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Detecting The Impact of Wealth Variation on Diarrhea Prevalence in Nigeria and Benin Republic Amongst Children Under 5 Years.

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Abstract- ***Considering the variable spread of Diarrhea and its effect across African Countries, this research was aimed at comparing recent trends in Diarrhea prevalence in Nigeria and Benin republic amongst children under 5 years (U5), determining the efficacy of interventions design from past research. Data for this research was sourced from UNICEF database for Percentage of children (under age five) with diarrhea for whom advice or treatment sought from a health facility or provider. Percentage of U5 Children in Benin republic was observed to be less than 30% while Nigeria had a higher rate of less than 50% irrespective of wealth status or year observed for both countries. Benin republic showed about 5% Diarrhea decline post Covid 19 for both rural and urban locations unlike Nigeria that showed increase of U5 children with diarrhea with advancing years especially for the rich and urban locations. Using the Wealth variable, an increase in percentage of U5 children with diarrhea were higher from Rich areas compared to those from poor areas in the year 2022 in Benin republic. Nigeria also had a higher percentage for U5 children with diarrhea for urban and rich areas compared to rural and poor areas. Possible reasons could be over the years the efforts channeled towards rural countries has actually led to decline in diarrhea prevalence amongst children especially in poor areas for both countries. The graduating increase of U5 children with diarrhea with increase in years especially amongst the rich Nigerian population poses an health problem most likely not related to wealth but if not handled shows a tendency for further increase as the years progress. Thus urgent further study has to be done detecting the unique factors predisposing children within the rich community to diarrhea to aid design interventions tailored to that community.***

Index Terms- ***Benin Republic, Children Under 5 Years, Diarrhea Prevalence, Nigeria***

I. INTRODUCTION

Addressing the prevalence of diarrhea in West Africa requires regular epidemiologic study and analysis of Health survey data to aid in understanding the current health trends of residents and active associated factors. Diarrhea is not just a West African health issue, but also prevalent in other African regions as well as globally, as observed in countries such as Indonesia. The Indonesian research using a survey showed that 14.72% of toddlers experienced diarrhea during the two weeks prior to the survey (Kurniawati et al, 2023)

Though geographic inequality with respect to diarrhea risk and varied fatality rates exists in Africa, with the highest values observed in Benin, Lesotho, Mali, Nigeria, and Sierra Leone, out of the estimated 330,000 childhood deaths linked to diarrhea in 2015, more than 50% occurred in 55 of the 782 first-level administrative subdivisions (Reiner et al., 2018)

A 2023 research observed significant wealth gradient in the burden of diarrheal diseases among under-five children in sub-Saharan Africa. The risk ratios of having diarrhea decreased progressively with higher wealth quintiles. Also, Boys had a higher percentage of having diarrhea than girls in all countries except in Libya. Of the 36 countries studied, Libya had the highest percentage of diarrhea, with more than one-

quarter of the children having diarrhea during the 2 weeks preceding the survey. Though Rural residency was associated with lower risks, not having access to improved water and toilet facilities was associated with higher diarrhea risks. Other factors were also reported to facilitate the incidence of diarrhea e.g increased age, younger mothers with primary education (He et al, 2023).

Similarly, a 2022 research aimed at assessing the prevalence and associated factors of diarrhea among under five years' children using the national representative Demographic and Health Surveys from 12 East African countries concluded that the wealth status of the household, the timing of breast feeding initiation, the Maternal age, child's age and sex, community level of educational status, working status of the mother, and the number of under five children were factors that were associated with diarrheal diseases (Tareke et al, 2022) this was confirmed by an earlier study focus on children in Rwanda (Tuyizere et al, 2019). The study concluded that low wealth index and child age less than 35 months were important risks for under-five child diarrhea (Tuyizere et al., 2019).

Childhood diarrhea was also observed to be a public health problem in Tiko city in Cameroon (Tambe et al., 2015). Children from households with two or more siblings and whose mothers/caregivers lacked awareness of safe sources of drinking water were reported to have higher rates of diarrhea. Integration of health workers to facilitate hygiene education to the community and family planning activities should be considered in the prevention of childhood diarrhea (Tambe et al, 2015).

Nigeria, as previously listed is not left out, a study in Enugu state and reported that ignorance, cultural/religious beliefs, and lack of funds were major barriers limiting the prevention of diarrhea (Odo et al, 2023).

In West and Central Africa, the decline of the prevalence rates of diarrhea, fever, acute respiratory infections, and malaria was observed to have decelerated over time (1995-2009), and little improvement occurred between 2010 and 2017. The reduction has varied, and the prevalence rates either accelerated or stagnated for diarrhea (Simen-Kapeu et al, 2021)

In addition, a survey for 13 West African countries was studied, and the weighted prevalence of diarrhea was 13.7%. Children aged <2 y, mothers aged <30 y, poor households, and poor nutritional status, mothers without formal education, wasting and underweight, were reported to be the independent predictors of diarrhea (Owusu et al, 2024). Suggested interventions targeted at high-risk subgroups in the population to reduce the burden and adverse effects of diarrhea, included increased vaccination coverage, population-based nutritional programmes, and campaigns on the use of cleaner cooking (Owusu et al, 2024)

A case study for Benin republic using health survey confirmed that household with clean water and good hygiene practices would have reduced diarrhea incidence. It also reported that the wealthier and educated population had reduced disease incidence, apparently owing to their capacity to obtain safe water for their household irrespective of residence location. They concluded from their assessments of cost and benefit, that improving accessibility to safe water is not costly but aids wellbeing (Pande et al 2008) thus a multifaceted approach was recommended facilitating education on hygiene practices, investments in water sources and management of wells (Pande et al., 2008). Another Benin study observed that basic sanitation services were observed and reported to aid in reducing the incidence of diarrhea, which was different from households without sanitation services and open defecation (Gaffan et al, 2023)

In consideration of another aspect of wellbeing with respect to diarrhea, a Nigerian study compared the knowledge and behavior of community pharmacists in the management of acute diarrhea in children with their observed practice. This study was carried out using a structured self-administered questionnaire and simulated patient visits in 186 pharmacies in the city of Lagos, Nigeria. The results showed that the knowledge and attitude of community pharmacists in the management of acute diarrhea in children were statistically different from their observed practice. 23% carried out an appropriate assessment before recommending any products, and 15% recommended ORT alone. Questionnaire data revealed that 24% of

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pharmacists knew the correct instructions to give on food and fluid intake during diarrhea, whereas 8% followed the WHO guideline on food and fluid intake during the visits. This study shows that only 15% of community pharmacists managed acute diarrhea in children according to the WHO guidelines. (Ogbo et al, 2014)

Data from the 2013 Nigeria Demographic and Health Survey (NDHS), including 28,596 mother-child pairs, was studied. Results showed that the prevalence of diarrhea was 11.3% with a higher rate being markedly higher in rural areas (67.3%) as compared to urban areas (32.7%). Inaccessibility to improved toilet and water facilities was associated with 14% and 16% respectively diarrhea cases as compared to those who had improved access. The study concluded that investing in healthy living conditions and WASH could aid in preventing child mortality (Yaya et al, 2018)

Maternal education has also been observed in a Nigerian study to be associated with diarrhea among children aged 0-24 months. Thus, policies targeting children of the illiterate, less educated mothers should be put in place to reduce diarrhea among children (Desmennu et al, 2017)

It was as well observed in a Nigerian study that the prevalence of diarrhea was highest prevalence in the North East (24.7%) (Awoniyi et al, 2021)

Taking into consideration the variable spread of Diarrhea and its effect across African Countries, this research is aimed at comparing recent trends in Diarrhea prevalence in Nigeria and Benin republic, observing if all previous studies and interventions has aided in the reduction of diarrhea especially after year after Covid 19.

II. MATERIALS AND METHOD

Data of children under-5 from Unicef Child health coverage database last updated November 2024 was used. The section used for this research was "Percentage of children (under age five) with diarrhea for whom advice or treatment sought from a health facility or provider"

The specific survey chosen was the Multiple Indicator Cluster Survey, selection for West and Central Africa was made and countries with dataset before and after Covid 19 was selected: Nigeria and Benin Data presentation was done using Excel

III. RESULTS

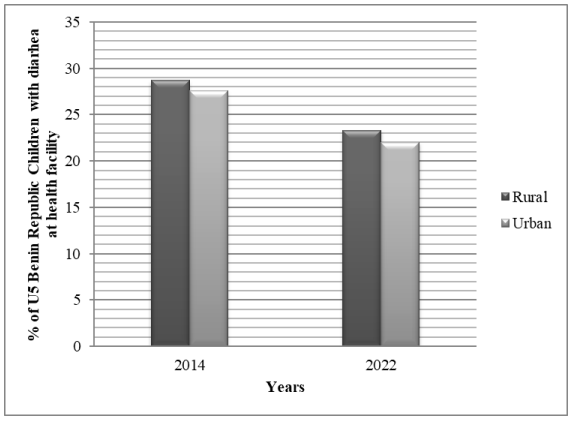

Figure 1: Percentage of children (under age five) with diarrhea for whom advice or treatment was sought from a health facility or provider at the republic of Benin (Urban and Rural)

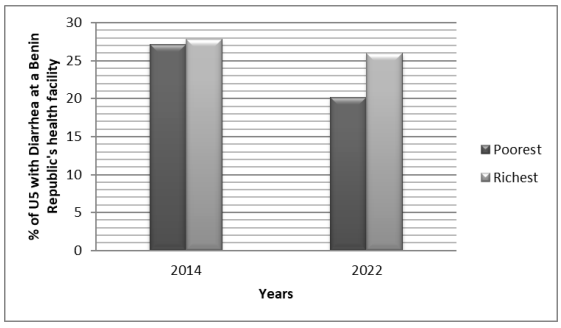

Figure 2: Percentage of children (under age five) with diarrhea for whom advice or treatment was sought from a health facility or provider at the republic of Benin (Poorest and Richest)

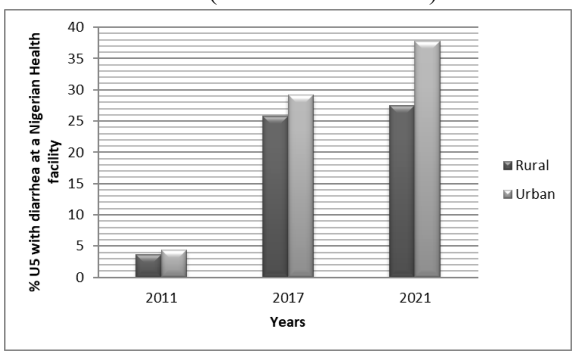

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Figure 3: Percentage of children (under age five) with diarrhea for whom advice or treatment was sought from a health facility or provider at the Nigerian (Poorest and Richest)

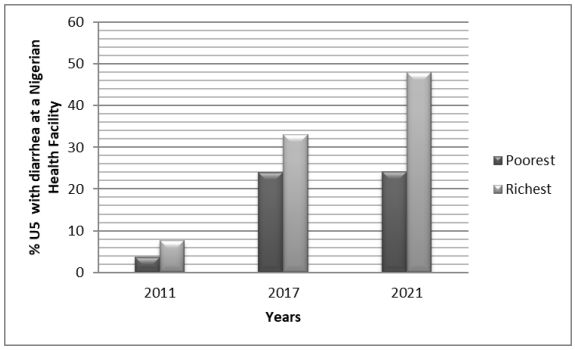

Figure 4: Percentage of children (under age five) with diarrhea for whom advice or treatment was sought from a health facility or provider at the Nigerian (Poorest and Richest)

IV. DISCUSSION

Benin republic data observed in this research showed that only slight difference existed between urban and rural irrespective of the years but an increase in percentage of children reporting at health facilities was more for children from Rich homes compared to Children from poor areas in the year 2022.
But in Nigeria percentage children reporting at health facilities was more for both urban and rich areas compared to rural and poor areas.

For years before and after Covid 19, Benin republic didn't show much difference apart from that already stated for rich families which occurred in 2022 But Nigeria had a graduating increase of percentage children reporting at health facilities as the years increased. With more increase observed with children form Rich areas.

This findings differs from earlier report of some African countries, Demographic and Health Surveys from 12 East African countries concluded that the wealth status of the household, were part of the factors that were associated with diarrheal diseases (Tareke et al, 2022) this was confirmed by an earlier study focus on children in Rwanda (Tuyizere et al, 2019) showing wealth index was part of the important risks for under-five children diarrhea (Tuyizere et al., 2019). It's important to however note that one glaring difference is that these countries were East African Countries but the countries in this research were West African countries.

The linear relationship of wealth and Diarrhea observed on these West African countries especially in Nigeria was similar with an earlier research of Sub-Saharan African countries where children from wealthier homes had more diarrhea than those from poor homes (He et al, 2023).

But a survey for 13 West African countries was studied, and poor households, and poor nutritional status, were reported to be the independent predictors of diarrhea (Owusu et al, 2024). Similarly A case study for Benin republic using health survey also reported that the wealthier and educated population had reduced disease incidence, apparently owing to their capacity to obtain safe water for their household irrespective of residence location. (Pande, et al, 2008). But this publication was done over a decade ago, so the present study showed that more indebt research has to be done on Benin republic to understand wealth impact on diarrhea, since our study showed in year 2022, poor areas reported less diarrhea amongst under 5 children compared to rich areas. Year 2008 to 2014 is more than half a decade and our 2014 data showed a slight decrease in diarrhea of 1% with decrease in wealth of about compared to the about 5% showed in 2022. Studying the years together in this research it shows it is not an increase in wealth predisposing to more diarrhea but a decrease in diarrhea with poorer areas as the years increases. This is obvious because in the year 2022 the percentage of diarrhea decrease for both rich and poor compared to 2014 but poor areas decrease at a higher rate. Thus an immediate research has to be done with more years involved and understanding the factors contributing to this change in wealth impact on diarrhea reported. This research has however tilted the possibility to be less a thing of negligence of care despite finance availability in rich areas to the effectiveness of interventions in poor areas.

The result obtained in this work was supported as earlier stated by He et al, which confirms a possibility for there to be a linear relationship between wealth and Diarrhea in certain communities (He et al, 2023).

Possible reasons could be over the years the efforts channeled towards rural countries has actually led to decline in diarrhea prevalence amongst children especially in poor areas of Nigeria as shown in this research. It could also mean that though the wealthy population could afford amenities they are not knowledgeable on the importance so overlook causes of diarrhea so they channel their wealth towards therapy instead of prevention.

More research analysing and comparing specific factors predisposing to diarrhea in Rich vs poor areas has to be analysed to aid specificity when designing interventions designed for the rich populations.

The increase in wealth population could also be a case of it not being reported to health facilities in rural areas due to the financial involvement and religious beliefs as was earlier reported in a Nigerian study where ignorance, cultural/religious beliefs, and lack of funds were major barriers limiting the prevention of diarrhea (Odo et al, 2023).

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