INTRODUCTION
Optimal child growth requires adequate intakes of energy and other nutrients, absence of disease and appropriate care. When nutrient intakes are inadequate, a child's body conserves energy by first limiting social activity and cognitive development. Children become apathetic and incurious; they do not play and learn. Later, their bodies limit the energy available for growth (Community Childhood Hunger Identification Project, 1999). Inadequate nutrition during childhood may lead to malnutrition, growth retardation, reduced work capacity and poor mental as well as social development (Awasthi and Kumar, 1999). Children from socially and economically backward families generally have inadequate food intakes and are more vulnerable to disease(s) and hence are at greater risk of undernutrition and its adverse consequences.

In developing countries, particularly among the poorest and most vulnerable segments of the population, malnutrition persists and is a widespread problem. In terms of numbers, the bulk of the world's under nutrition problems are localized. In almost all countries, the poorest quintile of children has the highest rate of malnutrition. However, inequalities in malnutrition between children of poor and rich families vary from country to country, with studies finding large gaps in Peru and very small gaps in Egypt. In 2000, rates of child malnutrition were much higher in low income countries (36 percent) compared to middle income countries (12 percent) and one percent in the United States (Victora, 2008). Despite recent improvements, approximately half of the children remain underweight in Asia, which is the highest level in the world (Moestue and Huttly, 2008). In India, 62 million children were reported to be underweight and in Iran there were 5 million (Ziaoddini et al; 2010).

Chronic nutritional deficiencies and frequent bouts of illness in early life are best indicated by infants’ growth in length and children’s growth in height. Day-to-day nutritional deficiencies over a period of time lead to diminished or stunted growth. Stunting is most commonly the result of chronic undernutrition often occurring in combination along with frequent infections and diarrhea (Allen, 1994).

Poor living conditions, including household food insecurity, low parental education, lack of access to quality health care and an unhealthy living environment are among the main
determinants of stunted growth. Poverty has a more detrimental effect on linear growth than on body weight (Black et al., 2008). Linear growth is generally considered to be decreased when a child’s height falls more than two standard deviations below the mean height for age, and when linear growth velocity diminishes to less than four centimeters per year. It is also reflected by a child’s growth shifting to a lower channel or when the child is small for the mid parental size (Moayeri et al.; 2004).

Stunting is defined as height-for-age z-score of equal to or less than minus two standard deviation (-2 SD) below the mean of a reference standard. Stunting is common among children in countries with high levels of poverty as well as in countries that have improved their socioeconomic performance, modified their mortality indicators and improved other quality of life indicators. In less-developed countries, the high prevalence of stunting reflects the high frequency of under nutrition observed in such countries (Hugo, 2001).

If substantially more than 5% of identified child populations have height for age below the fifth percentile on the reference curve, then the population is said to have a higher than expected prevalence of stunting, and inadequate nutrition is generally the first cause considered (Eugene, 1998). As measured by stunted growth or low height for age, twenty-four countries account for more than 80 per cent of the global burden of chronic undernutrition. Although India does not have the highest prevalence of stunted children, due to its large population, it has the greatest number of stunted children (UNICEF, 2009).

Once children are stunted, it is difficult for them to catch up in height later on, especially if they are living in unfavorable conditions that more often than not prevail in many developing countries. A deficit in weight can be recouped if nutrition and health improve later in childhood. Once malnutrition is treated, adequate growth is an indication of health and recovery. Even after recovering from severe malnutrition, children often remain stunted for the rest of their lives, indicating that a deficit in height (stunting) is difficult to correct (Walker et al., 2008, UNICEF,
Malnourished children grow up with poor health and lower educational achievements compared to well nourished children. Their own children also tend to be smaller. Short stature in any individual child may reflect normal genetic variation and not every person who is short may have been a victim of chronic malnutrition. However, the rate of growth stunting for a population of children can provide evidence of the extent to which children in that population experience nutritional deficiencies for a long period of time and suffer from other negative consequences of inadequate food, nutrition and care (Federation of American Societies for Experimental Biology, Life Sciences Research Office, 1999).

It is estimated that worldwide, more than 200 million children less than 5 years old are stunted, i.e., height more than two standard deviations below accepted reference standards. Stunting is a problem of greater magnitude than underweight or wasting; it more accurately reflects nutritional deficiencies and illnesses that occur during the most critical periods for growth and development in early life (UNICEF, 2009).

It is a major public-health problem in low and middle-income countries because of its association with increased risk of mortality during childhood (Idowu et al, 2011). Apart from being a cause of childhood mortality, it results in physical and functional deficits among survivors. Linear growth faltering early in life has been linked to functional disadvantages such as poor cognitive and school performance (Mendez & Adair, 1999; Walker et al, 2000) and relatively poor reproductive outcomes later in life (Neumann & Harrison, 1994). Stunting hinders cognitive growth. Children who are stunted complete fewer years of schooling. The consequences of stunting are shorter height in adulthood, lower educational achievement, and reduced productivity in adulthood thereby leading to reduced economic potential (Idowu et al, 2011). Due to the associated reduction in years of schooling (Victora et al, 2003) as well as the decreased learning per year in school (Glewwe et al, 2001; Walker et al, 2005), significant losses in adult income have been reported (Grantham-McGregor et al, 2007).
Most countries have stunting rates that are much higher than their underweight rates. Table 4.1 (UNICEF, 2009)

### Table 1.1: Prevalence of Underweight, Stunting and Wasting in Some Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Underweight (%)</th>
<th>Stunting (%)</th>
<th>Wasting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>33</td>
<td>53</td>
<td>9</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>41</td>
<td>43</td>
<td>17</td>
</tr>
<tr>
<td>China</td>
<td>6</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>Congo</td>
<td>25</td>
<td>46</td>
<td>10</td>
</tr>
<tr>
<td>Egypt</td>
<td>6</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td>India</td>
<td>43</td>
<td>48</td>
<td>20</td>
</tr>
<tr>
<td>Iran</td>
<td>11</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>Mexico</td>
<td>3</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Nepal</td>
<td>39</td>
<td>45</td>
<td>13</td>
</tr>
<tr>
<td>Pakistan</td>
<td>31</td>
<td>42</td>
<td>14</td>
</tr>
<tr>
<td>South Africa</td>
<td>12</td>
<td>27</td>
<td>5</td>
</tr>
<tr>
<td>Kenya</td>
<td>21</td>
<td>35</td>
<td>6</td>
</tr>
<tr>
<td>Yemen</td>
<td>43</td>
<td>58</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: (UNICEF, 2009)

Child growth patterns are strong predictors of future human capital and social progress and of the health of future generations (Victoria, 2008). Where undernutrition is widespread, these negative consequences for individuals translate into negative consequences for countries. Knowing whether children are at risk of nutritional deficiencies, and taking appropriate actions to prevent and treat such deficiencies, is therefore imperative. The school going children are a very
important segment of society, their physical growth and nutritional status is extremely significant and presents a general health status of a community and nation as a whole good nutrition.

In almost all countries, the focus of nutritionists, medical and health professionals, policy makers and governments has been on children under five years of age. A long standing assumption has been that by school age, a child has survived the most critical period and is no longer vulnerable. However, many of the infectious diseases affecting preschool children persist into the school years. Schoolchildren may also be at high nutritional risk, not only under-five children. However, their nutritional status is poorly documented, particularly in urban areas (Daboné et al, 2011).

Because the prevalence of malnutrition in school children and adolescents is considerably less than those in children, relatively few studies have been carried out with school-age populations. In addition, limitations in establishing relations between anthropometric indicators and nutritional status in adolescents appear to have hindered research in this area (Prista, 1997). In India and Iran, data on the nutritional status of school-age children have not been routinely collected, despite evidence, that nutritional problems adversely affect school attendance, performance, and learning (UN, 2000).

Poor health and nutrition may hinder children’s ability to learn and hunger is one of the conditions that has been indicted (Pollitt, 1990). Children from developing countries grow more slowly and achieve a shorter adult height than those from wealthier regions. Because stunting is regarded as a form of malnutrition, most investigations into the cause of poor growth in developing countries have concentrated on nutritional availability and dietary composition. However, the etiology of stunting is complex and full understanding of its causes requires more detailed investigations (Lunn, 2002). It is important to conduct studies using children who are just beginning school (6-9 years of age) because at this age, growth deficit reflects a reliable growth history of the child and offers an appropriate moment to study risk factors (Hugo, 2001).
In both India and Iran, there is concern that economic advances have not been reflected in improvements in child nutrition. Inadequate food habits along with traditional socio-cultural influences such as pure vegetarian diets and the low social status of Indian women, children’s diets often lack in both quality and quantity. This may lead to a high proportion of under nutrition in children that also interferes with their body growth and development (Balgir et al. 2002; Rao et al. 2006). In India, the third National Family Health Survey (2005-06) indicated that both chronic and acute under nutrition among young children was high in many states. According to the National Family Health Survey (NFHS-3, 2005-06), 20 per cent of Indian children under five years old were wasted (acutely malnourished) and 48 per cent were stunted (chronically malnourished). Importantly, with 43 per cent of children underweight (with a weight deficit for their age) rates of child underweight in India are twice higher than the average figure in sub-Saharan Africa (22 per cent) (HUNGAMA, 2011). However, large-scale surveys on nutritional status of Indian school children have not been reported in the literature.

In Iran, 10.9 percent of preschool children were underweight, 15.4 percent were stunted and 4.9 percent were wasted (Hosseini & Shiva, 2008). Data for acute and chronic malnutrition among Indian and Iranian school children across both countries is not easily available. A few studies have been conducted in some cities or regions of India (Agarwal, 1992; Moti, 1998; Agarwal, 2002; Kaur, 2004; Chhatwal et al; 2009 and Knjila et al; 2010) and Iran, (Assar, 2000; Mohammadian, 2005; Heshmat, 2005; Ayatilahi, 2006). There are high populations of school children in Iran and India; but studies regarding the nutritional status and growth patterns of this age group in both countries are less.

A detailed knowledge of the magnitude of the problem is required for strategic planning and implementing programs to promote good nutrition in a community. This requires updated profiles on physical growth and nutritional status of children are therefore important for formulation and implementation of appropriate nutrition intervention strategies and policies not only at the state level but also at district and tehsil levels (Vashisht, 2003).

In Iran, one of the world’s youngest populations, of the total population of nearly 70,000,000; about 15,000,000 are of school age. According to the data of the Ministry of Education &
Training in 2007, there were 99,500 schools in urban and rural areas, and the coverage of education is more than 99% in primary schools, 91% for middle schools and near 82% for high school (Amirkhani et al; 2010). Iran's population comprises about 60 million people, having approximately doubled twice over the last 40 years (Ghasemi, 2000) and it is estimated that 17% of the population lives below the poverty line (Ghasemi, 2002). Twenty two per cent of Iranian rural children aged 5 years are stunted compared with 11·0 % of urban children. The highest rate of stunting among 6-14 year old school going children in Sistan va Baluchestan in the south east was 38·1 % and the lowest prevalence of stunting was 6·8 % in Gilan in the north east of Iran. The difference in the prevalence of wasting between rural and urban areas was small, with 5·6 % of urban and 4·6 % of rural children meeting the criteria for wasting. However, the difference between provinces was large. The highest rate of wasting was 11·3 % in Harmozgan in the south west and the lowest rate was 1·1 % in Golestan in the north west (Ministry of Health and Medical Education,.2008).

Nutrition transition in Iran is taking place along rapid demographic changes, urbanization and social development, although there is lack steady and significant economic growth. Problems of malnutrition and micronutrient deficiencies are still important public health nutrition issues. About 6 percent of the population of Iran is classified as undernourished by the World Bank. Unemployment, caused by Iran's unstable economy is an important cause of urban and rural poverty. Such poverty is responsible for food and nutrition insecurity and therefore undernourishment. Inadequate intake of eggs, beans, lentils, and nuts from the diet can lead to protein inadequacy. Similarly, lack of fruits and vegetables can result in overall vitamin deficiencies. Many families affected by the country's shaky economy cannot afford to purchase or grow themselves, the necessary foods for a healthy diet. (Ghassemi, Harrison and Mohammad, 2002)

Iranian food also referred to as Persian food is famous for its fresh taste and healthy attributes. Rice is a relatively inexpensive food and since it is grown locally, it is affordable for most homes and available as a staple in every diet (Mezzetta, 2001). Iranians use red meat and large amounts of grains such as rice, as well as fruits and vegetables. A typical Iranian meal consists of a large
portion of cooked rice topped with vegetables, fish or meat. Popular meats in Iran include chicken and lamb. Breakfast typically includes hot tea, cheese and bread. Northern regions often prefer honey with cold rice and fish, while central regions enjoy yogurt and soft cream (Mezzetta, 2001). Food consumption patterns and dietary quality are highly income-dependent but dietary choices, particularly in higher income groups, are also driven by non-economic forces. Rapid urbanization has led to significant decreases in physical activity especially among school children, increasing the risk of overweight and obesity (Ghassemi, 2002).

The malnourished of India are located mostly in urban slums, but more so in rural areas, where income and food variety is lower. The children of India are malnourished because of factors attributed to over population, poverty, destruction of the environment, lack of education, gender inequality and inaccessible medical care leading to stunting and low weight. In a study by Joshi et al., (2011) to determine nutritional status of 4-14 school children western region of Nepal, showed that 26% of the school children were found undernourished, 13% stunted and 12% wasted.

The Indian diet consists of curries and bean dishes mostly and large amount of cereals such as grain, wheat, rice, millet and corn. Dairy products such as ghee, butter, yogurt, chhenna and paneer are also eaten by those who can afford these foods. In India, eating patterns are also influenced by religion. For example, Muslims are forbidden to eat pork, Hindus do not eat beef and some no meat at all, and Jains are strict vegetarians (Padez, 2003).

India consists of diverse agro-climatic regions and ethnic multiplicities. Socio-cultural practices, life style and eating habits vary not only between states but also between the districts within a state. Maharashtra is the second most urbanized state in India. It has an urban population of 4.1 crore comprising 42.4% of the state's population which is expected to be double by the year 2026. It is estimated that 1.46 crore persons comprising 32.2 % of the urban population of the state live below the poverty line. Maharashtra has the highest urban poor population in India and is rapidly growing (National Family Health Survey, 2005-2006).
However, availability of specific, timely and accurate nutritional data is still a problem in Iran and India. There is very little data on school age children. There is little information published about dietary patterns among school children and adolescents in these countries and how these vary according to socio demographic characteristics. There is a need to obtain more information on this subject to enable the government and other non-governmental agencies to formulate policies and initiate strategies for the well-being of primary school children (Abudayya et al, 2009).

The present study was therefore undertaken with the overall aim of studying the nutritional status and stunting among primary school children in selected urban areas of India and Iran.

The specific objectives were:

➢ To assess and compare the nutritional status of Iranian and Indian government primary school children, 6-9 years of age.

➢ To estimate the prevalence of nutritional stunting in urban Iranian and Indian school children.

➢ To determine whether selected factors such as family size, family income, parent's education, parent's occupation and influence child nutritional status.

➢ To study the dietary patterns and examine the diversity of the diets consumed by these children and to examine the influence of dietary diversity on nutritional status among both groups in Iran and India.