ORIGINAL ARTICLE

Association of Physicians of India Expert Consensus Recommendations on the Role of Oral Fluid Electrolytes in Acute Nondiarrheal Illnesses: A Multidisciplinary Delphi Consensus Recommendation

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Abstract

Background: Acute nondiarrheal illnesses (NDIs) frequently result in dehydration and electrolyte imbalance. Despite the substantial burden of NDIs in India, guidance on dehydration assessment and oral fluid and electrolyte management remains limited. This expert consensus aimed to develop evidence-based recommendations for managing dehydration associated with acute NDIs in Indian healthcare settings.

Materials and methods: A multidisciplinary expert panel was convened under the Association of Physicians of India to develop the recommendations using the modified Delphi method. A targeted literature review (January 2005–January 2026) was performed using PubMed and Google Scholar to formulate clinical statements/questions and was reviewed by the Association of Physicians of India. 10 experts voted on clinical questions across four domains: dehydration in NDIs and associated challenges; diagnosis and assessment; oral fluid and electrolyte management in outpatient settings; and oral fluid and electrolyte management in inpatient settings. Isotonic ready-to-drink electrolyte formulations were also evaluated. 42 statements were evaluated through anonymous voting on a 5-point Likert scale, with consensus defined as ≥70% agreement.

Results: Consensus was achieved for all statements (70–100%). Experts agreed that dehydration frequently accompanies NDIs but remains under-recognized. A multimodal assessment approach incorporating clinical signs, patient-reported symptoms, intake–output history and supporting investigations was recommended. Early oral fluid and electrolyte replacement was endorsed as first-line management for mild-to-moderate dehydration. Apart from the conventional oral rehydration solution, isotonic electrolyte solutions and ready-to-drink formulations were convenient, rapid, and effective in correcting mild-to-moderate dehydration. Structured hydration protocols, timely intravenous (IV)-to-oral transition, and individualized strategies for vulnerable populations, including children, older adults, and patients with diabetes, were recommended.

Conclusion: Systematic hydration assessment and early oral fluid and electrolyte therapy are pivotal toward effective management of dehydration in acute NDIs and should be integrated into routine clinical practice across outpatient and inpatient care settings.

Keywords: Dehydration, Electrolyte, Fluid therapy, Oral rehydration solution.

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Introduction

Nondiarrheal illnesses (NDIs) constitute a substantial disease burden in India. They comprise a broad spectrum of acute illnesses, including fever; tropical infections (such as dengue, malaria, and typhoid); respiratory and urinary tract infections; heat-related illnesses; flu; and other viral infections, in which fluid loss or inadequate fluid intake may lead to dehydration despite the absence of diarrhea.[1,2] In the Indian context, the climatic extremes and infectious disease burdens contribute substantially to incidence and morbidity related to NDIs, especially among vulnerable populations such as children, older adults, and those with comorbidities such as diabetes.[3,4]

According to a retrospective, real-world study based on the electronic medical record from January 2017 to March 2023, the incidence of NDIs in India was reported to be approximately 18.5 million cases (14.4 million, adults; 4.1 million, older adults).[4] An essential difference in nondiarrheal dehydration is that it results from factors such as reduced oral intake, fever-related insensible losses, i.e., sweating, or vomiting.[3] There is loss of total body water mainly with proportionate electrolyte imbalance, in contrast to diarrhea, where there is more marked loss of electrolytes including bicarbonates, which may even lead to acidosis.[5,6] Due to its subtle signs and variability in presentation, nondiarrheal dehydration remains an under-recognized clinical problem which should be addressed for faster recovery. There is limited epidemiological focus on NDI-related dehydration outside diarrheal disease paradigms, as evident from the low (4917/18489088, 0.026%) documented prevalence, highlighting gaps in proactive

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screening and documentation in routine practice.[4]

While oral fluid and electrolyte supplementation is a cornerstone in diarrheal disease management with well-established guidelines, there is a relative paucity of standardized, evidence-based recommendations addressing oral rehydration and electrolyte replacement in NDIs, particularly in India's healthcare settings.[3,7,8] This lack of comprehensive guidance contributes to inconsistent clinical practices and underutilization of appropriately formulated electrolyte drinks for management of NDIs. Oral ready-to-serve drinks are commonly referred to as hydration drinks or electrolyte drinks and are formulated to replenish body fluids lost during dehydration. These hydration or electrolyte drinks consist of hydration salts such as sodium citrate and potassium chloride, reflecting their essential role in restoring the body's fluid and electrolyte balance and facilitating hydration during states of dehydration. To address these challenges, a modified Delphi process was conducted with a multidisciplinary panel of experts to develop consensus-based recommendations to bridge critical knowledge gaps in oral fluid and electrolyte management for NDIs within the Indian clinical context and facilitate better clinical decision-making. These recommendations are intended to inform and guide clinical practice across diverse healthcare settings in India.

Materials and Methods

Consensus Development Process

A steering committee (SC) was set up in January 2026 with members from the Association of Physicians of India (API) to discuss the challenges associated with dehydration in NDIs in India and develop consensus recommendations on diagnosis or assessment and effective management of dehydration using oral fluids and electrolytes in Indian healthcare settings. The multidisciplinary panel comprised 10 experts, including consulting physicians and diabetologists (n = 5), a gastrosurgeon (n = 1), a nutritionist (n = 1), an infectious disease specialist (n = 1), and pediatricians (n = 2) from public and private institutions across India, all of whom provided informed consent. The members of the panel were selected based on their extensive experience in the management of NDIs, their involvement in recent clinical trials, and their contributions to the research community. The expert panel of the Association of Physicians of India convened to establish objectives, formulate key clinical questions using the PICO (P: problem, I: intervention, C: comparator, O: outcome) framework, and refine them through a simplified Delphi process. Four core areas were identified for the consensus meeting: (1) dehydration in NDIs and associated challenges, (2) diagnosis and assessment of dehydration, (3) oral fluid and electrolyte recommendations in the outpatient department (OPD) setting, and (4) oral fluid and electrolyte recommendations in the inpatient department (IPD) setting. A detailed literature review was carried out to identify the gaps in the current diagnosis and management of NDIs and dehydration in India. Data from PubMed and Google Scholar were used to identify relevant articles between January 2005 and January 2026 using keywords such as dehydration, nondiarrheal illness, oral rehydration therapy, clinical assessment, clinical signs, hospitalization, and management (Supplementary Table 1). Furthermore, studies not published in English or falling outside the January 2005 to January 2026 time frame or that did not focus on the diagnosis or management of dehydration related to NDIs were excluded from the review. The articles were evaluated based on the consensus guidelines' objective to address critical knowledge gaps regarding oral fluid and electrolyte management in NDIs. 42 clinically relevant gap statements, distributed across these four domains, were drafted and reviewed by the Association of Physicians of India before being circulated to all experts along with supporting evidence. The evidence was graded based on the Oxford Center for Evidence-based Medicine levels of evidence (Supplementary Table 1).[9,10]

Consensus Voting and Data Collection

All 10 experts participated in the first round of voting via a modified Delphi process, using anonymous electronic voting through SurveyMonkey. Responses were captured on a 5-point Likert scale (strongly agree, agree, neutral, disagree, strongly disagree), with reasons collected for any nonagreeing responses. Consensus was predefined as ≥70% agreement.[11,12] Voting for all statements was mandatory. The experts conducted clinical discussions in a virtual meeting centered on creating recommendations based on published literature and their clinical experiences on the diagnosis and management of dehydration in outpatient and inpatient settings with a focus on NDIs. In cases where there were insufficient data, recommendations were developed based on the opinions of the experts (Supplementary Table 1). An overview of the entire consensus process is presented in Figure 1. This study is not registered on any online platform.

Ethics Statement

The present study reports a Delphi consensus recommendation developed through iterative consensus methodology involving multidisciplinary experts. As the study did not involve patient recruitment, clinical intervention, or collection of identifiable human participant data, institutional ethics committee approval and an ethics approval number were not required.

Results

High levels of consensus (≥70% agreement) were achieved for all statements.

Consensus Recommendations

Dehydration in Nondiarrheal Illnesses and Challenges

Numerous international and national guidelines, along with observational and real-world studies, have established the clinical significance of dehydration in NDIs. The World Health Organization (WHO) and the National

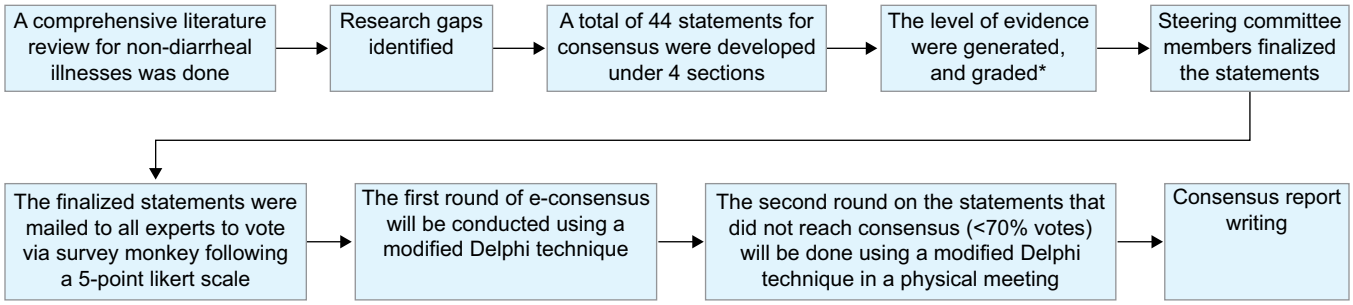

Fig. 1: Overview of consensus process [*Graded as per Oxford grading system]

Table 1: Consensus recommendations on dehydration in nondiarrheal illnesses and challenges

Statement	*Level of evidence*	*Consensus*
1. Acute nondiarrheal illnesses, including dengue, malaria, typhoid, chikungunya, heat-related illnesses (heat cramps, heat exhaustion, heat stress, and exertional heat illness), urinary tract infections, respiratory tract infections, flu and other viral illnesses, can cause overt or subclinical dehydration through symptoms such as fever, nausea, and vomiting, leading to fluid and electrolyte imbalances.	High	100%
2. Dehydration is common but often overlooked in dengue, malaria, typhoid, chikungunya, and other acute nondiarrheal illnesses. Clinicians should proactively assess and manage oral fluid and electrolyte requirements in all such patients.	High	90%
3. Proper management of dehydration is recommended for effective recovery in nondiarrheal illnesses.	High	100%
4. Elderly populations aged above 60 years are more prone to dehydration and should be screened for low-intake dehydration at the first opportunity.	High	100%
5. Patients with diabetes have an increased susceptibility to dehydration and require heightened clinical vigilance for fluid and electrolyte assessment and management.	High	100%

Center for Vector-Borne Diseases Control (NCVBD) emphasize careful fluid monitoring in arboviral diseases such as dengue and chikungunya, while observational studies have documented significant electrolyte imbalances in malaria and typhoid.[13–17] The Wilderness Medical Society (2024) also highlights fluid and electrolyte depletion in heat-related illnesses.[18] Real-world database analyses in adults and pediatric populations demonstrated that dehydration frequently accompanies NDIs but often remains underrecognized in routine practice.[1,2,4] Evidence indicates that dehydration in older adults is associated with adverse clinical outcomes, prolonged hospitalization, and increased healthcare burden.[19,20] The experts agreed that acute NDIs, including vector-borne, viral, respiratory, urinary, and heat-related conditions, frequently cause significant fluid and electrolyte imbalances through fever, reduced intake, and vomiting, yet dehydration in these settings remains considerably underrecognized compared to diarrheal disease.

Recommendations from the Association of Physicians of India advocate structured oral fluid and electrolyte strategies during hospitalization and transition care.[21] Interventional data from Indian outpatient settings further suggest that oral rehydration and electrolyte formulations, when used alongside standard care, facilitate restoration of fluid, electrolyte, and energy balance in febrile illnesses.[22] The European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines also advocate routine hydration assessment in geriatric care.[23] Age-related physiological changes, comorbidities, and impaired thirst response increase susceptibility to dehydration and warrant early screening. Additionally, patients with diabetes represent a high-risk group due to osmotic diuresis and altered fluid balance; the Indian Council of Medical Research (ICMR) guidelines elucidate the importance of maintaining adequate hydration, particularly during intercurrent illness.[24–26] Consensus was reached on the need for routine hydration assessment and timely fluid replacement, particularly in vulnerable populations such as older adults and individuals with diabetes, and thus, identified as high-risk groups requiring early screening and closer monitoring (Table 1).

Diagnosis and Assessment of Dehydration

Assessment of dehydration should be based on a constellation of symptoms and clinical findings rather than any single indicator, as isolated signs such as dry mucous membranes, reduced skin turgor, sunken eyes, oliguria, tachycardia, and urine color changes have limited sensitivity and specificity.[27,28] Multiple studies have demonstrated poor concordance between isolated clinical markers and objective hydration measures, with composite clinical scales outperforming individual signs in identifying dehydration severity.[29–37] A multidisciplinary consensus statement further highlighted variability in definitions and diagnostic methods, advocating comprehensive clinical evaluation.[38] The experts therefore agreed that assessment must incorporate multiple physical signs, patient-reported symptoms, and contextual risk factors in the absence of a universally reliable point-of-care test. The Hydration and Outcome in Older Patients (HOOP) prospective cohort study reported that poor hydration status at hospital admission in older adults was associated with worse clinical outcomes and increased mortality.[20] Similarly, real-world evidence from adults with NDIs indicated that dehydration is prevalent and clinically consequential, yet frequently under-assessed.[1,4] Hence, the experts agreed that hydration assessment should be a routine clinical standard across healthcare settings, given its demonstrated impact on outcomes. For pediatric populations, clinicians should assess multiple clinical indicators of dehydration, including weight loss, thirst, capillary refill time >2 seconds, decreased skin turgor, abnormal general appearance, reduced tears, dry mucous membranes, sunken eyes, altered respiratory pattern, pulse quality, heart rate, and urine output.[29,30,38]

Diagnosis of dehydration is particularly challenging in individuals aged >60 years due to atypical presentation, impaired thirst perception, and comorbidities. The ESPEN guideline emphasized individualized assessment based on intake, losses, comorbidities, and functional status, particularly in geriatric populations.[23,27,39] Urine color monitoring is a practical hydration tracking tool, and common symptoms of nondiarrheal dehydration, including generalized weakness, dark urine, reduced intake, and oliguria, warrant prompt clinical evaluation.[21,23,29,32,38] The experts recommend screening all adults over 60 years at the earliest clinical opportunity and emphasize simple home-based monitoring strategies. In heat exhaustion, particularly among athletes, sportspeople, and children in hot climates, plain water alone is insufficient; balanced electrolyte fluids are necessary to restore both fluid and electrolyte deficits. The experts reached consensus on a structured, multimodal, proactive approach to dehydration diagnosis across all age groups, with particular vigilance in older adults and other high-risk populations (Table 2).

Oral Fluid and Electrolyte Recommendations in OPD Setup

Dehydration is a modifiable factor significantly influencing clinical recovery, with inadequate hydration worsening prognosis and increasing morbidity, particularly in vulnerable populations.[40–42] Evidence also links hydration status to cytokine responses and gut microbiota–mediated immune regulation, highlighting the broader physiological importance of fluid balance.[43,44]

Clinical practice guidelines support the early initiation of balanced oral electrolyte solutions (50–100 mL/kg) alongside primary therapy, with continuation throughout the course of illness until complete recovery.[3,21,45,46] Fluid prescriptions in children should account for higher maintenance requirements and greater fluid losses, while elderly patients require proactive strategies given their heightened susceptibility to dehydration-

Table 2: Consensus recommendations on diagnosis or assessment of dehydration

Statement	*Level of evidence*	*Consensus*
6. Assessment of dehydration in adults and the elderly should incorporate multiple physical signs, including urine color, oliguria, mucous membrane dryness, sunken eyes, skin turgor, and tachycardia, as no single sign is reliable in isolation	High	100%
7. In the absence of reliable individual clinical signs or readily available point-of-care diagnostic tools for dehydration, clinicians must rely on systematic evaluation of multiple clinical parameters	High	100%
8. Hydration assessment should be a routine clinical standard given its significant impact on patient outcomes and mortality across all populations	Moderate	100%
9. Clinicians should assess multiple dehydration signs in children, such as weight loss, thirst, capillary refill >2 seconds, decreased skin turgor, and abnormal appearance, supplemented by assessment of tears, mucous membranes, eyes, respiratory pattern, pulse quality, heart rate, and urine output	Moderate	100%
10. The need for rehydration is recommended to be determined by the constellation of presenting symptoms rather than the primary diagnosis alone	High	100%
11. Clinicians should utilize a multimodal assessment approach when evaluating dehydration, incorporating clinical examination findings, patient-reported symptoms, intake–output history, and supporting laboratory investigations, as no single biological parameter can definitively diagnose dehydration in isolation	Moderate	100%
12. Dehydration diagnosis is challenging in elderly patients. Screening all patients over 60 years for low-intake dehydration at the earliest clinical opportunity is recommended	High	100%
13. Patients should monitor urine color at home as a simple hydration tracking tool, as the common symptoms of nondiarrheal dehydration in adults include generalized weakness, reduced fluid intake, dark urine, and oliguria	High	100%

related complications.[35,47,48] Oral electrolyte supplementation improves perceived hydration, restores fluid–electrolyte balance more rapidly, and facilitates faster return to baseline activity.[2,21,22,49] Electrolytes such as potassium, calcium, and magnesium play pivotal roles in regulating metabolic pathways and cellular energy homeostasis, making their replacement beneficial during acute illness.[50,51] Additionally, supplementation with electrolytes and nutrients such as taurine may help support neuromuscular function and reduce the risk of muscle cramps.[52–54]

Isotonic electrolyte drinks are recommended for rehydration in mild-to-moderate heat-related illness when oral intake is feasible. Their osmolality approximates plasma (≈280–300 mOsm/kg), enabling rapid absorption and efficient restoration of circulating and extracellular fluid.[18,55] These formulations provide balanced electrolytes, particularly sodium and potassium, with a modest carbohydrate content to enhance intestinal uptake via sodium-glucose cotransport (SGLT1). Compared with plain water (hypotonic) or hypertonic drinks, isotonic solutions promote faster gastric emptying, maintain plasma sodium, and help prevent dilutional hyponatremia while supporting cellular energy metabolism and neuromuscular function.[21,56–61] Although taste and palatability influence patient acceptance and adherence to oral rehydration solution (ORS), clinical guidance prioritizes scientifically validated formulations.[62–65]

Ready-to-drink (RTD) solutions may be considered only as adjuvants to support recovery in NDIs. RTD isotonic formulations offer standardized electrolyte concentrations, sterile packaging, improved palatability, and enhanced adherence.[2,3,21,65] They may be recommended to ensure reliable hydration compared with homemade alternatives when feasible. Electrolytes and nutrients such as potassium, calcium, magnesium, and taurine may support electrolyte balance and reduce the risk of muscle cramps. Low-sugar RTD formulations with optimal sodium-glucose composition may be effective in promoting rehydration in acute NDIs in patients with diabetes.[53,59,66] Furthermore, RTD electrolyte solutions in children with NDIs were reported to restore fluid balance and aid recovery.[2,3,21,67] The experts agreed that hydration should be assessed early in all patients presenting with acute illness in the outpatient setting, recognizing it as an important determinant of immune function. Oral fluid and electrolyte replenishment (rehydration) was confirmed as the first-line intervention for mild-to-moderate dehydration across age groups in the OPD setting, with isotonic electrolyte drinks preferred over plain water. Scientifically formulated RTD electrolyte solutions were recommended [wherein "scientifically formulated" refers to compositions that are modeled on or equivalent to standard oral rehydration formulations such as those recommended by WHO and the United Nations Children's Fund (UNICEF)] while caffeinated, fizzy energy drinks and high-taurine beverages should be avoided in acute NDIs. Thus, fluid and electrolyte replacement, including potassium, calcium, magnesium, and taurine to support cellular metabolism and neuromuscular function, as included in isotonic RTD formulations, may be preferred for their standardized composition and adherence benefits. The experts emphasized that hydration strategies should be individualized according to patient age, clinical condition, and oral intake tolerance as well as resources, with ongoing monitoring to optimize recovery (Table 3).

Oral Fluid and Electrolyte Recommendations in IPD Setup

Fluid and electrolyte assessment and management are core components of quality inpatient care, with guidelines recommending systematic evaluation and appropriate fluid therapy for hospitalized patients.[21,68] Inadequate oral intake during hospitalization is a common, preventable cause of dehydration that increases morbidity and mortality, necessitating institutional protocols for routine hydration assessment and optimization.[21,38] Fluid therapy should be managed with the same rigor as pharmacological treatment, including structured de-escalation involving timely transition from intravenous (IV) fluids to oral hydration upon clinical stability.[21,69] Oral electrolyte solutions during the IV-to-oral transition and at discharge have been reported to facilitate rehydration and recovery in patients with NDIs.[21] In specialized settings such as oncology and palliative care, hydration strategies should be individualized based on patient condition, symptom burden, and treatment goals.[70,71] Accordingly, the experts recommended integrating structured fluid and electrolyte assessment into routine inpatient care, establishing institutional protocols to optimize oral hydration, promoting timely IV-to-oral transition using balanced electrolyte solutions, and individualizing hydration strategies in special populations (Table 4).

The experts assessed the use of nonnutritive sweeteners such as sucralose in

Table 3: Consensus recommendations for oral rehydration in outpatient setup

Statement	*Level of evidence*	*Consensus*
14. Hydration status should be assessed early in all acute illnesses, as dehydration is a fundamental, modifiable factor that directly impacts patient recovery and outcomes	High	100%
15. Adequate hydration is recommended to maintain immunity, particularly in susceptible populations	Moderate	80%
16. Electrolytes such as potassium, calcium, and magnesium play crucial roles in modulating various metabolic pathways and enzyme activities that regulate cellular energy metabolism; therefore, appropriate electrolyte replacement must be prioritized as a core therapeutic intervention in dehydration and acute illness management	Moderate	100%
17. Fluid management in children must account for higher maintenance requirements than adults due to increased metabolic demands, greater body surface area-to-weight ratio, and elevated respiratory rates that increase fluid losses	Low	90%
18. Healthcare providers should prioritize adequate hydration in elderly patients, recognizing this population's heightened vulnerability to dehydration-related complications, morbidity, and mortality	High	100%
19. Oral rehydration therapy is the first-line treatment for mild-to-moderate dehydration across all ages. Scientifically formulated solutions with proper fluid-electrolyte balance (50–100 mL/kg) are recommended, with emphasis on early intervention, individualized management, and continuous monitoring	High	100%
20. Oral fluid and electrolyte supplementation should begin as an adjuvant to primary therapy from day one of illness and continue throughout the entire course until complete recovery from the underlying condition	High	90%
21. The selection of an electrolyte drink for patients with dehydration should be guided by its electrolyte content	High	90%
22. Oral electrolytes such as potassium, magnesium, and calcium, along with nutrients such as taurine, may be considered to support muscle function and prevent cramps arising from nondiarrheal illnesses.	High	80%
23. The speed of hydration should be considered as a key criterion for driving the choice of an electrolyte drink for patients with dehydration	Moderate	70%
24. Oral fluid and electrolytes (electrolyte drinks) are recommended for patients with nondiarrheal illnesses to make them feel hydrated faster after consumption	High	90%
25. Oral fluid and electrolyte supplementation may help in faster recovery in patients with nondiarrheal illnesses	High	100%
26. Electrolyte drinks with low sugar content may be recommended for the effective rehydration of patients with dehydration, especially those with diabetes and stress–induced hyperglycemia	High	90%
27. In patients with dehydration, the use of isotonic electrolyte drinks is recommended over plain water to attain faster hydration due to improved fluid absorption and electrolyte replacement	High	90%
28. Taste may be considered important when selecting an electrolyte drink for fluid and electrolyte replacement in dehydrated patients; however, it is recommended that the promotion of scientifically sound formulations be prioritized to ensure optimal clinical efficacy and safety	High	90%
29. Clinicians may consider prescribing ready-to-drink oral rehydration fluids, as their palatability/taste significantly improves patient compliance and ensures adequate hydration during illness	High	90%
30. Clinicians may consider prescribing ready-to-drink oral rehydration fluids due to their known quantity of ingredients and packaging in a sterile environment	High	80%
31. Scientifically formulated ready-to-drink fluids with standardized electrolyte concentrations and osmolarity may be recommended to ensure reliable hydration compared to homemade alternatives if resources are adequate	High	100%
32. Ready-to-drink oral fluid electrolyte formulations containing electrolytes such as potassium, calcium, and magnesium and nutrients like taurine may be considered as supportive therapy to replenish fluid electrolytes and promote recovery and relief from muscle cramps associated with nondiarrheal illnesses	High	100%
33. Ready-to-drink electrolyte drinks with calcium, magnesium, and potassium are useful to prevent muscle cramps and aid recovery during heat-related conditions	High	100%
34. Ready-to-drink oral fluid electrolyte formulations may be recommended for children to replenish fluid electrolytes and support recovery from nondiarrheal illnesses	High	90%
35. Low-sugar ready-to-drink formulations with optimal sodium and glucose may be effective for rehydration in acute nondiarrheal illnesses in patients with diabetes	High	100%
36. Beverages containing high quantities of taurine, caffeinated, fizzy energy drinks, and canned juices have adverse health effects and should not be recommended for fluid replacement in acute nondiarrheal illnesses	Moderate	100%
37. Sucralose could be permitted as a nonnutritive sweetener for ready-to-drink beverages, and when used within permissible limits, it enhances palatability while demonstrating a wide margin of safety and tolerability	High	70%

electrolyte formulations meant to improve palatability; however, their use should remain within established regulatory limits to ensure safety. The experts emphasized that intake should not exceed the defined acceptable daily intake (ADI), which is determined from the no-observed-effect level (NOEL) identified in toxicological and safety studies and incorporates substantial safety margins. Maintaining consumption within these limits helps minimize potential concerns related to alterations in the gut microbiome or the risk of dysbiosis while ensuring that electrolyte formulations remain safe and well-tolerated for routine clinical use (Table 3). A recent evaluation of sucralose as a food additive was conducted by the European Food Safety Authority (EFSA) panel on food additives and flavorings. The assessment of multiple lines of evidence (48 human studies) found a moderate-to-high level of evidence indicating

Table 4: Consensus recommendations on oral fluid and electrolyte replenishment in IPD setup

Statement	*Level of evidence*	*Consensus*
38. Fluid and electrolyte assessment and management should be a fundamental component of quality inpatient care across all healthcare settings	High	100%
39. Hospitals should establish protocols for routine assessment and optimization of oral fluid intake in all admitted patients, as inadequate intake-related dehydration is a preventable cause of increased morbidity and mortality	High	100%
40. Fluid therapy should be treated with the same rigor as pharmacological interventions, with systematic transition from IV to ready-to-drink or oral fluids with proper electrolyte balance as part of therapeutic de-escalation after patient stabilization	High	100%
41. Oral fluid and electrolyte replacement are recommended for inpatients during IV-to-oral de-escalation and at discharge to support rehydration and faster recovery in nondiarrheal illnesses	High	80%
42. Hydration approaches in palliative care and cancer therapy should be individualized to patient-specific needs.	High	100%

IPD, inpatient department; IV, intravenous

that sucralose is unlikely to be associated with increased risks of cardiovascular disease, disturbances in glucose or insulin homeostasis, inflammation, hematotoxicity, hepatotoxicity, nephrotoxicity, neurotoxicity, reproductive toxicity, or carcinogenicity. Based on the available evidence, the experts concluded that there are no safety concerns regarding the current reported uses and use levels of sucralose (E 955) as a food additive.[72]

Discussion

Despite the high prevalence of acute NDIs in India, the consequent dehydration and electrolyte disturbances have received less clinical attention compared with diarrheal diseases, culminating in a lack of hydration awareness and effective management.[3,4,7,8] The present modified Delphi consensus addresses this important gap by providing structured, evidence-informed recommendations on the role of oral fluids and electrolyte management in NDIs across outpatient and inpatient settings. The significance of these recommendations lies in recognizing hydration as a critical supportive intervention that can influence recovery, prevent complications, and improve overall patient outcomes.

A key emphasis is the early recognition and proactive management of dehydration in patients with NDIs. Dehydration in these conditions may arise from multiple mechanisms, including reduced oral intake due to illness-related anorexia or fatigue, fever-associated insensible fluid losses, evaporative loss from skin and the respiratory tract, vomiting, and increased metabolic demand.[3] Fever augments these losses substantially through a 12% increase in maintenance fluid requirement for each degree Celsius rise above normal body temperature.[3] Our research has indicated that 65.8% of patients with fever were dehydrated.[73] In acute or febrile illnesses, these factors can collectively predispose the patients to fluid deficits and electrolyte imbalances even in the absence of overt gastrointestinal fluid loss.[1–3,18,51]

Despite the well-documented clinical consequences of dehydration, very little evidence exists on the knowledge, attitudes, and perceptions of physicians regarding the accurate recognition and diagnosis of dehydration symptoms in NDIs, a gap that itself may contribute to its frequent under-assessment in routine practice. Drawing on their collective clinical expertise, the experts noted that febrile illness alone can drive significant dehydration and dyselectrolytemia in children and adults beyond what is attributable to vomiting, with clinical improvement observed with both IV and oral rehydration. Muscle cramps and body aches in febrile patients, across both OPD and IPD settings, were similarly attributed to underlying dehydration. In outpatient settings, the clinical spectrum commonly includes tachycardia, fatigue, muscle cramps, postural hypotension, and body aches, while hospitalized patients may experience more severe consequences including electrolyte imbalances, acute kidney dysfunction, hemodynamic instability, postpartum hypotension, immune suppression, and neurological manifestations such as delirium in the elderly, all of which can significantly delay recovery. The experts acknowledged that a critical gap remains: no standardized clinical assessment frameworks or clear guidelines currently exist for oral rehydration use in nondiarrheal conditions, leaving clinicians without structured guidance precisely where it is most needed.

Another important aspect of these recommendations is the understanding that hydration therapy should extend beyond simple fluid replacement to include adequate electrolyte replenishment. While plain water can help restore fluid deficits, it does not compensate for electrolyte losses that may occur due to fever, sweating, or systemic illness.[21,57] Balanced oral electrolyte formulations containing electrolytes such as sodium, potassium, and magnesium therefore play an important role in supporting effective rehydration by facilitating optimal intestinal fluid absorption and helping maintain electrolyte homeostasis, which is essential for preserving neuromuscular function, reducing fatigue, and preventing symptoms such as muscle cramps.[3,21,45,46,54,74] The use of scientifically formulated ready-to-drink electrolyte solutions or self-made standardized solutions holds the potential to address practical considerations such as palatability, hygiene, and standardized electrolyte composition, which may enhance patient adherence and improve the effectiveness of the rehydration strategies.

Standard oral electrolyte preparations, including WHO ORS, do not contain calcium, magnesium, and other micronutrients, further highlighting the importance of RTD electrolyte solutions in the management of NDIs. However, WHO ORS or standardized homemade ORS may remain useful in resource-limited settings (where formulated isotonic electrolyte solutions are unavailable or economically inaccessible), in NDIs with concurrent gastrointestinal losses such as vomiting or diarrheal phases, and as an interim oral rehydration measure before access to scientifically formulated isotonic electrolyte solutions, particularly during early presentation in primary or rural healthcare settings. Nevertheless, when oral rehydration is insufficient, or patients exhibit features suggestive of severe dehydration, such as persistent vomiting, altered sensorium, hemodynamic instability, inability to tolerate oral intake, markedly reduced urine output, or worsening clinical status, further evaluation with laboratory investigations, hospitalization, IV fluid therapy, and appropriate escalation of care should be considered.[21,38] Additional caution and closer monitoring are particularly warranted in vulnerable groups, including older adults, patients with diabetes, and those with significant comorbidities.[29,30,75]

Low-sugar electrolyte formulations are increasingly emphasized in hydration strategies, particularly for patients with acute illnesses in whom excessive sugar intake may be undesirable, including those with metabolic disorders such as diabetes or stress-

related hyperglycemia. Particular concern was raised for patients with diabetes, elderly individuals with poor glycemic control, those on glucagon-like peptide-1 (GLP-1)-based therapies, and patients with neurological disorders such as dysphagia, all of whom face elevated dehydration risk. In addition, beverages containing artificial color or flavor should preferably be avoided or used with caution when alternatives are unavailable. Thus, reducing sugar content while maintaining palatability was demarcated as an important consideration in the formulation of ready-to-drink electrolyte solutions.

Non-nutritive sweeteners such as sucralose, incorporated in such formulations, provide sweetness and enhance palatability without significantly increasing caloric or glycemic load. Sucralose has been widely evaluated for safety and is approved for use in food and beverage products by regulatory authorities such as the WHO and the U.S. Food and Drug Administration. It is also used as a nonsugar sweetener in WHO ORS.[72,76,77] The inclusion of sucralose in RTD oral rehydration solutions at permissible levels is supported by a robust and growing body of evidence. In February 2026, EFSA published its most comprehensive reassessment of sucralose in over 20 years, reviewing available scientific evidence on short- and long-term effects, manufacturing processes, and dietary exposure, and reconfirmed sucralose as safe at the established ADI of 15 mg/kg body weight per day, with current consumer exposure confirmed to remain within safe limits.[72] This conclusion is consistent with previous evaluations by international bodies including the Joint FAO/WHO Expert Committee on Food Additives (JECFA), reinforcing the established safety profile of sucralose across population groups when used within authorized levels.[78] Taken together, the evidence supports the inclusion of sucralose in scientifically formulated RTD electrolyte solutions within established regulatory limits as a safe and clinically beneficial strategy to enhance adherence and optimize rehydration outcomes.

In low-resource settings, dehydration management requires simple, practical strategies that rely on patient education and locally available fluids. Physicians should emphasize early recognition of dehydration symptoms, such as fatigue, dizziness, reduced urine output, and dark urine, and encourage adequate daily fluid intake. Simple noninvasive indicators, such as monitoring urine color or frequency, can help guide hydration practices when laboratory facilities are unavailable.[75] As RTD formulations are mostly inaccessible or costly in these regions, readily accessible fluids such as ORS (formulated from water, salt, and sugar), rice water, buttermilk, and coconut water may provide cost-effective options to support hydration.[75] Community-level education on hydration practices and early oral fluid replacement can therefore play a crucial role in preventing dehydration-related complications in low-resource settings.

Strengths and Limitations

The comprehensive consensus focusing on NDIs addresses an under-recognized aspect of hydration management and provides practical guidance applicable to routine clinical practice in India. The recommendations were developed through a structured Delphi process involving experienced clinicians from diverse specialties, allowing a balanced integration of available evidence and real-world clinical expertise. Moreover, the recommendations span both outpatient and inpatient settings, thereby offering a holistic approach to hydration management across the continuum of care. However, the heterogeneity of NDIs and variability in patient characteristics may influence individual hydration requirements; therefore, the recommendations may not address all possible clinical scenarios. Additionally, potential selection bias in the composition of the expert panel and the available literature, as well as implementation challenges across different resource settings and local clinical practices, call for context-dependent implementation of these recommendations.

Conclusion

Structured hydration management plays a critical role in the care of patients with acute NDIs, where both fluid depletion and electrolyte imbalance may contribute to clinical deterioration. Early recognition of dehydration, careful clinical assessment, and timely initiation of appropriate oral or intravenous fluid therapy are essential to restore fluid balance and support physiological recovery. These evidence-based expert recommendations aim to support systematic assessment, timely intervention, and appropriate electrolyte replacement to improve patient outcomes. Further prospective clinical studies evaluating hydration strategies and electrolyte formulations in NDIs are warranted to strengthen the evidence base and refine these recommendations for broader clinical application.

Supplementary Material

Supplementary Table 1 is available online at: https://turacoz.com/MS415560_AB_IN_Consensus%20statements/Supplementary-Table-1-1.pdf.

Author's Contributions

All authors contributed to the conceptualization, study design, development of the Delphi consensus process, interpretation of the findings, and drafting and critical revision of the manuscript. AP and HM additionally contributed to the overall supervision of the study. All authors reviewed and approved the final manuscript.

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Conflict of Interest

JP, BRR, PS, LSM, NC, MHT, JS, RN, TG, and EC received honoraria for participating in the advisory board meeting related to the development of these Delphi consensus recommendations.

AI Disclosure

The authors declare that no generative artificial intelligence or AI-assisted technologies were used in the analysis, interpretation, writing, or preparation of this manuscript.

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