



SPECIAL COMMUNICATION

FOOD UTILIZATION AS ANTI-STUNTING INTERVENTION IN PAKISTAN

* Naqvi Hamad, ** Zahida Sarwar, *** Muhammad Khan Ranjha, **** Irfan Ahmad

Policy and Strategic Planning Unit, Health Department, Government of Punjab, Pakistan

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ABSTRACT

Introduction: Worldwide childhood stunting is affecting approximately 162 million children under 5 years of age per year. It is a major public health problem in Pakistan likewise other developing countries. Children whose height for age Z-score is below minus two standard deviations i.e. ($HAZ < -2$ Z-score) are considered stunted. Stunting hampers children in reaching their full developmental potential and causes lasting damage in infancy and early childhood. To address stunting at birth, pregnant mothers need to be taken care of. Intervention leading to improve the nutritional status of the mother proved helpful to prevent stunting at birth. An integrated and multi sectoral approach is required to address menace of malnutrition and stunting. **Objective:** Objective of this paper is to estimate/ assess the reduction in stunting at the time of birth and perinatal mortality rate by implementing interventions to pregnant mothers (from conception till time of delivery). **Methods:** Interventional study design has been used in this research for testing our intervention among two groups of participants. Study is carried out among 200 pregnant mothers in different cities of Pakistan. 100 mothers were taken as control group and 100 mothers as study group. All pregnant mothers were selected from same age group i.e. 20 to 30 years of age group. They all belonged to same income group (i.e. affording food groups) and having approximately similar health parameters. The study group was oriented about the healthy eating habits and given directions to eat daily one food from each of five food groups. Stunting and perinatal deaths were observed in study group and control group. A comparison was made between the two groups to assess the impact of intervention. **Findings:** The study revealed that perinatal mortality among study group was 30 per 1000 births while in control group it was 50 per 1000 births. In study group 30% newborns were stunted whereas 40% were in control group. Eating weekly from five food groups was identified as significant intervention for anti-stunting at the time of birth. **Conclusion:** The findings show a strong evidence that use of healthy and balanced food has positive impact in reducing stunting at the time of birth and perinatal deaths. A coordinated approach by health, food and agriculture department is required to ensure availability and use of balanced food during pregnancy to address the issue of stunting at

Correspondence Author:

DR. NAQVI HAMAD,

Policy and Strategic Planning Unit,
Health Department, Government of
Punjab, Pakistan

Email: naqvihamad@hotmail.com

the time of birth. The results of our study shows that control group has same current rate of stunting in Pakistan. While intervention on study group shows significant effect in prevention of stunting. There is need to adopt an integrated approach by all relevant sectors under the umbrella of Multi-Sectoral Nutrition Strategy to overcome this major challenge in Pakistan. Situation can be improved by scaling up this nutrition intervention.

Keywords: Nutrition, Stunting, Perinatal mortality, Food access, Food utilization.

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INTRODUCTION

The diet of pregnant mothers in Pakistan is often deficient in energy and micronutrients. Improvement in the health and nutrition of pregnant mothers is paramount in prevention of stunting in children at the time of birth. In this regard, the mother and child must be considered as One Unit as fetus is part of mother during perinatal period. Maternal malnutrition is one of the contributing factors of perinatal and neonatal mortality. Child health is directly related to maternal health; a healthy mother engenders a healthy child. Thus, preventing maternal malnutrition prevents of stunting in children. Good nutrition is also critical in supporting the rapid growth and development of babies and young children during their first 1,000 days i.e. the period from conception to two years of age (minus 9 months to plus 24 months). Without good nutrition, a young child can suffer serious and often permanent damage to his developing brain and body.

A child who doesn't grow well and is too short

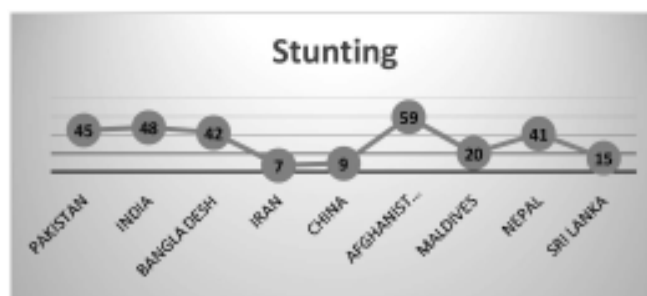
for their age suffers from a condition known as stunting. Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the WHO reference population are considered short for their age (stunted), or chronically malnourished [1]. Stunting starts before birth and is caused by poor maternal nutrition and feeding practices, substandard food quality, low sanitation as well as frequent infections which can slow down growth. Stunting in early childhood is associated with adverse functional repercussions, including poor cognition and educational performance, reduced lean body mass, short adult stature, lower productivity and reduced earnings. Stunting is affecting 800 million people worldwide [2,3,4].

An estimated 20% of stunting begins in the womb—with a mother who herself is malnourished and not getting enough nutrition to support her baby's growth during pregnancy. The effects of stunting last lifetime and can also be passed on from one generation to another. Girls who are born malnourished and become stunted as children often grow up as stunted mothers who in turn give birth to malnourished babies and the cycle repeats itself. In this way undernutrition passes from one generation to another as a grim inheritance. Maternal stunting is consistently associated with an elevated risk of perinatal mortality (stillbirths and deaths during the first 7 days after birth) [5]. Evidence indicates that children born to women who are stunted are at greater risk of dying than children of mothers with normal height [6]. Malnourishment of pregnant mothers is an important cause of perinatal deaths and these deaths can be avoided by giving nutritious food to

TABLE: 1
Stunting under 5

Country	Stunting
Pakistan	45%
India	48%
Bangla Desh	42%
Iran	7%
China	9%
Afghanistan	59%
Maldives	20%
Nepal	41%
Sri Lanka	15%

FIGURE: 1
STUNTING GRAPH



Source: The State of the World's Children 2015 [UNICEF]

TABLE: 2, EDUCATION OF MOTHERS AND STUNTING

Mother's Education	Stunting
Illiterate	26.6%
1-5 years Education	19.1%
6-8 years Education	17.1%
9-10 years education	11.5%
Above Matric	8.5%

Source NNS 2011

TABLE: 3, PAKISTAN'S NATIONAL AND PROVINCIAL STUNTING

Stunting	Pakistan	Punjab	Sindh	Khyber Pakhtunkhwa	Baluchistan
Year 2011	44	39	50	48	52
Year 2001	41	33	49	47	45
Year 1985	42	33	48	56	54

TABLE: 4 FOOD GROUPS

FOOD GROUPS

1	Milk Group	Milk, cheese, ice cream, and other milk-based foods
2	Meat Group	Meat, fish, seafood, poultry, eggs, legumes and nuts, seeds, beans and lentils as alternatives.
3	Fruit Group	All type of fresh fruits and fruit products, including dried, frozen and canned fruit.
4	Vegetables Group	All type of fresh vegetables and vegetable products, including frozen, canned and dried vegetables.
5	Grains Group	Bread, rice, pasta, breakfast cereals and all other types of cereals/tubers.

TABLE 5

Groups	Stunted Babies (HAZ < -2)	Perinatal Deaths (stillbirths + early neonatal deaths (under 7 days))
Control Group	40%	50/1000
Study Group	30%	30/1000

mothers.

Beyond the individual impacts of this problem, stunting is an enormous drain on economic productivity and growth. Economists estimate that stunting can reduce a country's GDP by as much as 12%. A large cross-sectional study in Brazil showed that 1 percent increase in height was associated with a 2.4 percent increase in

wages [7,8,9]. In 2012, the World Health Assembly endorsed a global stunting target that by 2025, there is 40% reduction in the number of children under-5 who are stunted. Many children in developing countries are nutritionally depleted by the end of the first year of life associated with maternal under nutrition [10,11]. Inappropriate feeding practice is the principal risk factor

which brought about nutritional deprivation^[12]. Globally it is estimated that 26% of children (165 million) under-five year are stunted. This indicates that stunting is the cause of an estimated 1 million child deaths annually^[13,14]. It is found that despite extensive global economic growth in recent decades, millions of people remain locked in a vicious cycle of hunger and poverty and this leads to irreversibly stunted development and less productive lives^[15].

With respect to number of children who are stunted, Pakistan occupies the second position in the world after India. Pakistani women and children suffer from some of the highest rates of malnutrition in the world with a national nutritional stunting prevalence among children under five of 45%. An estimated 80 percent of the world's 165 million stunted children live in just 14 countries, including Pakistan. According to National Nutritional Survey 2011 (NNS 2011), Pakistan's under-5 stunting rate is 44% which is very high percentage of stunted children in the world. It implies that more than 9.6 million Pakistani children are experiencing stunting. Severe stunting of 21.9% (HAZ < -3) in children under 5 years shows an alarming situation across Pakistan. It is 24% and 16.4% in rural and urban areas respectively^[16].

Childhood stunting continues to be a public health issue in Pakistan. The results of National Nutritional Survey (NNS) 2011 suggest that the employment status and education level of a mother is directly associated with the nutritional status of her children and percentage of stunting is much higher among children whose mothers are illiterate versus those whose mothers have completed at least 10 years of education. The low literacy in Pakistan is having adverse effects on stunting. The proportion of illiterate mothers in rural areas is almost double than urban areas. Furthermore, stunting prevalence is slightly higher in male children (48%) than in female children (42%). This high level of stunting can be associated with poor socioeconomic conditions and increased risk of frequent and early exposure to illness.

The results of last three National Nutritional Survey show that stunting was almost stagnant amongst children between 1985 and 2011. It also shows that no concrete steps have been taken by government of Pakistan to prevent stunting leading to a precarious situation. With the target to reduce stunting to 34 percent by 2017, Pakistan has to make serious efforts in reducing stunting, as reduction is usually indicative of improvements in

overall socioeconomic conditions of a country. Provincial governments face a similar situation. Only Punjab has shown some improvement in stunting with current statistics at 33.5% as per results of MICS 2014 but much has to be done in this regard. Nutrition counseling in addition to provision of fortified foods or supplements in food insecure settings can reduce stunting. The food insecurity assessment conducted by the United Nations in Pakistan reveals that 51% of the population is food insecure. The food security situation has shown no signs of improvement since last food insecurity assessment. A reduction in the amount of food eaten or in the quality of diets can lead to declining health and nutritional status and cause stunting. Stunting can be limited through the introduction of increased access to food security in Pakistan^[17, 18, 19, and 20].

METHODOLOGY

Stunting is associated with poor survival and development in children. The intervention proposed in the paper can significantly reduce stunting at the time of birth. An interventional study design is used in this research for testing our intervention among two groups of participants (expecting mothers) having same features. Stratified random sample of 200 pregnant mothers of same features were randomly selected on equal proportions from four provincial capitals of Pakistan i.e. 50 from each. Sample of 200 was selected in view of 45% stunting in Pakistan with permissible error of 7%. Study participants were randomly assigned to one of two groups: the experimental group receiving the intervention that is being tested and a comparison group (controls) which receives a conventional treatment. The sample was taken from four major hospitals of provincial capitals of Pakistan. Samples of pregnant women were taken from Mayo Hospital in Lahore, Quetta Hospital in Quetta, Civil Hospital in Karachi and Lady Reading Hospital in Peshawar. Interventional group was randomly assigned 100 expecting mothers i.e. 25 from each hospital. The enumerators ensured that all sampled expecting mothers were in their early stages of pregnancy i.e. in first trimester of pregnancy. Purposive technique was also applied to select samples of literate pregnant mothers as the area and population was heterogeneous and selected samples are comprised of those pregnant mothers who can afford food groups. The sizes of interventional group and control group was 100 each i.e. 25 pregnant mothers from each hospital. One sample was treated as study group and

intervention was applied to that group while other sample treated as control group and was without intervention. It was ensured that all pregnant mothers are from same age group i.e. 20 to 30 years of age group. Both samples have homogeneity with respect to livelihood, socio-economic back ground, health status and age groups. Both groups have food access but only study group was oriented about food utilization. The pregnant mothers selected were literate because adult female (ages 15 and above) literacy rate is 43% in Pakistan [21]. The duration of study was from conception to the birth of baby.

In study group, 100 pregnant mothers were oriented about balanced diet and nutrition and knowledge about food security during their pregnancy was provided. The food security is based on three important pillars i.e., food availability, food access and food utilization. Pakistan being an agricultural land have all types of food. But access and utilization is the major problem. Food access can be possible when individuals have money to obtain appropriate foods for a nutritious diet. We selected those mothers in the samples who can afford food. Researchers advocated study group about how to spend money on different food items per month during pregnancy period. Food utilization implies the use of food by people and nutritional knowledge. Study group was advocated about 5 food groups, its utilization and nutritional knowledge. Each food group provides certain nutritional benefits, so foods from each group should be consumed each day. Researchers oriented study group about all food groups and importance of each groups for reducing stunting and perinatal mortality rate. The basic consumption pattern of food for pregnant mothers of study group was to eat one food item from each of the 5 main food groups every day, i.e. 7 times a week. The basic five food groups are [22]

As far as water is concerned, it is treated in different ways. Some experts list water as separate category of food groups while others exclude this category. In this study researchers recommended to take water in plentiful amounts. Females need 1800 to 2000 calories per day as energy requirement and pregnant mother need about 300 extra calories a day. Pregnant mothers demand the nutrients, micronutrients, vitamins and minerals which can be obtained from food. Eating nutrient-dense foods from above mentioned food groups in recommended proportions helps pregnant mothers to deliver healthier babies.

Community based experimental study design was

used to determine impact of intervention. Mothers with initial pregnancy in study area were purposely selected which meet all study requirements. Necessary data were drawn from newborns at the time of birth. Two groups of pregnant mothers were considered: Study group was the one with food access and food utilization knowledge and control group was given no incentive and information about food. To assure the quality of the data, a rigorous training of enumerators about selection of pregnant mothers in samples and identifying (measuring HAZ < -2) stunting was provided. Masking was used for keeping the study group assignment hidden after allocation of sampling units (expecting mothers) to study group. This procedure was used to reduce the risk of bias. To measure stunting, child was made to lie flat on the length board. Two readings were taken from each newborn and the average was computed.

FINDINGS

Table 5 summarizes the results of the study which have been analyzed to develop a plan that can be extrapolated across provinces and can be translated into policies at the government level. After an explanation of the results, recommendations will be given along with policy implications and conclusion of the study.

The results of our study show that stunting prevalence rate in control group is almost same as of Pakistan which confirms that the same trend is stagnating. On the other hand, intervention on study group shows significant prevention of stunting.

What is required at this time is a more focused effort to improve the situation in Pakistan by scaling up this intervention the extent of the population in need of it. The study revealed that perinatal mortality among study group was 30 per 1000 births while in control group it was 50 per 1000 births. In the study group, 30% newborns were stunted with 40% stunted in control group hence proving a direct correlation between better nutrition and reduced stunting.

Eating weekly from five food groups was identified as significant intervention for anti-stunting at the time of birth. According to the World Health Organization (WHO) malnutrition classification when stunting is between 30-39%, it is considered serious and if it is 40% or more then it is critical. Therefore, the prevalence of stunting in control group is in serious range and intervention on study group shows significant impact on reduction of stunting. A low level of education

especially in women is also reported as key perpetuator of poor nutrition practices in the world. Lack of awareness regarding nutrition of the would-be mother in the family and herself leads to nutritional insufficiency hence causing stunting.

POLICY RECOMMENDATIONS

Inclusion of food intervention in provincial and national health policy can be the corrective measure in the fight against stunting. Food access and food utilization intervention programs should be strengthened throughout the country at large scale for the reduction of stunting and perinatal mortality. Food access intervention strategy will provide food and food utilization intervention strategy will bring awareness among the people about food usage and the nutritional benefits of consuming diverse food groups. Besides food access and food utilization intervention and food diversity actions for mother nutrition, optimum number of meals per day for mothers requires special attention for their complete energy requirement. This intervention if applied to large scale in the country with sincere efforts can reduce stunting at the time of birth from 20-25% within one year and 30-40% reduction in perinatal mortality.

Similarly this intervention can be extended for children under 5 years through proper child feeding practices and calories required per day for which mother knowledge on nutrition is important. Hence, to reduce child malnutrition, awareness campaigns aimed at educating the importance of child nutrition and more appropriate feeding practices should be designed and implemented. The nutritional intervention measures should be carefully specified with regard to residential localities. Our intervention was focused on reduction of stunting by ensuring that pregnant mothers should be adequately nourished and as a byproduct there was also significant improvement in perinatal mortality. In poor populations of Pakistan with food insecurity, this intervention can be coupled with additional measure like food supplements, reduction of indoor air pollution and increased agricultural production. The intervention can be strengthened by including improved water, sanitation and hygiene. All these broad approaches are vital to maximize the impact of intervention on stunting, and is a precondition for the socioeconomic advancement of societies.

Developing an evidence-based and multi-sectoral strategy for stunting reduction, collaborating with all donor partners is need of time. National and regional

partners should be brought together to accelerate progress in reducing stunting. According to Human Development Report 2015, Pakistan is spending 2.8% and 2.5 % of its GDP on public health sector and education respectively. 61% of Pakistan population is not satisfied with healthcare quality. After Nigeria, Pakistan is second in the world who has most people (83 million) in multi-dimensional poverty^[23,24]. Government of Pakistan must consider stunting as a top priority agenda and must put special emphasis on creating anti-stunting policies and more spending on health sector in line with research findings. Food security can be used to combat stunting. Beside our intervention, stunting can be reduced by other multiple factors like mother knowledge on child nutrition and health care practices, intra-household food allocation and utilization practices and access to health services and healthy environmental conditions.

Community based education in mothers for stunting can significantly reduce stunting rate. To prevent stunting in the foreseeable future, this intervention need to be replicated at large scale using feasible motivation and training of available health-care workers. Such initiative will show a significant reduction in stunting and perinatal mortality. Government should give attention to food fortification and implement a stunting sector strategy. Improving breastfeeding practices is another step in reduction of stunting. In Pakistan, 38 per cent of mothers ensure exclusive breastfeeding whereas in Bangladesh and Nepal the ratio is 60 and 70 percent. So there is need to improve breastfeeding practices in Pakistan. Protection and promotion of breastfeeding bill should be implemented in Pakistan. Complementary feeding practices are also helpful in trending down stunting. According to study result done in Nepal, children fed complementary food less than four times a day were 3.6 times more likely to be malnourished than their counter parts. Appropriate weaning and complementary feeding behaviours and nutritional interventions are strategies to prevent stunting among children under 5.

Another factor which can reduce stunting is presence of soap and hand washing practice before and after meal. There is a significant association between the absence of soap and stunting. In Punjab, stunting is 27% in households where soap is available and where soap is not available, it is 41%. Improving family and community hygiene practices, with a particular emphasis on washing hands with soap after defecation and before child feeding. Another study in Nepal showed that

14% of stunting can be prevented in children less than 2 years of age by starting supplements to their mothers during pregnancy [25]. Even if ten evidence-based nutritional interventions are applied at 90% coverage, only a 20% reduction in stunting would be achieved [26] but our intervention shows that stunting at the time of birth can be reduced from 20-25% within one year.

More comprehensive approaches that improve the diets of pregnant mothers are needed to promote mother growth and development. Institutional and human capacity should be strengthened and policies are enacted to improve and manage maternal nutrition and health in order to reduce stunting, beginning with adolescent girls. Healthy eating of mothers is an important prevention for perinatal deaths as perinatal deaths are associated with maternal undernutrition and ill health, among other factors and it is fully justifiable to include this approach in interventions and programs. There is also a need to improve the identification, measurement and understanding of anti-stunting activities. Intervention can be used in scaling up programs to improve women's nutrition in low income groups but for this purpose high-level political commitment at provincial and national level is required.

CONCLUSION

While stunting may be permanent, it is definitely preventable, and that to via a basic solution: improving nutrition of pregnant mothers. This study set out to determine the impact of intervention on the nutritional status and perinatal mortality of newborns. Findings from this study result show positive impact of food access and food utilization knowledge on stunting and perinatal mortality. While the solution is straightforward, the problem is not limited to lack of solution, it is also an inability to understand that there is a problem lying therein. Stunting is not spotted in community where short stature is common. Even health workers do not give attention to stunting as given to wasting. Many families, health workers and policy makers are unaware of the aftermaths of stunting and it is not regarded as public health issue. A larger scale quantitative study can be conducted to identify other important socio-demographic factors and cultural perceptions that could impact the situation of stunting in Pakistan. A country like Pakistan where more than 60% of the population has limited food access, big problem is to give them cash incentives for food access. When people have food access then they would go for food utilization,

so strategies and policies are needed in this regard. Government should give cash incentive to needy pregnant mothers just like Benazir Income Support Program or some other way for reducing stunting through food access and proper food utilization.

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