Thiamine Supplementation in Pregnant and Post Partum Women Saves Lives

Cost Effectiveness Analysis Study

Health Technology Assessment in India (HTAIn)
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Policy Brief

Executive Summary:

•The incidence of dietary deficiency of thiamine is notably high in Northeast India, where the average intake of thiamine is much lower than the national average of 1.15mg (6)

• Lack of an easy to perform diagnostic test, combined with low index of suspicion poses challenges in early detection and prevention of thiamine deficiency in infants, thus leading to almost 100% mortality in infantile beriberi cases.

•This study was undertaken to provide an evidence base for informing policy to address neonatal morbidity and mortality due to thiamine deficiency

•A cost effectiveness analysis (CEA) of a thiamine supplementation program with budgetary impact was done to generate this important policy-relevant evidence.

• A decision-tree was built to model the lifetime costs and outcomes accrued as a consequence of implementing a 12 month thiamine supplementation program in pregnant and post-partum women across the North East Region (NER). Both costs and outcomes were calculated for the neonatal population only. The costs for clinical events were taken from the National Cost Database, India. The primary outcome measure was life years gained based on average life expectancy at birth and prevented mortality in order to estimate the incremental cost per life year gained as a consequence of thiamine supplementation.

• Thiamine supplementation for Pregnant and postpartum mothers in Northeast India was found to be highly cost effective at an ICER of INR 2386 per Life Years Gained at a WTP threshold of INR 1, 72,000.

Image1: Cardiac infantile beri beri: features of florid shock - mottled skin, respiratory distress

Aim To assess whether a thiamine supplementation program in pregnant and postpartum women would be a cost-effective approach to averting deaths due to infantile beriberi and associated mortality in the northeast region of India

Objective To determine the incremental cost effectiveness of thiamine supplementation as compared to standard care among pregnant and post-partum women to prevent infantile beriberi

Background:

•The global prevalence of thiamine deficiency is poorly documented due to lack of data to establish definitive biochemical levels indicative of symptomatic thiamine deficiency (1–3) (1,2,3). In high-income countries such as the USA, wheat flour, cereals and infant formulae are fortified with thiamine (1). Prevalence of thiamine deficiency-related diseases like beriberi is reported to be as high as 58% to 66% in many poor households in LMICs (4)

•Recent instances of extreme thiamine deficiency syndromes have been observed amongst people in the northeast region (NER) of India (5–7). Several suspected and confirmed cases of Thiamine deficiency disorder have been documented in Assam, Mizoram and Tripura (5–7). These infants who died or presented with an illness later confirmed to be thiamine deficiency were mostly from low socio-economic families and exclusively breast fed (5).

Methods and Approach

•A Systematic Review was conducted in order to assess the effectiveness of thiamine supplementation among pregnant and postpartum women to prevent thiamine deficiency in infants. Expert opinion interviews were conducted in order to fill the gaps in published evidence and understand the prevalence and experience of managing thiamine deficiency cases in the context of Northeast India.

•A decision-tree was built to model the lifetime costs and outcomes accrued as a consequence of implementing a 12 month thiamine supplementation program in pregnant and post partum women across the North East of India. Both costs and outcomes were calculated for the neonatal population only.

•The costs for clinical events were taken from the National Cost Database, India. The primary outcome measure was life years gained based on average life expectancy at birth and prevented mortality in order to estimate the incremental cost per life year gained as a consequence of thiamine supplementation.

Conclusion and Policy Recommendations:

• The study shows that a supplementation programme of a single daily multivitamin tablet that contains at least 10 milligrams of thiamine is a cost effective means to avert deaths due to thiamine deficiency in infants.

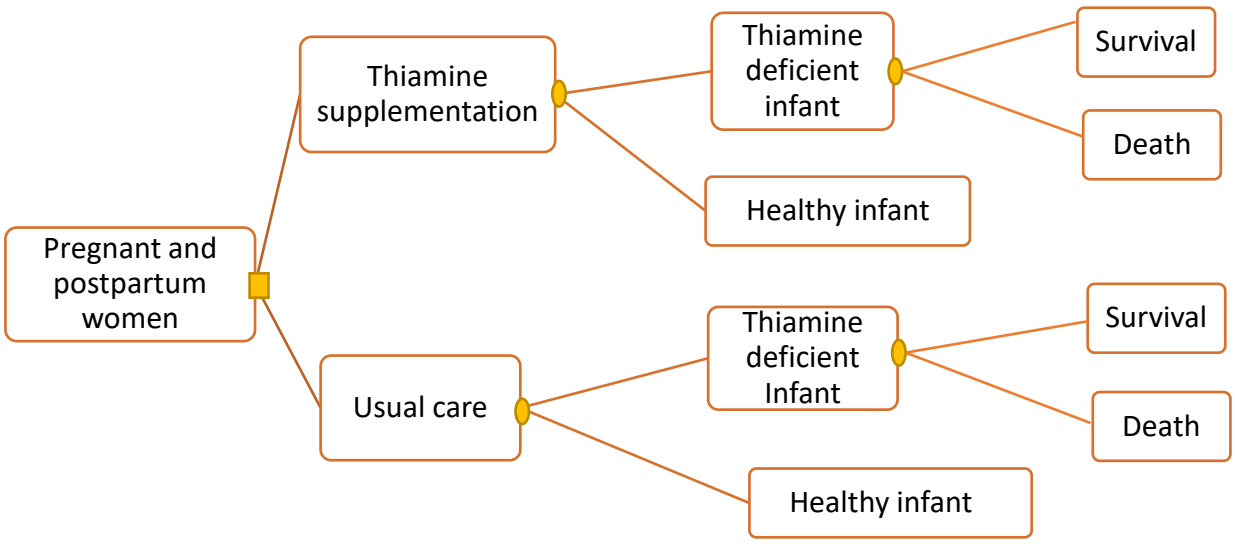
• The intervention is found to be highly cost effective at an ICER of INR 2386 per Life Years Gained at a WTP threshold of INR 1, 72,000/-

• The findings have important implications for informing policy that can help mitigate the burden of thiamine deficiency in pregnant and postpartum women and prevent infantile morbidity and mortality due to beriberi across the NER of India.

The intervention:

10mg Thiamine daily (which may be part of a multivitamin formulation) for 6 months antenatal and 6 months postnatal period

Figure 1 : Decision tree



Results:

•The systematic review revealed a dearth of published evidence on prevalence and cost effective studies on thiamine deficiency in pregnant and post partum populations.

• Doctors in the field especially in rural areas from four states confirmed definite prevalence of thiamine deficiency and occurrence of infant deaths due to thiamine deficiency in the northeast region.

• Qualitative data obtained from expert interviews highlighted the complexity of thiamine deficiency and related morbidity and mortality in northeast India. Outcome evidence from a recent hospital cohort in Assam where supplementation was initiated in pregnant women provided data for the model.

• Results of the cost effectiveness analysis (CEA) model indicates that daily thiamine supplementation in the antenatal and postnatal period (6+6 months) via one multivitamin or B-complex tablet containing 10 milligrams of thiamine is highly cost effective measure to avert deaths due to infantile beriberi

• The CEA showed an ICER of INR 2386 per life year saved at a WTP threshold of INR 1, 72,000 (1 x GDP).

Budget Impact for the	
Cost of one month's multivitamin (Rs)	43
Number of months	12
Total (Rs)	**516**

Name of each state	Total Number of Pregnant Women per annum	Cost Per State Per Annum (Rs)
Assam	920010	474725160
Meghalaya	80070	41316120
Mizoram	19110	9860760
Tripura	58560	30216960

Name of each state	Number of Live births per state per annum	Estimated Cases per State per annum
Assam	739920	5919.36
Meghalaya	76330	610.64
Mizoram	17760	142.08
Tripura	52010	416.08

Table 1: Budget impact ***analysis***

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