

Evaluation the Effectiveness of Interventions to Prevent Acute Respiratory Infection (Pneumonia) among Children under Five Year

A Systematic Review

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Abstract: Pneumonia accounted for 15% of the 6.3 million deaths among children under the age of five years. It kills children more than any other illness. Each year, over 2 million children die from pneumonia, accounting for 1 in 5 under-five deaths worldwide. A variety interventions to prevent and to reduce pneumonia are available. This systematic review was carried out in order to inform and to know some interventions that can prevent pneumonia among children under five year. **Methods :** We identified articles through databases searching: Proquest, Science Direct, SpringerLink, and Ebsco Host, published between (2002-2017). **Results:** Ten articles were analysed and selected from 1271. **Conclusions:** The studied evaluated that the integration of the interventions such as hand washing, vaccination, exclusive breastfeeding, giving zinc supplement potentially be more cost-effective, efficient and sustainable. Other interventions that may be effective involve providing health education to family or caregivers to raise awareness about this forgotten killer disease of children and to reduce child deaths from pneumonia.

1 BACKGROUND

Pneumonia is a severe form of acute lower respiratory infection responsible for high preventable morbidities and mortality among under-five year child. According to WHO estimates. It persist the leading killer of young children around the world. Pneumonia is killing 1 million children under the age of five years accounting for more young deaths annually than AIDS, malaria and measles combined each every year. This loss of life is especially tragic because pneumonia can be prevent and be treat. (International Vaccine Acces Centre, 2015).

In 2015, the 10 countries that contributed most to the global burden of child pneumonia were consist of India, Nigeria, Pakistan, Democratic Republic of Congo, Angola, Ethiopia, Indonesia, Chad, Afghanistan, Niger (WHO, 2015).

A variety interventions to prevent and to reduce pneumonia are available. These intervention can plausibly prevent pneumonia. Considering the worldwide high burden of ARI, preventing and reducing pneumonia in children is an crucial aspect

of a strategy to reduce child mortality. This systematic review aimed to evaluate the effectiveness of interventions to prevent pneumonia.

2 METHODS

We identified the articles according to the Cochrane group's recommendations. In addition, we actively searched articles through databases searching: Proquest, Science Direct, and EbscoHost, published between (2005-2017). The keywords used to search the articles included prevention, pneumonia, Acute Respiratory Infection, Children.

We found ten articles that suitable with our Inclusion Criteria. Our inclusion criteria are all kind of intervention in preventing and reducing pneumonia of children under five year old. All articles using the English language were included. We excluded the articles if the target population focused on adults or elderly.

3 RESULTS

Ten articles that have been collected, analyzed and scored, obtained the following results.

Research conducted by Luby *et al* (2005) aimed to know the effect of hand washing on acute respiratory-tract infections in prevention of pneumonia. Study result that children under 5 years in households that received plain soap and handwashing promotion had a 50% lower incidence of pneumonia than the children in controls.

Research conducted by Mortimer *et al* (2017) was to compare the effects of a cleaner burning biomass-fuelled cookstove intervention to continuation of open fire cooking on pneumonia in children living in two rural district show that there is no evidence that an intervention can prevent and reduced the risk of pneumonia in children. The study suggest that Effective strategies to reduce the adverse health effects of household air pollution are needed.

Research conducted by Gabida *et al* (2013) aimed to evaluate communities with village health workers who received training in cIYCF and the distribution of educational materials (newsletter) to mothers in promotion of exclusive breastfeeding using a cluster randomized controlled trial. Result showed that combination of intervention with village health worker and distribution of a newsletter to mothers on promotion of exclusive breastfeeding can prevent and reduce the pneumonia compared to non combine intervention.

The study by Rodriguez *et al* (2005) aims to evaluated the effect of a moderate dose of vitamin A treatment on the duration of respiratory signs in children with pneumonia. Result show there is no effect of a moderate dose of vitamin A supplementation on the duration of pneumonia in underweight or normal-weight children under 5 year old.

Research conducted by Fortunato *et al* (2015) aimed to assessed effectiveness of PCVs in preventing severe pneumococcal pneumonia in children. Result showed that PCVs program has a significant impact on reduction of pneumonia in children aged under 5 years both at a national level and in those regions with a longer vaccination history, with nearly a 40% reduction of hospitalizations for both outcomes.

Research by Mackenzi *et al* (2017) the results of the study aimed to measure the impact of the introduction of vaccines on pneumonia incidence. Result show that there is substantial reduction of cases of pneumonia in hospital.

Research by Smith *et al* (2011) aimed to investigated whether an intervention to lower indoor wood smoke emissions would prevent and reduce pneumonia in children. Result show that the intervention did not significantly reduce physician-diagnosed pneumonia for children younger than 18 months. However the study suggest that stove or fuel interventions producing lower average exposures than these chimney stoves might be needed to substantially reduce pneumonia in populations heavily exposed to biomass fuel air pollution.

The research by Brooks (2005) aimed to examine whether giving zinc weekly could prevent clinical pneumonia in children younger than 2 years. Result showed that 70 mg of zinc weekly could reduces pneumonia and mortality in young children.

Research by Shah *et al* (2014) aims to evaluate the benefits of zinc gluconate supplementation for 2 months period compared to placebo in reducing respiratory morbidity in acute lower respiratory infected children up to 5 years of age The final analysis showed that the number of episodes of acute lower respiratory infections and severe acute lower respiratory infections were significantly lower in zinc group compared to placebo group (20.8% vs. 45.8% (P = 0.009) and 21.7% vs. 58.3% (P < 0.001), respectively)

Gupta *et al* (2016) conducted a randomized double-blind, placebo-controlled trial aimed to evaluate the efficacy of single oral mega-dose of Vitamin D3 for treatment and prevention of pneumonia in under five children. Result show there was no significant effect of vitamin D supplementation on IgA and IgG and in reducing pneumonia.

4 DISCUSSION

This systematic review aimed to identify the articles around prevention of pneumonia specifically in children under five year. The reasons for conducting this systematic review are related to pneumonia as major killers of young children and we need to know what kind of interventions that we could use to prevent this disease.

This systematic review identified and evaluated several of the interventions that can prevent and reduce pneumonia rates such as exclusive breastfeeding, vaccination, reducing indoor air pollution, giving Vitamin A, Zinc, Vitamin D, and also health education intervention. Some of that are effective but the others are not. This could indicate

the need for a more research to prove the effectiveness of each intervention.

From the articles we know that hand washing, vaccination, exclusive breastfeeding, giving zinc supplement intervention are effective in preventing and reduce pneumonia in several settings. While other interventions such as reducing indoor air pollution, cleaner burning biomass-fuelled cook stove, giving vitamin A showed non significant effect to prevent pneumonia. Actually we couldn't say that we should leave the intervention behind, it indicates that there is a need for further research to prove it. The result may differ in other setting and it usually effect by length of study, participant number and research design so we needed to fully investigate these intervention.

The studied evaluated that the integration of interventions potentially be more effective, efficient and sustainable. Other interventions that may be effective involve providing health education to family or caregivers to raise awareness about this neglected disease and to reduce child deaths from pneumonia.

5 CONCLUSION

The studied evaluated that the integration of the interventions such as hand washing, vaccination, exclusive breastfeeding, giving zinc supplement intervention potentially be more cost-effective, efficient and sustainable. Other interventions that may be effective involve providing health education to family or caregivers to increase apprehension about this forgotten killer disease of children and to reduce child deaths from pneumonia.

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