			
		0	**1**	**2**	**3**
1	**Episodes Of Diarrhoea / 24 hr**	1-2 stool /day (normal)	>2 - 4 stool / 24hr	5- 9 stool/ day	>10 stool/day
2	**Character Of Stool**	Normal	Watery diarrhoea	Mucous diarrhoea	Bloody diarrhoea
3	**Episodes Of Vomiting / 24hr**	Absent	1-2 Episode /day	2-4 Episode /day	>5 episodes/day
4	**Abdominal Pain**	Absent	Present	_	_
5	**Fever**	Absent	Low-grade fever (37.3- 38° C)	Moderate grade fever(38.1- 39°C)	High-Grade fever (39.1- 41°C)
6	**Dehydration**	Absent	Mild dehydration	Moderate dehydration	Severe Dehydration
7	**Treatment**	No	Oral rehydration (No observation required)	Oral rehydration + 60 min Observation in clinic/hospital)	IV Fluid + Hospitalization

DISCUSSION

Using data from the global burden of disease database, incidence, causes, risk factors, and burden of diarrhoea in India over the previous 30 years, from 1990 to 2019. In 2019, the total number of deaths of all ages was 632,344; the mortality rate was 45 per 100,000 people. The age group of 70 years and older accounted for the majority of deaths, with 50–69 years old being in second. The study's findings also demonstrate a notable decrease in childhood diarrhoea over time. Campylobacter has been identified as the most common disease-causing pathogen in all age groups among all diarrhoea-related deaths in 2019.According to research, factors like contaminated water, inadequate sanitation, and hand washing contribute to diarrhoea-specific deaths for people of all ages.[13]

Acute gastroenteritis in adults is a significant health concern, impacting public health and individual well-being, despite not receiving as much attention as other health issues. Gastroenteritis might be neglected because:

- Perception as a Common Illness
- Prioritisation of more serious conditions such as cancer, heart disease, and infectious diseases like HIV/AIDS has higher mortality rates and long-term impacts.
- Limited Awareness of Causes and Prevention
- Underreporting and misdiagnosis of illnesses result in inaccurate data on prevalence and impact, a lack of awareness of the true burden, and a perceived lack of assessment tools, contributing to their neglect.
- Gastroenteritis, often linked to symptoms like vomiting and diarrhoea, can be stigmatised and embarrassing, potentially deterring individuals from seeking medical care or sharing their experiences, thereby reducing awareness and understanding of the condition.

    By addressing these gaps, we can work towards reducing the burden of gastroenteritis in adults and ensuring that appropriate attention and resources are allocated to this important public health issue.

This study proposes a clinical diagnostic tool that was empirically developed for the management and assessment of the severity of acute gastroenteritis, specifically in the adult population, which is still neglected. Numerous validated tools, such as the Vesikari severity scoring scale, Clarke Severity Scoring Scale, Modified Vesikari Score, Dhaka Scoring, etc., are available to evaluate gastroenteritis in children; however, none of these tools have ever undergone validation on adults. Clearly, Children and adults often have different physiological responses to illnesses, including gastroenteritis. For example, dehydration can occur more rapidly in children due to their smaller fluid reserves and higher metabolic rates. Both have variations in symptom presentation and communication, Paediatric assessment tools often rely on observable signs such as changes in behaviour, decreased urine output, and irritability, which may not be as evident or reliable in adults who can articulate their symptoms more clearly. and Gastrointestinal infections in children can be caused by different pathogens and may lead to different complications compared to adults. Paediatric assessment tools may include specific questions or assessments tailored to common paediatric pathogens or complications, such as rotavirus or intussusception, which are not relevant to adult patients. Other than this, they have different treatment approaches and guidelines. and Paediatric assessment tools take into account age-specific considerations such as developmental milestones, growth parameters, and age-related variations in clinical presentation.All of them might affect the level of accuracy of any clinical diagnostic models constructed for use with young children.

Overall, developing a dedicated assessment tool for gastroenteritis in adults is essential for addressing the current neglect of this condition in comparison to children. By providing healthcare providers with a standardised framework for evaluating and managing gastroenteritis in adults, such a tool has the potential to early detection and diagnosis, which can lead to prompt initiation of appropriate treatment, reduce the duration and severity of symptoms, prevent complications, and help in differentiation from other gastrointestinal conditions like IBS, IBD, food intolerance, etc. It also helps to develop personalised treatment plans for adults with gastroenteritis, which include recommendations for fluid and electrolyte replacement, dietary modifications, pharmacological interventions, and monitoring diseases and progression.

The development of this assessment tool for gastroenteritis in adults can also facilitate research efforts aimed at better understanding the aetiology, epidemiology, and outcomes of the condition in this population. This can contribute to the development of evidence-based guidelines and interventions for prevention and management, and improving the diagnosis and management of gastroenteritis in adults can have broader public health implications, including reducing the spread of infectious agents, minimising

healthcare utilisation and associated costs, and improving the overall quality of life for affected individuals.

Without empirical research to support their applicability to older children and adults, the current WHO IMAI guidelines—the gold standard for managing diarrhoea in developing nations—are based on previously developed WHO IMCI guidelines. Furthermore, despite an abundance of recent research suggesting that the dehydration assessment algorithms in the diarrhoea care sections of both the IMCI and IMAI guidelines are not the most reliable or accurate means of assessing dehydration status among patients of any age group, they have not been updated in over 20 years.[14][15][16]

These innovative tool could potentially enhance care for acute gastroenteritis in adult patients in low-resource environments, as well as during other diarrheal disease and cholera outbreaks where prompt and accurate patient triage and resuscitation are crucial. By extending the use of these gastroenteritis assessment tools beyond clinical settings, these tools can contribute to various aspects of public health, research, occupational health, travel medicine, community education, emergency preparedness, telemedicine, and revolutionise the pharmapuetical industries for several purposes, such as clinical trial and drug development, preclinical research and screening, quality control and assurance, post-market surveillance and pharmacovigilance, etc.

CONCLUSION

This innovative scoring system holds great potential, especially for the adult population. The score provides a standardized and comprehensive approach. Thus, in the future, we can use this scale to acquire a better understanding prior to undergoing stool culture, stool electron microscopy, PCR to determine the viral genome, etc. to clinically evaluate the severity of gastroenteritis, enabling healthcare professionals to make informed treatment decisions. The introduction of this tool fills a significant gap in the assessment criteria for adult patients, ultimately enhancing the overall care provided to individuals with gastroenteritis. However, further validation and research are required to establish the effectiveness and reliability of the AGE score in various clinical settings and populations.

REFERENCES

1. Nayak C, Singh V, Singh K, Singh H, Chakraborty P, Kaushik S, et al. A prospective multicentre observational study to evaluate the role of homeopathic therapy with a group of predefined homeopathic medicines in the management of gastroenteritis. Ind J Res Homeopat [Internet]. 2011;5(1):28–35.
2. Graves NS. Acute gastroenteritis. Prim Care [Internet]. 2013;40(3):727–41.
3. Vos T, Lim SS, Abbafati C. Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study. Lancet. 2019;396:1204–22.
4. Levine AC, Gainey M, Qu K, Nasrin S, Sharif MB-E, Noor SS, et al. A comparison of the NIRUDAK models and WHO algorithm for dehydration assessment in older children and adults with acute diarrhea: a prospective, observational study. Lancet Glob Health [Internet]. 2023;11(11):e1725–33.
5. United Nations. UN News Global Perspective Human Stories. "2022 year in health: new Ebola and cholera outbreaks, mpox emergency, COVID-19 'not over'. https://news.un.org/en/story/2022/12/1131967 (accessed Jan 13, 2023. UN NEWS. 13 Jan,2023;
6. Don't ignore gastrointestinal disord .. Read more at: http://timesofindia.indiatimes.com/articleshow/99910610.cms?utm_source=contentofinterest&utm_

medium=text&utm_campaign=cppst. the times of India; 2023.

7. Riddle MS, DuPont HL, Connor BA. ACG clinical guideline: Diagnosis, treatment, and prevention of acute diarrheal infections in adults. Am J Gastroenterol [Internet]. 2016;111(5):602–22.

8. Fischer-Walker CL, Black RE. Diarrhoea morbidity and mortality in older children, adolescents, and adults. Epidemiol Infect. 2010;138(9):1215–26.

9. Lamberti LM, Fischer Walker CL, Black RE. Systematic review of diarrhea duration and severity in children and adults in low- and middle-income countries. BMC Public Health [Internet]. 2012 [cited 2024 Mar 21];12(1):1–11.

10. Ruuska T, Vesikari T. Rotavirus disease in Finnish children: Use of numerical scores for clinical severity of diarrhoeal episodes. Scand J Infect Dis [Internet]. 1990;22(3):259–67.

11. Balli S, Shumway KR, Sharan S. Physiology, Fever. [Updated 2023 Sep 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan

12. Acute Adult Dehydration. POAC CLINICAL GUIDELINE [Internet]. Poac.co.nz. [cited 2024 Apr 26].

13. Behera DK, Mishra S. The burden of diarrhea, etiologies, and risk factors in India from 1990 to 2019: evidence from the global burden of disease study. BMC Public Health [homepage on the Internet] 2022;22

14. WHO. IMAI district clinician manual: hospital care for adolescents and adults.http://apps.who.int/iris/bitstream/10665/77751/3/9789241548290_Vol2_eng.pdf (accessed Jan 13, 2023)

15. Levine AC, Glavis-Bloom J, Modi P, et al. External validation of the DHAKA score and comparison with the current IMCI algorithm for the assessment of dehydration in children with diarrhoea: a prospective cohort study. Lancet Glob Health 2016; 4: e744–51.

16. Falszewska A, Szajewska H, Dziechciarz P. Diagnostic accuracy of three clinical dehydration scales: a systematic review. Arch Dis Child 2018; 103: 383–88.