Response to the reviewer:  
  
Reviewer: 1  
  
Comments to the Author  
Assessing Contributory Factors of Diarrhea among Under Five Children in Bangladesh: A Comprehensive Analysis of  Three Waves of Nationally Represent Data  
Authors presented the analysis of 3 waves of MICS data showing trends of diarrhoea in children under five years in Bangladesh. The comments below would help improve upon the current paper.

Introduction  
•       In paragraph 1, there are 2 conflicting statements, one says 21000 children die of diarrhoea each day, and another says 5,000 children die each day. This needs to be relooked at and rephrased

**Response:** Thank you for highlighting this issue. In paragraph 1, lines 72-75, we incorporated recent information from the World Health Organization (WHO) and removed the previous confusing details. I also reorganized the sentence for improved clarity.

“According to the World Health Organization (WHO), every year, there are approximately 1.7 billion cases of diarrheal disease among children worldwide and diarrhea claims the lives of about 443,832 children under the age of 5, along with an additional 50,851 children aged 5 to 9 (WHO, 2024).”

•       From the introduction… “According to the information that we have, no study was conducted using the Multiple Indicator Cluster Survey (MICS) data of Bangladesh to portray the changes of factors influencing diarrhea over time.”  
Why is this important in a country like Bangladesh where extensive work on diarrhoea has already been done and is still ongoing? Authors need to provide a more meaningful justification.

**Response:** Thank you for your insightful comments. We have now included a valid justification for conducting our study. Recent data from two large, nationally recognized surveys indicate a significant increase in the prevalence of diarrhea. Therefore, it is crucial to reassess the contributing factors and provide recommendations for policymakers to address this issue. We hope the reviewers will be pleased with our updates.

In lines 129-132, we included, “Based on the Multiple Indicator Cluster Surveys (MICS) from 2006, 2012-13, and 2019, the prevalence of diarrhea among under-five children was reported at 7.1%, 3.9%, and 6.9%, respectively (MICS, 2006, 2014, 2019). Additionally, the BDHS from 2014, 2017-18, and 2022 indicated rates of 5.7%, 4.7%, and 4.8% (BDHS, 2014, 2019, 2022). Despite various interventions and innovations aimed at reducing childhood diarrhea, the burden of the disease appears to be increasing in recent years in Bangladesh.”

In lines 136-138, we included, “Additionally, we sought to understand the reasons behind the recent increase in diarrhea cases, despite improvements in various health indicators.”

Also, we modified our previous objectives, In lines 140-143, “Overall, we aimed to analyze the prevalence of diarrhea and identify the factors contributing to diarrheal diseases among children aged 0-5 years in Bangladesh from 2006 to 2019, in order to understand the recent increase in this serious health issue.”

Methods  
Outcome and possible covariates  
•       The definition of diarrhoea has diarrhoea in it. What exactly was the definition of diarrhoea used in this study?

**Response:** Thank you for highlighting this issue. In the outcome variable section, we did not provide a formal definition; we simply described how the MICS survey and our study defined the outcome variable. If mothers or caretakers confirmed that their children had diarrhea in the two weeks preceding the survey, we classified that as “Yes” for diarrheal status. I have rewritten the outcome variable section for clarity.

In lines 188-192, we modified the description of the outcome variable, “In this study, we assessed diarrhea among children aged 0-5 years based on whether they experienced diarrhea in the two weeks prior to the survey. The responses were provided by mothers or caretakers. We defined the binary outcome variable “Diarrhea,” which has two categories: “Yes” for children who had diarrhea and “No” for those who did not in the two weeks before the survey.”

•       It would be advisable to group the covariates as done in the result tables. Such as household characteristics, community characteristics, etc

**Response:** Your feedback greatly enhanced the presentation of our manuscript. We implemented your suggestions and grouped all covariates accordingly.

•       How was the variable on supervision measured? How was it collected in the MICS? How was it presented in this study?

**Response:** Thank you for bringing this issue to our attention. We have elaborated on our previous statement regarding the measurement of this variable in the MICS. We also cited the MICS report to provide further insights and clarified how we categorized and utilized this variable in our study.

In lines 209-2012, we included, “A child was considered under inadequate supervision if the child under age 5 was left alone or under the supervision of another child younger than 10 years old for more than one hour at least once in the last week (MICS, 2019). In this study, we categorized inadequate supervision as either 'yes' or 'no.”  
  
Results  
•       The arrangement of tables after the references is unclear. Table S2 must come before the tables with the adjusted values. Tables need to be properly formatted

**Response:** Thank you for your comments. We have placed the tables and figures within the manuscript where they are cited. Table S2 has been positioned before Table 2. All tables have been formatted according to the journal's instructions and cross-checked with some published papers.  
  
Discussion  
•       “However, it is not sure that the shared toilet facility caused diarrhea, but the unhygienic toilet facility contains the pathogens like norovirus, which caused diarrhea..” authors should refer to the paper below and revise their argument on the use of shared toilets (Ramlal et al., 2019)  
Ramlal, P. S., Stenström, T. A., Munien, S., Amoah, I. D., Buckley, C. A., & Sershen. (2019). Relationships between shared sanitation facilities and diarrhoeal and soil-transmitted helminth infections: An analytical review. Journal of Water Sanitation and Hygiene for Development, 9(2), 198–209. <https://doi.org/10.2166/WASHDEV.2019.180/643608/WASHDEV2019180.PDF>

**Response:** Thank you for your suggestions. We have cited the article you recommended and revised our argument accordingly.

In lines 389-391, we included “Similar to our findings, the shared toilet facility caused a significantly increased risk of diarrhea (Ramlal et al., 2019) and the unhygienic toilet facility contains pathogens like norovirus, which caused diarrhea also (Just et al., 2018).”

•       The recommendation must come after the conclusion

**Response:** Thank you for your suggestions. We did accordingly to your suggestions.

•       The conclusion should reflect the aim of the study. The conclusion did not cover the prevalence of diarhoea over the years.

**Response:** Thank you for bringing this issue to our attention. We have included the aim of the study and the prevalence of diarrhea in the conclusion.

In lines 431-434, we included, “Our study found that the prevalence of diarrhea among children under five has reportedly increased in recent years. Therefore, we aimed to analyze the prevalence of diarrhea and identify the factors contributing to diarrheal diseases in children aged 0-5 years in Bangladesh from 2006 to 2019, in order to understand the recent rise in this serious health issue.”  
  
•       What new knowledge does this study add that is not already known?

**Response:** Thank you for the comments. We included the new knowledge that we found state in the strengths and limitations sections.

In lines 422-427, we included, “This study observed a significant increase in the prevalence of diarrhea, nearly double that of the previous survey, marking it as the first study to highlight this issue. Several variables were assessed during the analysis, which may influence diarrhea. Additionally, we examined the association of different covariates over time that have the greatest impact, and the recent survey clarified the current situation regarding other factors contributing to the rise in diarrhea prevalence.”

•       Authors should be thinking about ideas such as \*are the factors changing over the years? Which factors have been the same over the years? Is the prevalence declining? Are there diarrhoea hotspots that need to be taken note of?\*

**Response:** Thank you for your valuable suggestions. We addressed the changes in factors over time in the discussion section. Similar or changed factors have already been mentioned in the discussion, conclusion, and recommendations. In this version, we focused on the increasing trend of diarrhea and made corresponding modifications throughout the manuscript. We also discussed the hotspots in the discussion, conclusion, and recommendations.

In lines 440-454, we updated, “These factors include the child's age (across lower age categories), underweight status, place of residence (both urban and rural), divisions (Barisal and Rangpur), mother's education (incomplete and complete primary), mother's age (15-19 and 20-34 years), wealth status (poorest and poor), religion (Islam), ethnicity (Bengali), use of shared toilet facilities, type of non-improved toilet facilities, usage of iodized salt, and consumption of water from covered containers. Younger children, particularly those aged 12 to 23 months, as well as underweight children, children from rural areas, and those from Barisal, were found to have a higher risk of diarrhea. Additionally, children whose parents have only a primary education, mothers aged 15-19 or 20-34 years, and those from poorer or poorest households were also at greater risk. Other contributing factors include being of Islamic faith, sharing toilet facilities, using non-improved toilet types, not using iodized salt, and consuming water from uncovered containers also at higher risk of diarrhea. In addition, we also noticed that the age of the child, Division, and shared toilet facilities are significantly associated in all survey years. However, underweight status, division, mother's education, wealth index, religion, ethnicity, type of toilet facility, and salt iodization were significant factors in 2019 but not in the previous survey.”

In lines 468-474, we include, “In addition to all contributing factors, policymakers should consider and take to immediate action to reduce diarrhea in underweight children, specific divisions, lower education of mother's education, lower wealth index, specific religion, specific ethnicity, unimproved type of toilet facility, and no salt iodization in food intake. These factors were significant in 2019 but not in the previous survey, and they play a role in the overall increasing prevalence of diarrhea in Bangladesh.”  
  
Strengths and limitations  
•       You can consider looking rather at the nationwide data collected by the MICS and how generalizable its findings could be to the country.

**Response:** Thank you for your comments. We have generalized our findings by comparing them with the nationwide data collected by the MICS, which enhances the relevance and applicability of our results to the broader context of the country.

In lines 422-427, we included, “This study observed a significant increase in the prevalence of diarrhea, nearly double that of the previous survey, marking it as the first study to highlight this issue. Several variables were assessed during the analysis, which may influence diarrhea. Additionally, we examined the association of different covariates over time that have the greatest impact, and the recent survey clarified the current situation regarding other factors contributing to the rise in diarrhea prevalence.”

Recommendations  
•       The recommendations are vague. What findings are policymakers supposed to consider? What are the exact things proposed to improve the diarrhoea situation in the country

**Response:** Thank you for your comments. We have clarified the recommendations in this version by specifying the factors of concern for policymakers and suggesting precise actions that should be prioritized to improve the diarrhea situation in the country.

In lines 468-474, we include, “In addition to all contributing factors, policymakers should consider and take to immediate action to reduce diarrhea in underweight children, specific divisions, lower education of mother's education, lower wealth index, specific religion, specific ethnicity, unimproved type of toilet facility, and no salt iodization in food intake. These factors were significant in 2019 but not in the previous survey, and they play a role in the overall increasing prevalence of diarrhea in Bangladesh.”

•       Authors should note that the data used for the study is cross-sectional and thus cannot show causality therefore all the interpretations must be made with caution. In the light of that, authors should appropriately revise their recommendations.  
  
**Response:** Thank you for raising this issue. We included this issue in our limitations.

In lines 428-430, we included, “The main limitation of this paper is to use a cross-sectional study and hence it may produce selection and information bias, and this study such as the information was derived from a secondary source.”

Reviewer: 2  
  
Comments to the Author  
Abstract:  
There seem to be some omissions in the text, for example:  
“…a total of 31,566, 23,402, and 24,686 children under five were included from, 2012, and 2019, respectively.”  
Do you mean:  
“…a total of 31,566, 23,402, and 24,686 children under five were included from 2006, 2012, and 2019, respectively.”

**Response:** Thank you for identifying our gaps; we truly overlooked them. We've now included 2006 in the latest version.

The language throughout the manuscript should be carefully reviewed. For example, to maintain the academic tone expected in scientific writing, it is recommended to avoid using subjective or qualitative terms such as "unfortunately."

**Response:** Thank you for your valuable comments. We have reviewed and removed those types of words. Additionally, we carefully went through the entire manuscript to address all grammatical issues and enhance the language quality in terms of scientific writing.

Introduction:  
Instead of “influential cause”, you can use “main” or “leading cause”

**Response:** Thank you for your valuable suggestion. We followed your suggestion and changed it accordingly.

Some information is inconsistent. For example, you say that “…about 21,000 of them died every day” and further down you mention “more than 5000 children are dying every day”. From my understanding, both of these numbers refer to daily child deaths from diarrhea, but the numbers are inconsistent. You should carefully check your sources and polish the text. Generally, the first paragraph of the introduction is disorganized and repetitive.

**Response:** Thank you for bringing this issue to our attention. We have rewritten the first paragraph of the introduction and carefully reviewed it to remove any repeated or confusing statements.

From lines 70-82, we rewrite the 1st paragraph as “Diarrhea is a leading cause of under-five child mortality globally. According to the World Health Organization (WHO), every year, there are approximately 1.7 billion cases of diarrheal disease among children worldwide and diarrhea claims the lives of about 443,832 children under the age of 5, along with an additional 50,851 children aged 5 to 9 (WHO, 2024). In 2010, about 7.6 million Children aged below five years died worldwide and about 21,000 of them died every day (Woldu, Bitew, & Gizaw, 2016). The diarrhea-related mortality rate is high in developing countries and deaths from diarrhea are rare in developed countries (Podewils, Mintz, Nataro, & Parashar, 2004; Zeleke & Alemu, 2014). Each year in developing countries, almost 2 million people die of diarrhea, a significant number of whom are children aged between 0-5 years (Zeleke & Alemu, 2014). Due to high mortality rates in developing countries, the loss of human lives is the main concern for those countries while the developed countries focus on reducing the economic cost associated with cases of diarrhea (Pinzón-Rondón, Zárate-Ardila, Hoyos-Martínez, Ruiz-Sternberg, & Vélez-van-Meerbeke, 2015).”

The second paragraph also seems repetitive and disorganized, a lot of statistics are cited but a coherent storyline is missing.

**Response:** Thank you for your comments. We have updated the second paragraph of the introduction and thoroughly reviewed it to eliminate any repeated or confusing statements.

From lines 83-93, we updated, “Among the South Asian countries, the percentage of deaths due to diarrhea among children under five was high for Pakistan (8%), followed by India (7%) and Bangladesh (7%), and low for Maldives (1%) and Sri Lanka (1%) in 2019 (“Diarrhoea,” 2022). In a developing country like Bangladesh, most children suffer from diarrheal diseases which ultimately lead them to death (Shah, Yousafzai, Lakhani, Chotani, & Nowshad, 2003). Each year, in Bangladesh, every child suffers three to five times on an average from diarrheal attacks (M. J. Alam, 2007). A previous study showed that diarrhea is the reason behind about 33% of total child deaths in Bangladesh (M. R. Islam, Hossain, Khan, & Ali, 2015). Most of the deaths due to diarrhea occur in rural areas (Shah et al., 2003). According to 2007 Bangladesh Demographic and Health Survey (BDHS) data, most sufferers are 6-23 months old children and boys are more at risk of this disease compared to girls (Begum, Ahmed, & Sen, 2011).”

It is unclear what the innovative aspects of the study are. The authors need to highlight better the innovative aspects of their study.

**Response:** Thank you for your insightful comments. We have now included a valid justification and innovativeness for conducting our study. Recent data from two large, nationally recognized surveys indicate a significant increase in the prevalence of diarrhea. Therefore, it is crucial to reassess the contributing factors and provide recommendations for policymakers to address this issue.

In lines 129-132, we included, “Based on the Multiple Indicator Cluster Surveys (MICS) from 2006, 2012-13, and 2019, the prevalence of diarrhea among under-five children was reported at 7.1%, 3.9%, and 6.9%, respectively (MICS, 2006, 2014, 2019). Additionally, the BDHS from 2014, 2017-18, and 2022 indicated rates of 5.7%, 4.7%, and 4.8% (BDHS, 2014, 2019, 2022). Despite various interventions and innovations aimed at reducing childhood diarrhea, the burden of the disease appears to be increasing in recent years in Bangladesh.”

In lines 136-138, we included, “Additionally, we sought to understand the reasons behind the recent increase in diarrhea cases, despite improvements in various health indicators.”

Also, we modified our previous objectives, In lines 140-143, “Overall, we aimed to analyze the prevalence of diarrhea and identify the factors contributing to diarrheal diseases among children aged 0-5 years in Bangladesh from 2006 to 2019, in order to understand the recent increase in this serious health issue.”

In the fourth paragraph, the authors list a lot of factors that have been shown in the literature to increase the risk of diarrhea among children. It is unclear whether the mentioned studies focused on Bangladesh or other countries too. The previous literature should be presented more comprehensively.

**Response:** Thank you for your comments. We have updated the fourth paragraph of the introduction and thoroughly reviewed it to present more comprehensive.

We updated the fourth paragraph, lines 102-123, “Several studies assess the prevalence and identified risk factors of childhood diarrheal diseases at a national, regional, and international level. A prospective, community-based surveillance study in the Peruvian Amazon revealed that diarrheal disease transmission was significantly higher from March to October (rainy season), and having dirt/wood/bark as floor material also increased its risk (Kosek et al., 2008). A study in Belarus reported that exclusive breastfeeding reduced the risk of diarrhea by 40% (Kramer et al., 2001). A study among children under five in Nigeria found that lower maternal education levels were associated with higher risks of childhood diarrhea (Yaya et al., 2018). A case-control study conducted in Kadoma City, Zimbabwe, identified several factors associated with an increased risk of diarrhea. These included the use of outdoor drinking water sources, such as rivers and outdoor faucets, as well as the distance to these water sources. Additionally, the use of unprotected water storage containers, the absence of treated drinking water, the lack of handwashing facilities, and an unhealthy home environment—characterized by the presence of garbage and flies—were also linked to a higher risk of diarrhea (Maponga et al., 2013). Additionally, some Brazilian studies found larger household sizes and lower household income (Blake et al., 1993), not having antenatal care during pregnancy, and an unimproved sanitation system (Genser et al., 2006). In Bolivia, wastewater in septic tanks/streets and disposal of children have increased the risk of diarrhea (Tornheim et al., 2009). It was identified that boys and younger children had a higher risk of having diarrhea (Mølbak et al., 1997; Quick et al., 1999). Young children in Bangladesh generally experience a variety of common illnesses like fever, cough, short/difficult breathing, diarrhea, etc (Hasan et al., 2020; Md. Aminul Islam et al., 2022). To reduce child morbidity and mortality, the prevention of diarrhea is indispensable.”

Results  
In figure 1, the ORs should be displayed on a log scale.

**Response:** Thank you for your suggestions. We displayed the figure on a log scale.

The discussion ties the results well with the broader literature on the topic.

**Response:** Thank you for your suggestions. We tried to improve the discussion in this version.

Editor Comments to Author  
1. Authors are encouraged to review and follow the recommendations put forward in the "Guidelines for reporting of statistics for clinical research in urology" (Assel et al., 2018) for guidance on the proper analysis, reporting, and interpretation of clinical research.

**Response:** Thank you for your suggestions. We have reviewed and followed the recommendations outlined in the "Guidelines for Reporting of Statistics for Clinical Research in Urology" (Assel et al., 2018) to ensure proper analysis, reporting, and interpretation of our clinical research. Our manuscript has been prepared accordingly.  
  
2. Avoid relying solely on statistical hypothesis testing, such as P values, which fail to convey important information about effect size and precision of estimates. P values should never be presented alone without the data that are being compared and the test used to derive them. If P values are reported, please follow standard conventions for decimal places: for P values less than .001, report "P<.001"; for P values between .001 and .01, report the value to the nearest thousandth; for P values greater than or equal to .01, report the value to the nearest hundredth; and for P values greater than .99, report as "P>.99."

**Response:** Thank you for your suggestions. We carefully consider our P-values and do not rely solely on them. We recognize the importance of various factors that may be relevant to our analysis and have not excluded these important variables solely based on statistical hypothesis testing.

3. References for the design of the study and statistical methods should be to standard works when possible. Define statistical terms, abbreviations, and symbols. Further, distinguish pre-specified from exploratory analyses, including subgroup analyses. At the end of the Methods section, please describe all of the statistical tests used for the analyses. State any a priori levels of significance, and whether tests were 1- or 2-sided. Also, specify the statistical software package(s) used in the analyses, and its versions. We encourage authors to follow SAMPL guidelines.

**Response:** Thank you for your suggestions. We followed your suggestions and ensured that references for the study design and statistical methods are based on standard works whenever possible. We defined all statistical terms, abbreviations, and symbols clearly. Additionally, we distinguished between pre-specified and exploratory analyses, including subgroup analyses. At the end of the Methods section, we have described all statistical tests used in our analyses, stated the a priori levels of significance, and indicated whether the tests were one- or two-sided. We also specified the statistical software package(s) used, along with their versions.  
  
4. Reporting guidelines ensure good reporting standards, so that your study can be understood, replicated, or used in a systematic review. Please stick to CONSORT guidelines when revising the manuscript. Ethical approval details and informed consent should be stated. These should appear in the Method section.

**Response:** We appreciate your feedback and adhered to the STROBE guidelines during the revision of our manuscript. We ensured that details regarding ethical approval and informed consent are clearly stated in the Methods section, in line with good reporting standards.   
  
5. The Abstract should be divided into the following sections 'Background and Aims', 'Methods’. ‘Results', and 'Conclusion', and it should not exceed 300 words. Details can be found in the journal Author Guidelines.

**Response:** Thank you for your guidance. We restructured the Abstract into the specified sections: 'Background and Aims,' 'Methods,' 'Results,' and 'Conclusion,' ensuring that it does not exceed 300 words. We followed the journal's Author Guidelines in these revisions.  
  
6. Please state the following: "All authors have read and approved the final version of the manuscript [CORRESPONDING AUTHOR or MANUSCRIPT GUARANTOR] had full access to all of the data in this study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis.”

**Response:** Thank you for your suggestions. All authors approved this version of the revision.   
  
7. Further, when listing the funding sources and/or financial relationships (i.e. conflicts of interest), please provide explanations of the role of those sources, if any: in study design; collection, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication. Alternatively, please provide a statement declaring that the supporting source/financial relationships had no such involvement.

**Response:** Thank you for your suggestions. We did accordingly.  
  
8. Please provide a transparency statement: "The [lead author/manuscript guarantor] affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained". Please replace the [lead author/manuscript guarantor] text with the name of the author who will act as such.

**Response:** Thank you for your suggestions.   
  
9. Please check all references to ensure that none of the cited articles have been retracted. You can use the Retraction Watch database, available here (<http://retractiondatabase.org/>). Zotero does this automatically (<https://bit.ly/2RPrA3F>). PubMed now also tags retracted articles. Similarly, please check whether a "Correction" has been issued for any of the cited articles, and if that is the case, please evaluate whether this affects the relevance of the citation for your article.

**Response:** Thank you for your suggestions.   
  
10. If you are acknowledging people in your article by name, it is expected that the corresponding author has obtained permission for them to be included in the Acknowledgments section of your article. This is in accordance with ICMJE recommendations as acknowledgments may imply endorsement of acknowledged individuals of a study's data and conclusions.

**Response:** Thank you for your suggestions.   
  
11. Please note that the submitting author is required to provide an ORCID ID.

**Response:** Thank you for your suggestions.   
  
12. Please show your study type in the title. Example: The trend of top five types of poisonings in hospitalized patients based on ICD-10 in the northeast of Iran during 2012–2018: A cross-sectional study.

**Response:** Thank you for your suggestions.   
  
13. Please provide a data availability statement indicating whether data and materials are available, and, if so, how and where to access them. For examples and templates, please see out

Author Guidelines(<https://onlinelibrary.wiley.com/page/journal/23988835/homepage/forauthors.html#DataAvailabilityStatement>). For data that cannot be shared, a short description of the restriction will need to be provided. If, alternatively, no data is associated with the article or all data underlying the results presented are available in the article, then this is what will need to be stated. For the latter, an example would be "The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials."

**Response:** Thank you for your suggestions.