Cost compared to effects of food and micronutrient supplementation in pregnancy for rural Bangladeshi women

When under nutrition affects pregnant women it many leave long lasting consequences on the newborn baby. Even though over nutrition in the form of overweight and obesity is now sweeping the world, in low-income countries under nutrition among women is still common. These is particularly harmful in pregnant women since under nutrition in pregnancy may affect the growth and health of the fetus and cause negative outcomes including infant death. Therefore, community-based nutrition interventions are often required in low-income countries to combat the problem of under nutrition. However, alongside evaluating whether or not these interventions are effective, it is also essential to examine whether or not these interventions are cost-effective. That is, whether or not the effects outweighs the cost.

In this study costs and effects were compared for women who were invited to food supplementation (608 kcal/D) early (E, around 9 week) in pregnancy and to multiple micronutrient supplements (MMS) that contain 15 micronutrients including 30 mg iron and 400 microgram folic acid with women who were invited to food supplementation at usual time (U, around 20 weeks) in pregnancy and to 60 mg iron and 400 microgram folic acid.

Infant death data were used from MINIMat (Maternal and Child Health Intervention, Matlab) conducted at Matlab, Chandpur district, Bangladesh. In MINIMat, all pregnant women (total 4436 in the study area) were randomly allocated to food supplementation early in pregnancy, E, or at usual time, U, and also were randomly allocated to 30 mg iron and 400 microgram folic acid (Fe30F,) or 60 mg iron and 400 microgram folic acid, (Fe60F) or MMS. Therefore, with two food groups and three micronutrient groups there were total six groups, UFe39F, EFe30F, UFe60F, EF60F, UMMS and EMMS. The government policy was to supplement under nourished pregnant women with food and also to provide them with 60 mg iron and 400 microgram folic acid which was routine micronutrient supplementation for pregnant women.

In effectiveness analysis, significant difference was found only between EMMS and UFe60F with far lower infant deaths in EMMS; 44.1 per 1000 live births in UFe60F and 16.8 per 1000 live births in EMMS. That is, there were 27.3 less infant deaths per 1000 live births in the EMMS. If converted to life years (LY) this can be translated to 819 LY saved even when we consider the minimum value of LYs in future with 70 years of life expectancy at birth at present discounted at 3% rate. This discounting of LY was done because the value of present years of life is more than the future years but also to remain consistent with how we have treated the cost data, and to ensure that this nutrition intervention has been treated similarly with other sectors.

Cost data were compiled from published literature, from the organization (BRAC, Bangladesh Rural Advancement Committee) responsible for implementation of the food supplementation program and from MINIMat study. This resulted in US $ 36, 939 to US $ 47, 865 for supplementing 1000

pregnant women in UFe60 group and US $ 58, 699 to US $ 75, 817 for supplementing 1000 pregnant women in EMMS group.

When effects and costs were compared it was found that by uplifting UFe60F to EMMS one extra infant death can be avoided with US$797 to US$907 if implemented by government run system or NGO run system and US$1024 under a hypothetical scenario of highest cost. Similar calculations revealed by uplifting the program from UFe60F to EMMS, one extra LY can be saved with US$27 to US$34.

In conclusion, in a low-income country situations, the amount of gains achieved are substantial compared to the amount of expenditure as the estimates are below the per capita gross domestic product, about US $ 958 for Bangladesh. The results suggest all low-income countries where women have poor nutrition should consider about nutritional support to pregnant women in terms of both the quantity (as represented by calorie) and quality (as represented by micronutrients) of food since improved food leads to better infant health and survival. We believe this is profoundly important since all societies in the world desires for better health and survival for infants.

Publication

Cost-effectiveness of invitation to food supplementation early in pregnancy combined with multiple micronutrients on infant survival: analysis of data from MINIMat randomized trial, Bangladesh.
Shaheen R, Persson LÅ, Ahmed S, Streatfield PK, Lindholm L.
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