Prevalence of Diarrhoeal Diseases Among Children under Five Years in East African Countries from 2012–2017

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This meta-analysis analyzed the prevalence of diarrhoeal diseases among children less than five years in three selected East African countries from 2012–2017. Search engines used Google Scholar, Proquest, and PubMed. Primarily, 300 studies were selected; hence 297 were eliminated using inclusion and exclusion criteria. The PICO (population, intervention, comparison, and outcome) guide helped in the analysis of the three selected studies. The prevalence of diarrhoea among children less than five years in the three selected East African countries from 2012 to 2017, averaged to 27% range from a minimum of 11% to a maximum of 54% of the 5478 total respondents (OR 2.07). The five-year prevalence escalated extensively at Kenya, Ethiopia, and Somalia. There is a 207% risk of further escalation.

Key words: Diarrhoea; East Africa; meta-analysis; nursing; public health

Diarrhoeal diseases are the most major health problems in the world which cause highest mortality and morbidity in children especially in children less than five years, and they can also affect children's growth and development (World Health Organization 2001). Diarrhoea becomes the primary burden of all water and sanitation related diseases.

Globally about 4 million cases of diarrhea are recorded annually, and this causes about 2.2 million deaths, mostly among children under the age five (United Nations Children's Fund/World Health Organization 2009).

About 50% of deaths are due to acute watery stool, 35% are due to persistent diarrhoea, and 15% are due to dysentery (United Nations Children's Fund/World Health Organization 1999). According to World Health Organization,

in developing countries, diarrhoea is the major cause of child death when children are less than five years old (World Health Organization 2000). Diarrhoea mortality is mainly due to dehydration which is the first direct consequence (United Nations Children's Fund/World Health Organization 1999). Diarrhoea morbidity is one of the major health burdens among infants and young children in low-income countries (Cunliffe *et al.* 1999).

An incidence of 3.2 episodes of diarrhoea per child per year among children below five years old was estimated between 1990 and 2000 within 20 countries (World Health Organization 1996). The immediate impact of diarrhoeal infant diseases regarding morbidity, hospitalization and death has been proved in several studies (United Nations Children's Fund/World Health Organization 1999).

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In developing countries, diarrhoeal diseases represent one-third of the hospitalizations (World Health Organization 1996). Children who were not looked after by their mothers, and those who were partially breastfed or weaned children are at risk for diarrhoeal morbidity (Jensen *et al.* 2002). The long-term consequence is under-nutrition when episodes are repeated and prolonged (Cairncross & Feachem 1993). Poor socio-economic status, sanitation and living conditions, nutrition and hygiene behaviour are the health determinants for diarrhoea prevalence (Jensen *et al.* 2002).

In Africa and especially Sub-Saharan Africa, diarrhoeal diseases account for over 90% of deaths in children below five years old (World Health Organization 2007). This has been attributed to lack of safe drinking water, sanitation and hygiene as well as poor nutrition (World Health Organization 2005). Accordingly, improved water sources reduce diarrhoea morbidity by 21%, improved

sanitation by 37.5% and hand washing by as much as 35% (Roberts *et al.* 2001; World Health Organization 2007).

METHODS

Literature Searches

Google Scholar, Proquest and PubMed were searched from similar research articles related to the prevalence of diarrhoeal diseases in East African countries. Search strategy started with using keywords entered on search engines on the internet as English text words.

Study Selection

The inclusion criteria were: a population-based study with participants under five years children; random sampling of a defined population or studies involving entire; studies involving African participants living in East African countries. Data extracted from each paper included country where research was conducted.

Figure 1. Data extraction.

Data Extraction

Extracted data were collected using the PICO (population, intervention, comparison, outcome) guide. Of the 300 studies found on search engines, only three were selected (*Figure 1*). The study design method, sample size, and reported prevalence rate was analyzed by comparing factors related to occurrences of diarrhoea.

RESULTS

A total of three studies that fulfilled the inclusion criteria were used for the meta-analysis as shown in *Table 1*. All the studies adopted a cross-sectional design method. In the majority of the studies, diarrhoea was measured in a single visit of the children's caregivers by asking incidences of diarrhoea among their children in last two weeks. All the studies used children less than 5 years old. Prevalence of diarrhoea varied extensively between studies, ranging from a minimum of 11% to a maximum of 54%.

Furthermore, this study summarized prevalence of diarrhoea in 3 East African countries for a five years period (2012 to 2017). The prevalence of diarrhoea from the three counties was 11% in Somalia, 16% in Kenya and 54% in Ethiopia. The total population was 1480 of the 5478 (27%).

In Kenya, according to Kawakatsu *et al.* (2017), a total of 278 mothers were participated in the study. Of the 278 participants, 150 (54%) children had acute diarrhoea. Only family income and current breast feeding status of the children were significantly associated with diarrhoea [AOR at 95% CI, 0.59 (0.21–1.65)] and [AOR at 95% CI, 0.36 (0.16–0.80), respectively].

In Somalia according to Mohamed *et al.* (2016), a total of 245 under-five children were identified from Bosaso city, to be a total of 23 (9.4%) children with diarrhoeal diseases who had a watery type of diarrhoea. The north-eastern regions of Somalia on the southern coast of the Gulf of Aden have caregivers to report children in the month before the day of the interview, having only 26 (11%) diarrhoeal cases. About 7.34% reported 1 episode and only 2.85% reported 2 episodes and 0.4% reported 3. Diarrhoea also occurred more often in children who were not exclusively breastfed (OR 3.9).

In Ethiopia, according to Mengistie *et al.* (2013), 4955 children under five and their family members living in Nyanza Province had diarrhoea. This Sample was used to determine the prevalence of childhood diarrhoea in Kenya at about 16% from the total respondents.

Table 1. The PICO Guide.

Comparison	Intervention	Population	Outcome	
Mohamed <i>et al.</i> (2016)	Determined the prevalence of diarrhoea	Somalia	245	11%
Mengistie <i>et al.</i> (2014)	Determined the prevalence of diarrhoea	Ethiopia	4955	16%
Kawakatsu <i>et al.</i> (2017)	Assessed the prevalence of diarrhoea	Kenya	278	54%

DISCUSSION

Three important studies were extracted from search engines that address the risk factors associated with the prevalence of diarrhoea in the East Africa. The biases on selecting the studies are called selection biases. But considering the implications of diarrhoea and how harmful it will be is enough to ignore the biases implied.

In addition, occurrences of diarrhoea in this meta-analysis found 3 associated factors affecting it – (1) caregivers (2) age (3) surroundings.

Caregivers who are not mothers of the children are a factor associated with the occurrence of diarrhoeal diseases (OR 3.5) (Kawakatsu *et al.* 2017). The education level of the caregivers had an association with the occurrence of diarrhoea (Kawakatsu *et al.* 2017). Illiterate caregivers usually do not understand that milk can expire fast after diluted with water especially in warm climates (OR 1.6) (Mohamed, *et al.* 2016). Lastly, caregivers who are not giving enough time caring for children end up ignoring their dirty hands, that is usually sucked by children (OR 5.4) (Mengistie *et al.* 2013).

Children between 1 to 2 years old addressed the age as a factor associated with diarrhoeal diseases (OR 5.8) (Kawakatsu *et al.* 2017). Also, children who received other milk during the first six months of life (bottle feeding) also had occurrence of diarrhoea (OR 3.4) (Mohamed, *et al.* 2016). Similarly, Children who did not receive colostrums from breast milk had diarrhoea as well (OR 3.7873) (Mohamed *et al.* 2016).

Children living in unhygienic conditions addressed the surroundings as a factor associated with the occurrence of diarrhoeal diseases (OR 2.4) Mengistie *et al.* 2013. Those who were prematurely born without latrines had association diarrhoea (OR 1.04) (Mohamed *et al.* 2016). Similarly, those who have no separated drinking water storage had diarrhoea (OR 1.3) Mengistie *et al.* 2013.

CONCLUSION

The three studies from different east African countries revealed that children have the occurrence of diarrhoeal diseases less than five years of age that was 27% of the 5,478 total respondents (OR 2.07) from 2012 to 2017. Therefore, there is a 207% risk of further escalation of prevalence in East Africa.

Even though poor environmental conditions were believed to increase the risk of diarrhoeal disease, the majority of the environmental variables included in this study showed significant association with diarrhoea. Secondly, children who are 1 to 5 years old must be given breast milk (not exactly breastfed) to develop intestinal resistance to diarrhoea. Low family income per month may have no other choice but hire unintelligent caregivers who sometimes are uneducated and illiterate.

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