Doi: 10.32677/IJCH.2015.v02.i04.002

Editorial

Prompting points for systematic review and meta analysis

Diarrhea is one of the leading causes of death among under-five children. Worldwide, diarrhea causes one out of every nine childhood deaths, which is a preventable disease. Some of the well-known and preventable risk factors of childhood diarrhea include Rotavirus, poor sanitation, unsafe water, lack of education, and lack of awareness about the primary treatment of diarrhea such as oral rehydration therapy (ORT). According to the National Institute of Cholera and Enteric Diseases, diarrheal diseases contribute to about 9.1% of the total deaths among the children 0-6 years of age. However in the last one decade, there is a significant reduction in childhood deaths from 2.5 million in 2001 to 1.5 million in 2012 [1]. This remarkable reduction might be because of various universal programs such as immunization for Rotavirus, program for control of diarrheal disease and acute respiratory infection, awareness programs for ORT and hand washing. Hopefully, recently initiated "Swachh Bharat" campaign by the Indian Government might also be helpful to reduce the burden of diarrhea disease. Yet, there is a large burden of diarrheal diseases in India, and we have to go a long way to overcome this burden.

A systematic review published in the current issue of IJCH is aiming to estimate the prevalence of diarrhea and identifying its risk factors which might be a noble work in view of the need for policies planning [2]. In the present systematic review, pooled prevalence as well as risk factors of diarrhea among under-five children in India was explored. It included all the studies available in English language from 2002 to 2013 and identified in PubMed. A study was considered to be eligible if either prevalence of diarrhea or gastrointestinal diseases, or risk factors in relation to childhood diarrhea among under-five and younger children were reported. The authors found 15 eligible studies. The prevalence of diarrhea among included studies ranges from 2.2% to 55.6% and the reported pooled prevalence by random effect method (REM) was 21.70% (11.24-34.46). Authors have correctly used I^2 statistics for identifying the heterogeneity among included studies, which is the best statistic for estimating the heterogeneity [3]. They also identified major risk factors associated with childhood diarrhea as severe malnutrition, anemia, and low socio-economic status.

In the present systematic review, the authors have considered studies involving various types of study designs namely cross-sectional, retrospective cohort and prospective cohort, case-control, and randomized controlled trials (RCT). Since intervention (RCT) studies are performed exclusively to assess preventive impact of the intervention on the disease and case-control studies are carried out mainly to find out determinants of the disease, it may not be advisable to consider them for prevalence estimation. As a matter of fact, the authors should have included only cross-sectional studies and cohort studies for estimating the pooled prevalence. Even for risk factor identification, intervention studies should have not been included. The authors should have included mainly case-control and cohort studies for identification of risk factors. Further, since cross-sectional studies may provide only associated factors, not the risk factors, for pooling of the results authors could have analyzed with and without the inclusion of cross-sectional studies.

Apart from the consideration of various study designs, authors have also considered the varying definition of outcome variables, e.g., acute diarrheal disease, severe diarrhea, acute gastroenteritis, and jaundice. In the inclusion criteria of the systematic review itself, author has included the reporting of diarrhea or gastrointestinal diseases. Furthermore, the present systematic review included the studies having variable study population, e.g., urban slum and general population. Although they did subgroup analysis on the basis of rural and urban, but in urban area itself there may be a large variation in the prevalence of diarrhea among urban general population and urban slum population. One more examples on the variable study population are one of the included studies reporting 55.6% prevalence, which was conducted partly on flood affected children of Bahraich district of Uttar Pradesh [4]. Such population will naturally have a high prevalence of diarrhea in that area.

The mentioned reasons may also be the cause of high heterogeneity among the included studies for synthesizing the prevalence (n=12, I^2=99.5%) and some of the risk factors such as age of the child <24 months (n=5, I^2=95.37%), low socio-economic status (n=5, I^2=98.4%). In the presence of substantial heterogeneity, pooling of the results and interpretation of the finding should be done carefully. Although authors have applied REM, but it is not admissible to pool the results with such a large heterogeneity because REM considers heterogeneity but does not remove it. In the case of large heterogeneity as evident from I^2=99%, authors would have found out the source of heterogeneity and could have explored subgroup analysis on that basis. If it is not possible to find the source of heterogeneity, the author should have done narrative review of each included study rather than pooling the results for prevalence and some of the risk factors.

The aim and objective of the systematic review is very much important and need of the time, but results are inconclusive because of low power and high heterogeneity among the included studies.

S N Dwivedi, Mona Pathak

From Department of Biostatistics, All India Institutes of Medical Sciences, New Delhi, India

Correspondence to: Dr S.N. Dwivedi,
Department of Biostatistics,
All India Institute of Medical Sciences,
Ansari Nagar, New Delhi - 110029, India.
E-mail: dwivedi7@hotmail.com

REFERENCES

1. Bhan MK. Accelerated progress to reduce under-5 mortality in India. Lancet Glob Health. 2013;1(4):e172-3.
2. Ganguly E, Sharma PK, Bunker CH. Prevalence and risk factors of diarrhea morbidity among under-five children in India: A systematic review and meta-analysis. Indian J Child Health. 2015;2(4):152-160.
3. Mona Pathak SN, Dwivedi SV, Deo SV. Comparison of methods measuring heterogeneity and between study variance in meta-analysis; Paper Presented in International Conference on "Statistics and Related Areas for Equity, Sustainability and Development." In: Conjunction with XXXV Annual Convention of Indian Society for Probability and Statistics (ISPS) Held at Lucknow University, Lucknow, during 28th-30th November, 2015.
4. Joshi PC, Kaushal S, Aribam BS, Khattri P, D'Aoust O, Singh MM, et al. Recurrent floods and prevalence of diarrhea among under five children: Observations from Bahraich District, Uttar Pradesh, India. Glob Health Action. 2011;4.

Funding: None; Conflict of Interest: None Stated.

How to cite this article: Dwivedi SN, Pathak M. Prompting points for systematic review and meta analysis. Indian J Child Health. 2015;2(4):149-150.