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Review

Management of childhood diarrhea by healthcare professionals in low income countries: An integrative review

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ABSTRACT

Background: The significant drop in child mortality due to diarrhea has been primarily attributed to the use of oral rehydration solutions, continuous feeding and zinc supplementation. Nevertheless uptake of these interventions have been slow in developing countries and many children suffering from diarrhea are not receiving adequate care according to the World Health Organization recommended guidelines for the clinical management of childhood diarrhea.
Objectives: The aim of this integrative review is to appraise healthcare professionals' management of childhood diarrhea in low-income countries.
Design: Whittemore and Knafl integrative review method was used, in conjunction with the Reporting of Observational Studies in Epidemiology (STROBE) checklist for reporting observational cohort, case control and cross sectional studies.
Method: A comprehensive search performed from December 2014 to April 2015 used five databases and focused on observational studies of healthcare professional's management of childhood diarrhea in low-income countries.
Results: A total of 21 studies were included in the review. Eight studies used a survey design while three used some type of simulated client survey referring to a fictitious case of a child with diarrhea. Retrospective chart reviews were used in one study. Only one study used direct observation of the healthcare professionals during practice and the remaining eight used a combination of research designs. Studies were completed in South East Asia (n = 13), Sub-Saharan Africa (n = 6) and South America (n = 2).
Conclusion: Studies report that healthcare providers have adequate knowledge of the etiology of diarrhea and the severe signs of dehydration associated with diarrhea. More importantly, regardless of geographical settings and year of study publication, inconsistencies were noted in healthcare professionals' physical examination, prescription of oral rehydration solutions, antibiotics and other medications as well as education provided to the primary caregivers. Factors other than knowledge about diarrhea were shown to significantly influence prescriptive behaviors of healthcare professionals. This review demonstrates that "*knowledge is not enough*" to ensure the appropriate use of oral rehydration solutions, zinc and antibiotics by healthcare professionals in the management of childhood diarrhea.

What is already known:

- Diarrhea remains the major cause of death for children under the age of 5 years.
- Oral rehydration therapy, zinc supplementation and continuous feeding are cost-effective measures accounting for the significant drop in childhood mortality in the past 30 years.
- Use of these interventions is limited, and many children who suffer from diarrhea in low-income countries do not receive oral rehydration therapy and continued feeding.
- Lack of training and support of healthcare providers has been identified as a barrier for the slow progress made in tackling childhood diarrhea worldwide.

What this paper adds
Regardless of time, geographical settings and training

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- Healthcare providers prescription of oral rehydration therapy and caregivers education about rehydration therapy remain inconsistent;
- Unnecessary prescription of antibiotics and antidiarrheal medications remains high.
- Influencing factors, especially, caregivers expectations, healthcare providers experience and perception of the severity of the disease as well as financial profit play a significant role in the healthcare providers clinical practices during management of childhood diarrhea.
- While considered the largest healthcare profession, nurses and midwives are the least represented healthcare provider groups included in studies evaluating the clinical management of childhood diarrhea.

1. Introduction

Ranked as the second leading cause of death in children under the age of 5, diarrhea is responsible for approximately 578 000 deaths and 1.7 billion reported episodes each year (Liu et al., 2015). Beginning in 1978, diarrheal-control programs led by the World Health Organization (WHO), focused on the promotion of safe drinking water and oral rehydration solutions (ORS) in conjunction with continued feeding (Fontaine et al., 2009). By 1988, more than 100 countries adopted diarrheal diseases control programs following the WHO recommendation that focuses on the promotion of oral rehydration solutions as a major aspect of management (WHO, 1989). Diarrhea-control programs have been reported to account for substantial reductions in childhood mortality due to diarrhea, decreasing by 20.8% between 2000 and 2013 in South Asia and by 16.8% in Sub-Saharan African during the same period (Liu et al., 2015).

As of 2004, the WHO updated its childhood diarrhea management guidelines with a new oral rehydration formulation containing decreased glucose and sodium concentrations. Studies demonstrated that the reduced osmolarity of oral rehydration was safer than the original oral rehydration solutions and decreased stool output by 20% (Hahn et al., 2002). Oral zinc supplementation is recommended for 10–14 days at 20 mg per day in children 6 months and older and 10 mg per day in those younger than 6 months (World Health Organization and United Nations Children's Fund, 2004). It is important to note that the guidelines included the prescription of antibiotic therapy only in cases of bloody diarrhea or cholera.

Despite the success of the early diarrhea-control programs and the updated WHO guidelines, many children under the age of 5 do not receive adequate treatment during an episode of diarrhea. Recent reports indicated that only 40% of children suffering from diarrhea worldwide received oral rehydration or increased fluid intake with continued feeding as part of their management (United Nations Children's Fund, 2013). This increase is only 10% greater (approximately) than the 1995 global percentage of children under 5 years who received oral rehydration as treatment for their diarrhea (Fontaine et al., 2009).

The unchanged rate of use of oral rehydration solutions over the past two decades has been linked to the diversion of international funding toward malaria and AIDS after the incorporation of diarrhea-control programs into the Integrated Management of Childhood Illness approach (Fontaine et al., 2009). Management of diarrhea programs were moved down in the priority list of national and international institutions. This is despite the fact that diarrhea causes more deaths than AIDS, malaria and measles combined (United Nations Children's Fund/World Health Organization, 2009). In addition, the incorporation of the diarrhea-control program into Integrated Management of Childhood Illness caused inconsistencies in healthcare professionals' training and community programming specific to diarrhea management (Fontaine et al., 2009).

Healthcare professionals (mainly physicians, pharmacists, midwives and nurses) at the public and private levels play an important role in the management of childhood diarrhea. Recent studies performed in South India and Sub-Saharan Africa have shown that, regardless of receiving formal diarrhea management training, healthcare professionals treating children with diarrhea tended to prescribe more antibiotics, injections and anti-diarrheal medications than oral rehydration solutions and zinc (Pathak et al., 2011; Sood and Wagner, 2014). Efforts are therefore needed to evaluate healthcare professionals' clinical management of childhood diarrhea in the most affected area of the globe.

The purpose of this integrative review is to evaluate the clinical practice of healthcare professionals in the management of diarrhea in children. The study will answer the following research question: *What has been healthcare professionals' management of childhood diarrhea in low income countries between 1988 and 2014?* The ultimate goal of the study is to explore the clinical practice of healthcare professionals, as it occurs in the natural settings over the years and across geographical settings. A synthesis of observational studies, completed between 1988 and 2014, will strengthen the literature and provide a broad picture of the magnitude of the problem in the most affected regions of the world. Recommendations for how best to change practice will also be discussed.

2. Method

2.1. Search strategy and selection criteria

Due to the global reach of the WHO guidelines, physicians' and other advanced health workers' training manuals for the treatment of diarrhea published in 2004 were used to guide the literature search. According to the manuals, healthcare care professionals' training should be based on three major elements: a fundamental knowledge about diarrhea; the assessment of the clinical signs and symptoms presented by a child with diarrhea; and the clinical management based on the different types of diarrhea. Observational studies reporting on at least two or more of the following outcomes related to healthcare professionals' clinical management of childhood diarrhea following the WHO guidelines were included. The measured outcomes were: 1) healthcare professionals' knowledge about childhood diarrhea and assessment of the dangerous signs and symptoms; 2) the prescription of oral rehydration solutions, antibiotics and other drugs for the clinical management; and 3) the prescription of zinc supplementation.

Healthcare professionals were defined as any individual with some medical or pharmacological training, including physicians, pharmacists, nurses and midwives. The review was restricted to studies performed in low-income countries. The literature search included studies published between 1988, when most national programs for the control of diarrheal diseases were established, and 2014, published in English. Exclusion criteria were: studies reporting infections other than those causing diarrheal diseases in children; and studies focusing only on drug therapies and the management of a population of children older than 5 years.

A comprehensive literature search was performed using five databases between December 2014 and April 2015. The databases were PubMed, CINAHL, Scopus, World Health Organization Global Health Library and CAB Direct. The following keywords, MeSH terms and headings were used in various combinations: *adherence*, *guideline*, *practice guideline*, *management*, prescribing patterns, knowledge attitude and practice, attitude of health personnel, physicians' *practice patterns*, *health care providers*, *healthcare*