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Proximal and Distal Determinants Associated with Dysentery in Children Under-5 Years from Developing Countries

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Abstract: Dysentery represents 10% of all cases of acute diarrhea in the world and recognizing the implied factors at different levels has the potential to impact its incidence. Our purpose is to identify proximal and distal factors including mother, household and country characteristics that favor the presence of dysentery in children under 5 years old. We conducted a multilevel analysis of data from phase V of the Demographic and Health Survey and the World Bank which included 38,762 children from 33 countries. Prevalence of dysentery was 14.74%. GDP per-capita was negative associated (OR = 0.75; 95% CI 0.71-0.78) and Gini index was positive associated (OR = 1.23; 95% CI 1.19-1.28). Additionally, maternal age in years (OR = 1.01; 95% CI 1.00-1.01), employed mother (OR = 1.11; 95% CI 1.02-1.20) and number of household members (OR = 1.02; 95% CI 1.01-1.03) have significant positive associations with the presence of dysentery, while child age in months (OR= 0.99; 95% CI 0.99-0.99), complete immunization schedule (OR= 0.88; 95% CI 0.81-0.96), duration of breast feeding (OR = 0.81; 95% CI 0.75-0.89) and type of residence (OR = 0.87; 95% CI 0.79-0.97) have significant negative associations with having the illness. Finally, each of the categories of wealth index showed a significant association with dysentery ($p<0.001$). Lower per capita GDP and higher Gini coefficient are associated with the development of dysentery, regardless of the characteristics of children, their mother and household. Future and present public health programs should address these issues in order to impact on the occurrence of this illness.

INTRODUCTION

Acute Diarrheal Disease (ADD) is defined as the presence of three or more abnormally loose or watery stools in 24 h. It is the secondary cause of death in children under 5 years old (WHO., 2017; Endo *et al*., 2014) with a worldwide prevalence of about 8% (Unicef, 2018). Dysentery is defined as the presence of mucus or blood in the stools as a manifestation of intestinal inflammation. It is a particularly worrying presentation of ADD usually accompanied by fever, abdominal pain and impaired general conditions (WHO., 2017).

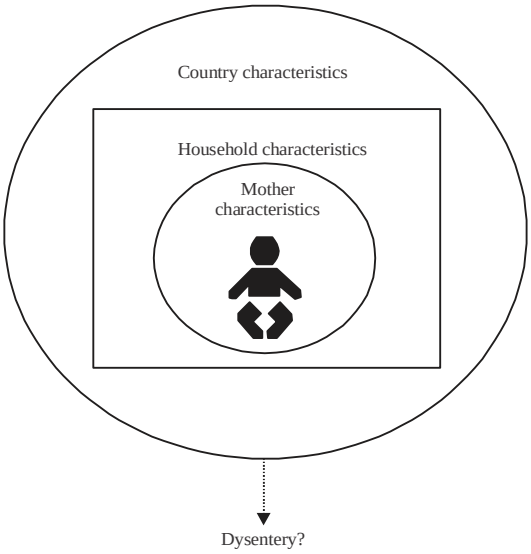

Fig. 1: Conceptual framework of proximal and distal determinants associated with dysentery in children under 5 years in developing countries

According to the World Health Organization (WHO), dysentery represents 10% of all cases of ADD and accounts for 15% of all deaths from this cause. It is also the fifth cause of death worldwide in children under 5 years old (WHO., 2004). In developing countries, Shigellosis is the most frequent cause of dysentery in children (Gomez-Duarte., 2014; Parashar *et al*., 2009; Kotloff *et al*., 2017).

Complications associated with dysentery go from dehydration, malnutrition and cognitive impairment to severe outcomes as convulsive episodes, uremic syndrome and death (Kotloff *et al*., 2017). It is worth recognizing that children are at higher risk to acquire this mentioned infection, not only because they have more contact with soil but also because their immune system is still immature for establishing an appropriate response to any microorganism (Endo *et al*., 2014).

In a recent study, we evaluated the relationship between some characteristics of developing countries and the occurrence of diarrheal disease. We concluded that residents of nations with higher inequality and lower incomes have greater probabilities of having diarrhea, especially when there is a lack of household wealth and mother's education (Pinzon-Rondon *et al.*, 2015).

Other factors that showed strong positive association with diarrhea were female sex of the child, younger age of the child, incomplete immunization status, birth weight, lack of education of the mother and an unemployed mother. Other factors such as planned pregnancy showed negative association to diarrhea (Pinzon-Rondon *et al.*, 2015).

Recognizing dysentery risk factors would reduce not only mortality rates in children under 5 years old but also would impact on every outcome related to this disease. This study aims to identify proximal and distal factors associated to the presence of dysentery (Fig. 1) mother, household and country characteristics that favor the presence or absence of dysentery in children under 5 years old by analyzing the Demographic and Health Survey (DHS) phase V in 33 nations.

MATERIALS AND METHODS

This is a cross-sectional, transnational and multilevel study. We used level-1 data (child, mother and household characteristics) from the Demographic and Health Survey (DHS) phase-V and level-2 data (country characteristics) from the World Bank (WB) country data (WB., 2014).

The DHS phase-V collected data from 41 developing countries from 2004-2010. A nationally representative, probabilistic sample including rural and urban areas was collected from each participating country. Respondents were selected through a multistage, stratified sampling procedure of households. Between 5,000 and 30,000 households were surveyed per country. Data was gathered for the countries included in attachment 1. We excluded Ukraine from the analysis because it did not apply the child health module of the survey. Information from the remaining 40 countries was merged to create a single dataset which included 395,485 households with children. The dataset was further limited to biological mothers answering the survey to assure comparability (384,662), living children (359,527), permanent household residents (349,849) and cases with complete information in variable diarrhea (348,706). Afterward, the database was limited to cases that reported diarrhea during the two weeks before the interview (49,065) in order to know how many of them had dysentery. Then, the database was limited to cases with complete information in the variable dysentery (38,762). Finally, we have information from 33 countries because Bangladesh, Benin, Congo, Democratic Republic of the Congo, Indonesia, Mali and Niger did not have information about dysentery.

After a sensitivity analysis using data from sources such as IMF, CIA and the World Bank we obtained the same results. We concluded that the WB country data was the best source of level-2 data in this study because of its country comparability and robustness when compared to data from other sources. These data included the 2010 indicators: per capita Gross Domestic Product (GDP), Gini-coefficient and health expenditure as a percentage of GDP.

Outcome variable: Presence of dysentery in the last two weeks: the presence of bloody diarrhea (as defined by the respondent, the child's mother). The DHS asked mothers whether there was any blood in the stools of those children who had diarrhea at any time during the two weeks preceding the interview (0 = no; 1 = yes).

Independent variables: We divided the variables according to the data source: level-1 variables included the child, mother and household characteristics and level-2 variables included country data. At first, we considered three levels of analysis-child, household and country but most households had only one child under the age of five, so, it was decided to include only one child per household, the youngest, adjusted in household weighting and conducted a two-level analysis.

Level-1 data, children: Age of the child in months, sex coded as male = 0 female = 1 , possession of the health card coded as 0 = no 1 = yes, immunization defined as the completeness of WHO schedule coded as 0 = no 1 = yes, duration of breath feeding in months, birth weight codified in dummy variables as follows: normal-above 2500 g- 0 = no, 1 = yes ; low-below 2500 g- 0 = no 1 = yes; no weighted 0 = no, 1 = yes, twin pregnancy 0 = no 1= yes , cesarean section 0= no 1= yes, bottle feeding with a nipple 0 = no 1= yes. Even though it is not ideal to include a birth weight-missing indicator taking into consideration that 46% of the children did not have this information, imputation was ruled out.

Level-1 data, mother: Age in years, education o educational attainment codified in dummy variables as follows: no education coded as 0 = no, 1 = yes; elementary education coded as 0 = no, 1 = yes; high school coded as 0 = no, 1 = yes; superior [technical or professional] education coded as 0 = no, 1 = yes), current employment 0 = no 1 = yes, marital status codified in dummy variables as follows: single 0 = no, 1 = yes; married 0 = no, 1 = yes; divorced/separated/widow (previously married) 0 = no, 1 = yes; total children and partner age in years.

Level-1 data, mother's pregnancy: Planned pregnancy coded as 0 = no, 1 = yes, antenatal visits codified as dummies as follows: none 0 = no, 1 = yes; 1-2 visits 0 = no, 1 = yes; 3-10 visits 0 = no, 1 = yes; more than 10 0 = no, 1 = yes.

Level-1 data, household: Household members defined as the number of people living in the same home, place of residence urban = 0 , rural = 1, the age of household head in years, main floor material coded as dummies as follows: soil or sand 0 = no, 1 = yes; wood 0 = no, 1 = yes; finished floor 0 = no, 1 = yes, sanitation score based upon water source and waste disposal and wealth index calculated by the DHS considering income, possessions and quality of life (Hueb *et al*., 2000).

Level-2 data, country: Country wealth coded as a set of dummy variables: low income (1 = Gross Domestic Product per capita (GDPpc) of US$1,025 or less), lower middle income (1 = GDPpc between US$1,026 and US$4,035), upper middle income (1 = GDPpc between $4,036 and $12,475) and high income (1 = GDPpc of $12,476 or more) (McCoach, 2010). Inequality based on the Gini coefficient (1 = top 25% unequal countries and 0 = more equal countries) because of the variable's distribution and health expenditure coded as a set of dummy variables based on the percentage of GDP expended on health. Low health expenditure (1 = 5% or less), middle health expenditure (1 = between 5.1 and 10%), high health expenditure (1 = >10%). In the initial models, we considered country homicide rates and total country population but these variables were omitted in the final models because of their lack of association with dysentery and their negative effects on the model's validity, measured using residual files and reliability estimates.

Statistical analysis: The analysis was conducted considering known factors associated with dysentery and the country characteristics studied. Multilevel analyses were preferred because the hierarchical nature of the data violated the principles of independence and homogeneity required for a single-level analysis (Sellstrom and Bremberg, 2006).

The statistical analysis was performed using SPSS 20.0 (IBM) and HLM 7 (Scientific Software International, Inc.: as follows) we merged the individual datasets of the 40 countries; we filtered out the database following the inclusion and exclusion criteria explained above obtaining information from 33 countries: we calculated descriptive statistics for categorical (proportions) and numerical variables (mean, standard deviation, minimum and maximum values) we obtained odds ratios using hierarchical logistic modeling regressions of dysentery in each of the studied variables and) we generated multivariable models for dysentery using hierarchical linear modeling. Stepwise multilevel logistic regression equations were estimated. Individual, family and household factors were included as possible predictors of dysentery and differences were deemed to be significant with $p<0.05$. The large sample size allowed us to find small differences with narrow 95% confidence intervals. Finally, multilevel modeling was used to explore the association of country characteristics with dysentery (between countries associations) adjusting for individual, family and household predictors of the condition (within countries associations) (Guo and Zhao, 2000;

McCoach, 2010). Full maximum likelihood was used to fit the models. Random effects were estimated only for indicators with variations between groups that could be explained by the studied variables, allowing the coefficients to vary across groups. Those level-1 indicators were centered on the country mean to avoid the problem of co-linearity. All other variables as well as the neighborhood variables, were centered on the grand mean and we constrained their variance. Level 2 country data variables were dichotomized and analyzed into 50% higher and 50% lower. We have calculated Median Odd Ratios (MORs) and Intra-Class Correlations (ICC) for the models as well as 80% Interval Odds Ratios (IORs) for the country level variables (Merlo *et al*., 2006; Kaufman, 2005).

We tested bivariate interactions by multiplying duration of breastfeeding and maternal education, duration of breastfeeding and maternal employment, immunization and maternal education and wealth index and immunization to determine if an interaction was present, but none of them were significant.

Within countries, weights provided by the DHS for children under 5 years old were employed in the analysis for the level-1 data. They were adjusted to the survey design. Post-stratification was incorporated as a weight adjustment. The adjusted weights were used in all of the analyses. For level-2 data, between countries, weights were created and used in the analysis for each country accounting for their population.

Regression analyses considering the DHS year of survey were performed to assure that the results were not biased by the different time lapses the surveys took place at each country. Macro International provided the datasets from the 41 countries included in this study. The study was based on secondary sources without identifying information about individual participants. It was given approval by the institutional review board, Comite de Etica en Investigacion, Universidad del Rosario.

RESULTS AND DISCUSSION

The sample comprised 38,762 children under 5 years from 33 developing countries who presented diarrhea during the last two weeks before the interview, according to the mother's report. The descriptive features of the evaluated population are shown in Table 1. They are separated from children who did and did not present dysentery in their last episode of diarrhea. The prevalence of dysentery was 14.74%. The median age of the children who had dysentery was 24 months and the median age among the children who did not present it was 19 months. Also, only 56% of the children who had dysentery had their immunization schedule completed in contrast with children who did not present dysentery who accounted for 63%, approximately.

Nearly half of the children who did not have dysentery had a normal weight (48%). However, this percentage was lower among the group of children who did present the illness (41%). Moreover, this last group of children was breastfed a median of 15 months in comparison with the group of children who did not present dysentery and was breastfed a median of 13 months.

Approximately, 24% of the mothers did not have any level of education in the group of children who had present dysentery. Nevertheless, this value was higher in the group of the mothers of children who did present dysentery (30%). Additionally, more than half of this last group of mothers was employed (57%). Finally, the higher the wealth index was the lower its percentage became in both groups of children. Table 1 also shows the results of the bivariate regressions among dysentery and each one of the others included variables.

Furthermore, the prevalence of dysentery in each of the evaluated countries is shown in Fig. 2. The Republic of Liberia presented the highest prevalence of dysentery in the whole group of countries and Colombia had the highest one among the evaluated Latin-American countries.

The characteristics of the acute diarrhea episode in both groups of children are shown in Table 2. Approximately, 58% of children who had dysentery also had fever. Likewise, this group of children received almost 55 and 27% of oral rehydration and antibiotic therapy, respectively. However, they did receive lower amounts of liquids and solids during illness (61% and 38%, respectively), than the group of children who did not present dysentery (67 and 43%, respectively).

Results of logistic regression among dysentery and the country level characteristics are shown in Table 3. After controlling for each of the child, mother, house and country-level variables, we found that related to dysentery, GDP per-capita and health expenditure were negatively associated and GINI index was positively associated.

At the same time, this last model showed that maternal age, employed mother and the number of household members have significant positive associations with having dysentery ($p<0.05$). On the other hand, complete immunization schedule, duration of breastfeeding and the type of residence have significant negative associations with having the illness ($p<0.05$). Simultaneously, each one of the categories of wealth index showed a significant association with dysentery ($p<0.001$). And it is possible to appreciate that the richer a person is the lower its odds ratios become.

In this study, 14.7% of the 38,762 children under 5 years who suffered from diarrhea, had dysentery. This is consistent with the following data found. Diarrheal diseases remain among the most common causes of

Table 1: Descriptive statistics from children under 5 years old from 33 countries, 2004-2010 who reported diarrhea. Proportions for categorical variables and median/interquartile range for numerical variables. Bivariate regressions of dysentery on independent variables

Variables	No dysentery	Dysentery	OR	p-values
Children				
Dysentery (%) (n)	85.25 (33.048)	14.74 (5.714)		
Age in months median (IQR)	19 (22)	24 (22)	1.01	0.000
Female sex (%) (n)	47.32 (15.639)	47.67 (2.724)	1.01	0.624
Possession of health card (%) (n)	87.82 (29.026)	85.35 (4.877)	0.81	0.000
Complete immunization schedule (%) (n)	63.72 (21.060)	55.98 (3.199)	0.72	0.000
Planned pregnancy (%) (n)	57.17 (18.895)	53.02 (3.030)	0.85	0.000
Antenatal visits (%) (n)				
None	9.47 (3.131)	11.06 (632)	1.19	0.000
1-2 antenatal visits	10.02 (3.312)	9.53 (545)	0.95	
3-10 antenatal visits	59.77 (19.753)	56.09 (3.205)	0.86	
More than 10	4.16 (1, 376)	2.55 (146)	0.60	
Missing information	16.56 (5.476)	20.75 (1.186)	1.32	
Birth weight (%) (n)				
Low	6.25 (2.066)	5.19 (297)	0.82	0.000
Normal	48.17 (15.921)	40.47 (2.313)	0.73	
Not weighed or not remember	45.057 (15.061)	54.32 (3.104)	1.42	
Cesarean delivery (%) (n)	11.08 (3.665)	8.76 (501)	0.77	0.000
Duration of breastfeeding (months)	13 (10)	15 (10)	1.03	0.000
Median (IQR)				
Still breastfeeding (%) (n)	62.07 (20.514)	56.10 (3.206)	0.78	0.000
Drinking from a bottle with a nipple (%) (n)	22.44 (7.418)	17.72 (1.013)	0.75	0.000
Twin pregnancy (%) (n)	1.99 (659)	1.90 (109)	0.96	0.665
Mother				
Age (years) median (IQR)	27 (10)	28 (11)	1.02	0.000
Educational attainment (%) (n)				
No education	24.23 (8.010)	30.36 (1.735)	1.36	0.000
Elementary	39.38 (13.017)	44.50 (2.543)	1.23	
High school	30.24 (9.995)	21.92 (1.253)	0.65	
Superior	6.12 (2.025)	3.18 (182)	0.50	
Mother's employment (%) (n)	47.76 (15.787)	57.47 (3.284)	1.48	0.000
Marital status (%) (n)				
Single	4.27 (1.669)	4.48 (256)	1.50	0.187
Married	88.34 (29.195)	87.73 (5.013)	0.94	
Divorced separated or widow	7.38 (2.440)	7.78 (445)	1.06	
Total children ever born median (IQR)	3 (3)	3 (3)	1.10	0.000
Partner age (years) (%) (n)				
Under 20	0.58 (193)	0.36 (21)	0.63	0.000
Between 20 and 40	70.77 (23.391)	65.68 (3.753)	0.79	
Above 40	16.43 (5.430)	20.86 (1.192)	1.34	
Missing information	12.20 (4.034)	13.09 (748)	1.08	
Household				
No. of household members median (IQR)	6 (4)	6 (3)	1.03	0.000
Male-headed households % (n)	82.17 (27.157)	80.71 (4.612)	0.91	0.008
Age of head of household in years median (IQR)	36 (18)	37 (17)	1.00	0.760
Who is the head of household (%) (n)				
Mother	9.61 (3.179)	11.37 (650)	1.21	0.000
Husband	64.64 (21365)	66.22 (3.784)	1.07	
Other relative	25.73 (8.504)	22.40 (1.280)	0.83	
Urban residence (%) (n)	65.20 (21.548)	73.90 (4.223)	1.52	0.000
Floor material (%) (n)				
Soil or sand	44.65 (14.758)	56.72 (3.241)	1.62	0.000
Wood	11.51 (3.804)	11.95 (683)	1.04	
Finished floor	43.83 (14.486)	31.32 (1.790)	0.59	
Inadequate sanitation score (%) (n)	16.70 (5.520)	23.27 (1.330)	1.52	0.000
Wealth index (%) (n)				
Poorest	27.78 (9.182)	37.45 (2.140)	1.56	0.000
Poorer	22.82 (7.543)	25.28 (1.445)	1.15	
Middle	20.42 (6.749)	18.34 (1.048)	0.88	
Richer	16.75 (5.537)	12.58 (719)	0.72	
Richest	12.21 (4.037)	6.33 (362)	0.49	

mortality and morbidity in children, particularly in low and middle-income countries. In 2013 of the 6.3 million children worldwide who died before their fifth birthday about 7.94% died from diarrhea (Thiam *et al*., 2017). In a study in North Ethiopia with 241 participants, the overall prevalence was 13.3% (Kahsay and Teklemariam, 2015). Similar to previous studies, we observed a positive correlation between dysentery and mother's age,

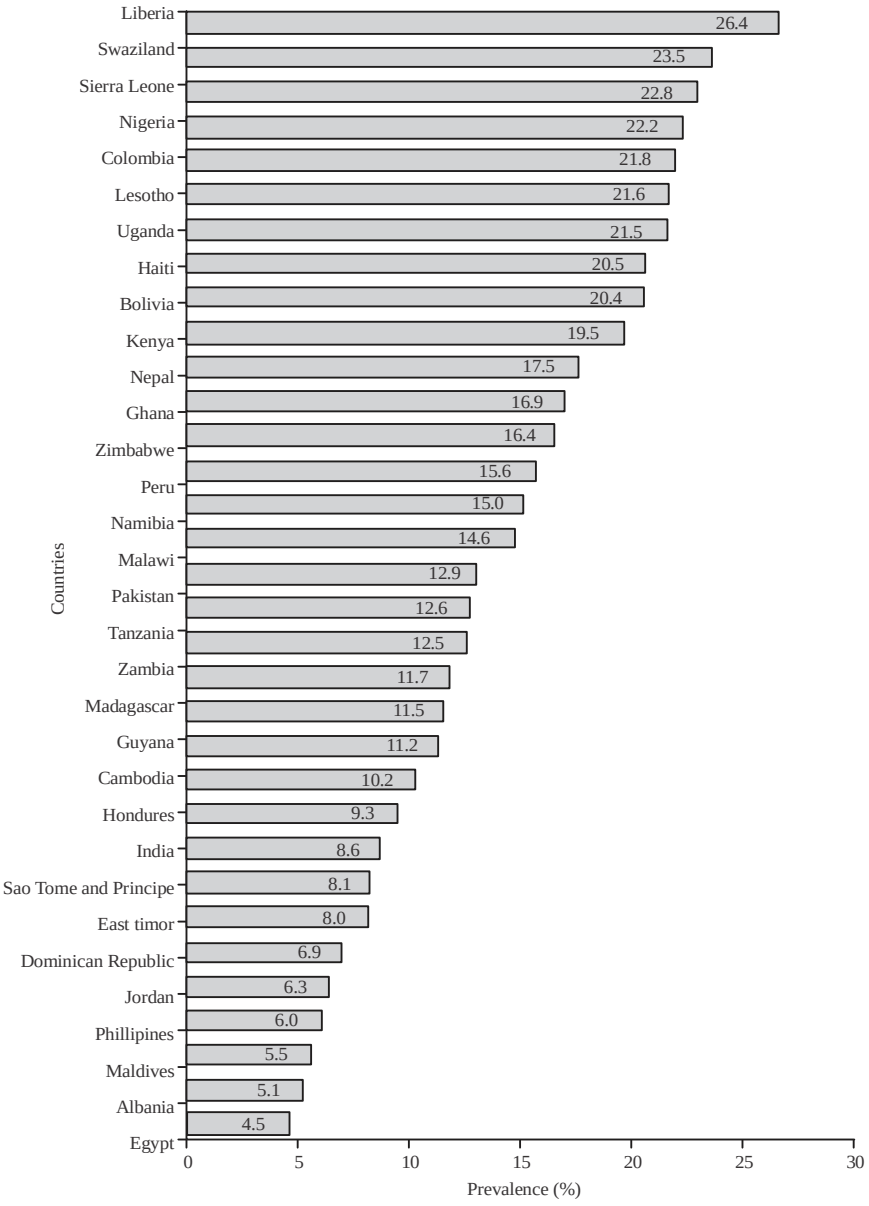

Fig. 2: Prevalence of dysentery in evaluated countries

Table 2: Signs, symptoms and characteristics related to dysentery from children under 5 years from 33 countries, 2004-2010

Variables % (n)	No. Dysentery	Dysentery	OR	p-values
Fever	45.66 (15.090)	58.54 (3.347)	1.68	0.000
Heard or used oral rehydration salts	83.85 (27.712)	83.40 (4.766)	0.97	0.400
Visited an appropriate place for medical treatment	51.27 (16.947)	58.69 (3.354)	1.35	0.000
Received oral rehydration solutions	47.34 (15.645)	54.91 (3.138)	1.36	0.000
Received antibiotic treatment	20.99 (6.937)	26.96 (1.541)	1.39	0.000
Offered adequate amount of liquids during illness	67.55 (22.327)	61.46 (3.512)	0.77	0.000
Offered adequate amount of solids during illness	43.86 (14. 497)	38.08 (2.176)	0.79	0.000

no education of the mother, employed mother, the number of household members and poverty (Ahmed *et al*., 2004; Wang *et al*., 2015; Chang *et al*., 2009) as well as a negative correlation between dysentery and child age, vaccination, duration of breastfeeding and urban residence (Bhutta and Salam, 2012; Abdel-Hafeez *et al*., 2013).

It is worth mentioning that the household wealth showed a gradient of association with dysentery that

Table 3: Multivariate multilevel logistic regressions for dysentery and country level characteristics

Final model			
Variables	OR	CI	p-values
Child sex	1.03	(0.96-1.11)	0.337
Child age	0.99	(0.99-0.99)	<0.001
Vaccination	0.88	(0.81-0.96)	0.003
Normal weight at born	0.95	(0.87-1.04)	0.276
Duration of breastfeeding	0.81	(0.75-0.89)	<0.001
Mother's age	1.01	(1.00-1.01)	0.002
Mother's education			
No education	1.25	(1.06-1.84)	0.049
Elementary level education	1.24	(0.98-1.57)	0.065
High school level education	1.03	(0.82-1.29)	0.798
Superior level education	**Comparison category**		
Employed mother	1.11	(1.02-1.20)	0.009
Married	1.07	(0.95-1.20)	0.242
Number household members	1.02	(1.01-1.03)	<0.001
Type of residence urban	0.87	(0.79-0.97)	0.015
Household wealth			
Poorest	2.07	(1.72-2.49)	<0.001
Poorer	1.78	(1.49-2.13)	<0.001
Middle	1.49	(1.25-1.78)	<0.001
Richer	1.38	(1.16-1.65)	<0.001
Richest	**Comparison category**		
Intercept	0.14	(0.12-0.16)	<0.001
GDP per capita	0.75	(0.71-0.78)	0.003
Gini index	1.23	(1.19-1.28)	<0.001
Health expenditure	0.85	(0.80-0.89)	<0.001
Random effects intercept	SD	Variance component	p-value
	0.34	0.12	<0.001
Reliability intercept		87.80%	

changed depending on the wealth category. This confirms what was found by Chompook *et al.* (2006) in Thailand the poorer you are the more likely to get dysentery.

The country characteristics studied showed association with dysentery. A negative correlation of GDP per capita and child dysentery was observed which means that the lack of economic production is associated with the health of children at the country level. This finding is consistent with other epidemiological studies which present how the lack of economic resources at the country level is associated with the decrease and absence of opportunities and in turn with impaired health of the population (Ma *et al*., 2015; Nie *et al*., 2014).

The Gini index showed a positive correlation with dysentery. The degree of inequality in the distribution of income is related to the health of children at the country level. Inequalities create the sense of unfairness and feelings of injustice and discrimination in the disadvantaged group due to the difference in the opportunities offered (Kawachi and Subramanian, 2007). These feelings have the potential to undermine the well being of children and their families.

Health expenditure also showed a positive correlation to dysentery. It is likely that when a country invests their money in health, it is giving its children the potential to be healthier (Musich *et al*., 2016).

CONCLUSION

This study explored by using a multilevel analysis, the association between country characteristics per capita GDP, income inequalities (Gini coefficient) and health expenditure-individual, maternal and household characteristics and dysentery in a multinational population. We found that some factors like older age of the child and lower maternal age an unemployed mother, lower number of household members, higher wealth index and higher Gini index are protective factors against dysentery while lower GDP per-capita, incomplete immunization schedule, lower duration of breastfeeding and rural residence are risk factors against the same illness.

Additionally as in a previous study, health expenditure does not appear to take part in developing dysentery. However, per capita GDP and Gini coefficient keep showing an important involvement with progressing from acute diarrhea to dysentery. Due to this and to diminish the consequences of this morbid presentation of acute diarrhea, countries must weigh up ways of improving their per capita GDP and diminishing inequalities. Studying factors associated with developing dysentery during an episode of acute diarrhea could be the base upon which we can diminish mortality from this illness and keep our efforts addressed to reduce inequality

within and among countries, so we can influence in the factors already described and children worldwide can achieve their highest possible development.

LIMITATIONS

Even though DHS has significant and well-known advantages related to quality, comparability and representativeness of the information, our study presents some limitations. First, due to its cross-sectional nature, it is not possible to establish any causal relationship among studied variables. Second as data was collected exclusively from mothers who are supposed to be the best relators about their child's history, related bias are likely to be found. Third while DHS questionnaires are not executed simultaneously in every country and social conditions tend to change over time, some differences could be expected. However, our results did not change after controlling for year of the survey. Fourth, the variable definitions are limited by the established methodology of the DHS team. Fifth, we did not include information from the countries that did not take into account dysentery as part of their questionnaire. Finally, the resulting large sample size contributes to an over-power analysis that could detect minimal effect sizes and these could mean slight biases in the sampling process.

Attachment #1

Countries	Years	Countries	Years
Albania	2008-2009	Malawi	2010
Azerbaijan	2006	Maldives	2009
Bangladesh	2007	Mali	2006
Benin	2006	Namibia	2006-2007
Bolivia	2008	Nepal	2006
Cambodia	2010	Niger	2006
Colombia	2010	Nigeria	2008
Congo	2005	Pakistan	2006-2007
Egypt	2005-2006	Peru	2004-2008
Philippines	2008	Democratic Republic of Congo	2007
Ghana	2008	Dominican Republic	2007
Guyana	2009	Sao Tome e Principe	2008-2009
Haiti	2005-2006	Sierra Leone	2008
Honduras	2005-2006	Swaziland	2006-2007
India	2005-2006	Tanzania	2010
Indonesia	2007	East Timor	2009–2010
Jordan	2007	Ukraine	2007
Kenya	2008-2009	Uganda	2006
Lesotho	2009	Zambia	2007
Liberia	2007	Zimbabwe	2005-2006
Madagascar	2008-2009		

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