Nutritional transition in Albania among children 0-59 months

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Abstract

Aim: This paper analyses trends of nutrition outcomes among children under five years in Albania during the nutrition transition in order to contribute to tailored interventions.
Methods: The paper compares nutrition outcome data from three population-based surveys conducted in Albania in the last decade: MICS 2000, 2005 and ADHS 2008-09.
At the same time, analyses data from the ADHS 2008-09 to define the determinants and profiles of the malnourished children considering both under and over nutrition. All children under five years of age were weighted and measured to assess their nutritional status. Stunting and overweight were the dependent variables, while the independent variables were classified into four groups including child characteristics, mother's characteristics, household and community level characteristics.
Results: Data form nationally representative household surveys indicate that between 2000 and 2009, stunting prevalence was reduced from 32% in 2000 to 19% in 2009; at the same time, the prevalence of child overweight for children under five increased from 20% in 2005 to 22% in 2009 with significant changes in distribution among population groups. Based on the analysis of stunting trends across wealth quintiles, there is evidence that alongside the reduction of stunting prevalence in absolute numbers, the equity gap is increased. In 2000, the poorest were 1.4 times more likely to be stunted as compared to 1.9 times in 2009. Children of the poorest families living in urban areas are 2.2 times more likely to be stunted, as compared to children living in richer families. Among younger children, those living in rural areas are 2.5 times more likely to be overweight ($P < 0.05$).
Conclusion: Summarizing the characteristics of nutrition transition in Albania, we observe that the country is still facing the double burden of malnutrition, with stunting being on the decline but still a public health problem and overweight in raising trend. Burden of overweight in Albania has moved from children living in urban areas, belonging to mothers with secondary or higher education and living in better off families in 2005, to children living in poor families and rural areas in 2009, as latest ADHS confirms.

Keywords: child nutrition outcomes, determinants of nutrition outcomes, nutrition transition, overweight, stunting.

Introduction

Child under nutrition includes stunting (height-for-age), wasting (weight-for-height), underweight (weight-for-age) and deficiencies in vitamins and minerals. Under nutrition in infants and young children is a key underlying determinant not only of infant and child mortality, but also of permanent physical and mental disability at very young ages. Caused by a combination of a lack of quality food, frequent attacks of infectious diseases and deficient care, under nutrition continues to be widely prevalent in both developing and industrialized countries, to different degrees and in different forms (1). When children are undernourished before their 2nd birthday, they can suffer irreversible cognitive and physical damage. The consequences continue into adulthood, they accumulate in lower economic productivity and poor social development in affected communities, and are passed on to the next generation as undernourished girls and women have children of their own (2).

Overweight and obesity as manifestations of over nutrition were once associated mostly with high income countries but currently their incidence is on the rise in low and middle income countries as well. They contribute significantly to diabetes and other non-communicable diseases in adulthood. Both under and over nutrition have serious consequences on child survival, development, healthy outcomes in adulthood and economic productivity of individuals, communities and nations (3).

Recent global reports indicate that stunting and overweight coexist in low and middle income countries indicating a double burden of malnutrition among children under five years and this challenges further the relatively weak health systems in these countries and adds to their health and economic burden. According to UNICEF and WHO (4), globally, in 2011 about 101 million children under five years of age were underweight and 165 million stunted. At the same time, about 43 million children under five years were overweight or obese.

The double burden of malnutrition is part of the process of the nutrition transition that low and middle income countries are facing now at earlier stages of their economic and social development as compared to developed and industrialized world (5,6). According to Popkin (7) rapid globalization remains the root cause of the nutrition transition. Other factors occurring simultaneously and associated with nutrition transition include: demographic transition, economic development with income inequity, urbanization, behavioural changes and some biological factors (5,8-10).

The nutrition transition is happening in the context of and is closely related to demographic, epidemiologic and economic transition of these countries. Like other middle-income countries in Europe, Albania has experienced in the recent years a combination of rising over-nutrition, especially among urban privileged groups whose increasing consumption of refined foods is coupled with lower physical activity, and residual under-nutrition among vulnerable groups such as pregnant women, infants and children especially in remote areas with significant food and livelihood insecurity (11).

In spite of improving trends, infant and child mortality and morbidity, and malnutrition in Albania remain public health problems that require complex interventions to address, especially disparities related to socioeconomic status, geographical location, place of residence, and ethnicity.

The double burden of malnutrition is clearly indicated by the presence of stunting at 19% and overweight among 22% of children under five years of age, as measured by the 2008-09 Albanian Demographic and Health Survey (ADHS). Stunting among under five year-old children is among the highest of all the countries in the WHO European region. Moreover, the growth failure of infants in Albania occurs exceptionally early in life. More than one in three new-born babies is already stunted before reaching six months of age (14).

However, the status of child under nutrition has improved in the last decade, as stunting rates have decreased from 32% in 2000 (12) to 22% in 2005 (13) and 19% in 2008 (14). At the same time, the prevalence of overweight increased from 20% in 2005 (13) to 22% in 2009 (14), with significant changes in distribution among affected population groups.

Albanian Government supported by the UNICEF, WHO and other partners is escalating efforts to improve child nutrition. Interventions include improved legislation framework for marketing of breast milk substitutes and universal salt iodisation, upgrading of capacities of health professionals to monitor growth of children and provide nutrition

counselling, and communication for behaviour change to improve infant and young child feeding practices.

The purpose of this paper is to understand better the process of nutrition transition in Albania, its characteristic, and the profile of children population groups most affected in order to contribute to tailored interventions.

Methods

Comparison of nutrition outcomes, stunting and overweight, among children under five years using data from MICS 2005 and ADHS 2008-09. Both surveys use the NCHS standard recommended for use at that time by UNICEF and WHO and each of the determinants of nutrition outcomes are expressed in standard deviation units for the median of the reference population.

Secondary data analysis of ADHS 2008-09 was undertaken to define the determinants and profile of the malnourished children (including both under and over nutrition). The analysis uses data from the ADHS conducted in 2008-09 with a nationally representative sample of 8,994 households and a 98% response rate. All children under five years of age and eligible women and men aged 15-49 years were weighed and measured to assess their nutritional status. The 2008-09 ADHS used a two–stage sample design, initially selecting a sample of 450 primary sampling units (PSUs) covering four geographical regions: mountains, central, coastal and urban Tirana, followed by the selection of households as the Second Stage Units (SSUs).

This analysis is based on data from cross-sectional survey collected from a sample of 1,616 children aged 0-59 months. Selected outcome variables were stunting (height-for-age), and overweight (weight-for-height >2SD), that are examined against a set of control factors to asses their influence and statistical significance. The physical growth of children was measured by weight and height. A child was classified as stunted if height for age was less than or equal to two standard deviations (SD) below the median, and overweight if weight for height was greater than or equal to two standard deviations above the median.

Stunting and overweight were recoded as dummy variables and take the value "1" if the children is

overweight and "0" if not overweight, and similarly "1" if the child is stunted and "0" if not stunted. The independent variables considered were classified into four groups. Child related characteristics included current age of the child, sex of the child, and birth order; mother's characteristics the age of the mother and her educational level; the household characteristics included a wealth index and number of children in the household; while regions and rural/urban status were the community level characteristics.

The place of residence is coded as a categorical variable. Region is measured by four categories, indicating whether the household is located in a Mountain, Coastal, or Central region, or in Tirana urban.

The education level of the mother is categorised by levels of the study (primary or lower, secondary and higher). The age of the mother is a category variable with three groups (15-24, 25-34 and 35-49 years). Data were analysed using descriptive statistics, chi-square test of independence (significance level set at $P<0.05$, $P<0.01$ and $P<0.1$). For stunting, binary logistic regression was used and for overweight, multinomial logistic regression was used to measure the relative risk of all confounding factors (odds ratios). All analyses were carried out using the SPSS statistical software package.

Results

Analysis of trends in malnutrition (stunting and overweight) by key socioeconomic determinants

Between 2000 and 2009, the prevalence of stunting among children under five years in Albania has decreased from 32% (12) to 19% (14), while the prevalence of overweight has increased from 20% to 22%, with significant changes in distribution among population groups (Figure 1).

Based on analysis of stunting across wealth quintiles in MICS 2000, 2005 and ADHS 2009, there is evidence that alongside the reduction of stunting prevalence in absolute numbers, the equity gap is increased. As shown in Figure 2, in 2000 the poorest (Q1) were 1.4 times more likely to be stunted as compared to the richest (Q5), this ratio has increased to 1.7 in 2005 and further to 1.9 in 2009.

Figure 3 shows that initially (in 2000) children living

Figure 1. Stunting and overweight in Albania from 2000 to 2009
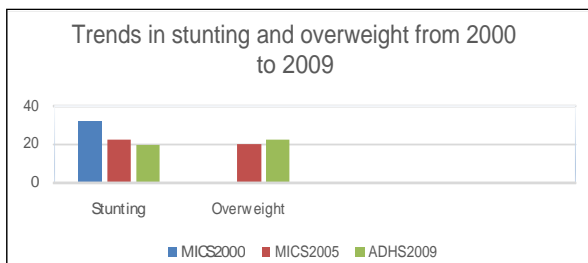
in rural areas were more likely to be stunted as compared to those living in urban areas (38% vs. 24%). However, this difference is not present any more in 2005 and 2009.

While no major differences were observed for overweight by place of residence (Figure 4) the initial gap of overweight by mothers education, observed in 2005, was not any more present in 2009 (Figure 5).
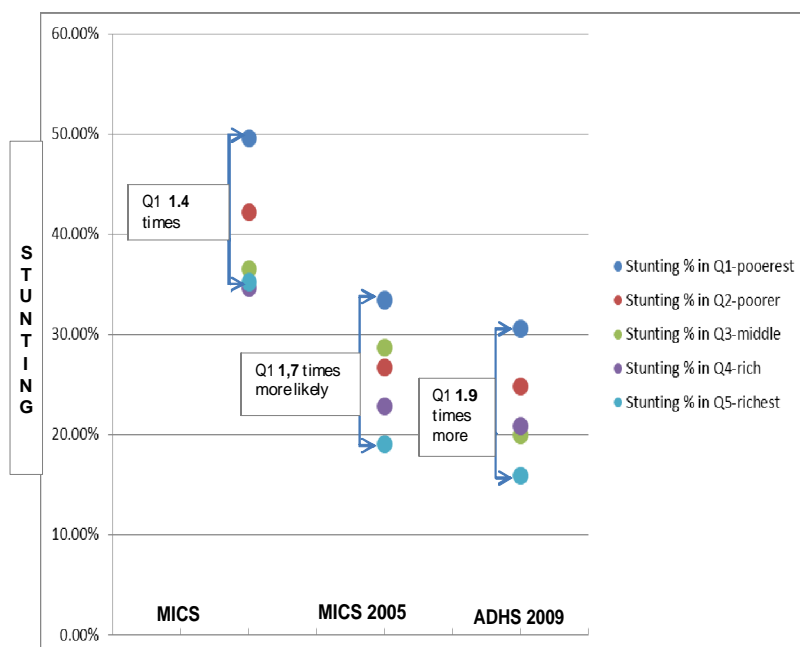
Figure 2. Equity gaps in stunting
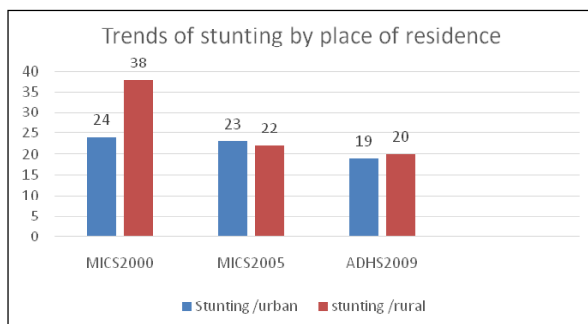

Figure 3. Trends of stunting in Albania by place of residence

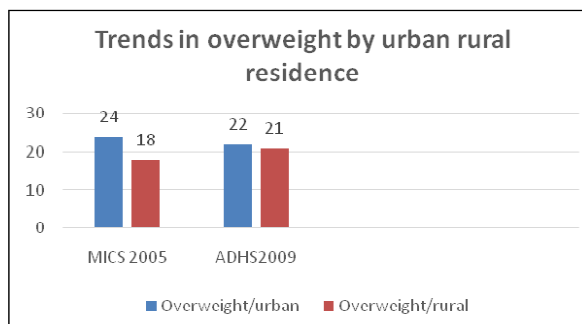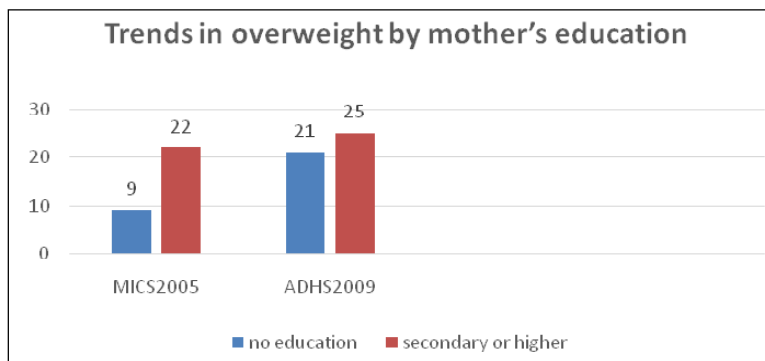**Figure 4. Trends of overweight in Albania by place of residence**

Figure 6 shows an increase in prevalence of overweight among children living in poor families

during 2005-2009, and at same time overweight, during the same period, was less frequent among the rich families.

Figure 5. Trends of overweight in Albania by mothers' level of education

Figure 6. Trend of overweight in Albania by the wealth index
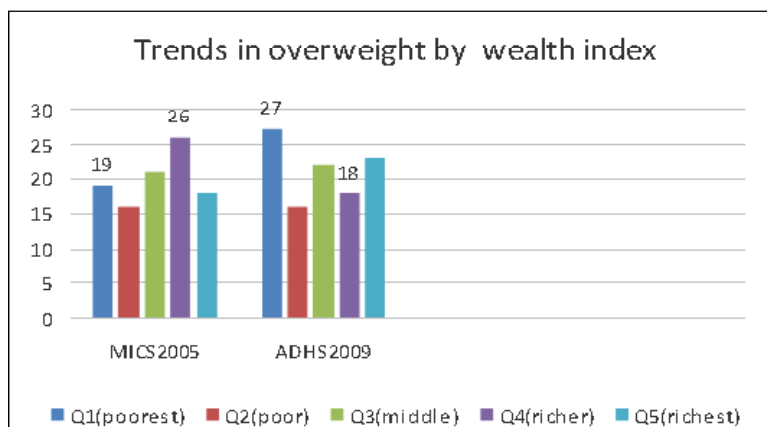
Profile of the malnourished child based on multivariate analysis of ADHS 2008-09

Age of the child remains a strong predictor of stunting, youngest children under six months of age are 3.2 times (P<0.001) more likely to be stunted as compared to children aged 36-59 months. Within the youngest age group, urban children are 4.1 times (P<0.001) more likely to be stunted and girls are four times more likely to be stunted (Table 1).

Girls are 1.3 times (P<0.10) more likely to be stunted as compared to boys (reference category).

Among children with a birth order of four or more, girls and those living in rural areas are respectively 2.3 (P<0.05) and 2.4 (P<0.05) times more likely to be stunted.

For the variable education of the mother, children of mothers with primary education and living in urban areas are two times (P<0.10) more likely to be stunted.

Children living in poorest families are 1.7 times (P<0.05) more likely to be stunted compared to those living in the richest category. Children of the poorest families living in urban areas are 2.2 times (P<0.10) more likely to be stunted.

Children living in mountainous areas are 1.5 times (P<0.10) more likely to be stunted compared to the central region (reference category); children with an urban residence in mountainous areas are 2.3 times (P<0.10) more likely to be stunted; boys living in mountainous areas are 1.9 times (P<0.10) more likely to be stunted.

Younger children 0-5 months are 1.8 times (P<0.10) more likely to be overweight as compared to children in the 36-59 months age group. Within this category, children living in rural areas and girls are respectively 2.5 (P<0.05) and two times (P<0.10) more likely to be overweight (Table 2).

Children of families in the middle wealth quintile are 1.4 times (P<0.10) more likely to be overweight as compared to those living in families of richer wealth quintiles. Out of children in the middle wealth quintile, rural children and boys are 1.8 times

Table 1: Model results for the determinants of stunting – total, boys, girls, urban, rural†

	Total	Girls	Boys	Rural	Urban
Child characteristic					
Age of child in months					
0-5	3.199***	3.857**	2.92**	2.563**	4.146**
6-23	2.116***	2.391**	2.019*	1.521+	3.618***
24-35	1.341	1.222	1.543	1.346	1.382
36-59	1.000	1.000	1.000	1.000	1.000
Sex of the child					
Female	1.306+	1.000	1.000	1.100	1.723
Male	1.000			1.000	1.000
Birth order					
2	1.592*	1.792*	1.377	1.382	2.000*
3	1.519+	1.690	1.339	1.442	1.829
4+	1.994*	2.339*	1.665	2.423*	1.544
First	1.000	1.000	1.000	1.000	1.000
Maternal characteristics					
Age of the mother					
15-24	0.805	0.420*	1.542	1.144	0.484
25-34	0.783	0.587+	1.012	0.918	0.648
35-49	1.000	1.000	1.000	1.000	1.000
Education level					
Primary	1.309	1.298	1.546	0.267*	2.026+
Secondary	0.995	0.931	1.099	0.144**	1.596
Higher	1.000	1.000	1.000	1.000	1.000
Household characteristics					
Wealth quintile					
Poor	1.757*	1.674	1.728	1.844	2.180+
Middle	1.491	1.945*	1.015	1.663	1.299
Richer	1.000	1.000	1.000	1.000	1.000
Geographic characteristics					
Region					
Coastal	0.994	0.881	1.104	0.726	1.614
Mountain	1.556+	1.325	1.871+	1.383	2.256+
Urban Tirana	1.131	0.947	1.512		1.625
Central	1.000	1.000	1.000	1.000	1.000
Residence					
Rural	0.555**	0.464	0.667		1.000
Urban	1.000	1.000	1.000	1.000	

† Binary logistic regression, valid cases = 1254 children

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

(P<0.05) more likely to be overweight.
Children living in the coastal area are 53% less likely (P<0.01) to be overweight compared to those living in central areas.

Discussion

Similarly to what is happening with global trends (15), in Albania trends for stunting and overweight for children under five years have moved in opposite directions. As indicated in the results section, while stunting prevalence has decreased in the last decade, overweight rates are on the rise.
Stunting remains a problem of greater magnitude than underweight or wasting, and it more accurately

Table 2. Multivariate model results for the determinants of overweight (weight for height >2SD) total, boys, girls, urban, rural

	Total	Girls	Boys	Rural	Urban
Child characteristic					
Age of child in months					
0-5	1.820+	2.075+	1.698	2.548*	1.16
23-Jun	1.2	1.339	1.047	1.672	0.773
24-35	0.901	1.041	0.763	0.923	0.976
36-59	1	1	1	1	1
Sex of the child					
Female	1.058+	1	1	1.049	1.096
Male	1			1	1
Birth order					
First	1	1	1	1	1
2	1.289	1.124	1.52	1.117	1.5
3	0.934	0.952	0.904	0.813	1.156
4+	0.663	0.622	0.711	0.506	0.983
Maternal characteristic					
Age of the mother					
15-24	0.537+	0.515+	0.525	0.370+	0.927
25-34	0.579*	0.537*	0.62	0.517+	0.662+
35-49	1	1	1	1	1
Education level					
Primary	0.904	1.085	0.742	0.846	0.796
Secondary	0.788	0.869	0.726	0.682	0.703
Higher	1	1	1	1	1
Household characteristic					
Wealth quintile					
Poor	1.56	1.305	1.854	1.992*	1.255
Middle	1.492+	1.281	1.860+	1.837*	1.268
Richer	1	1	1	1	1
Geographic characteristic					
Region					
Coastal	0.529**	0.550*	0.501**	0.426**	0.765
Mountain	0.86	0.739	1.022	0.773	1.075
Urban Tirana	0.972	0.933	1.021		1.054
Central	1	1	1	1	1
Residence					
Rural	0.746	0.753	0.769		1
Urban	1	1	1	1	

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

reflects nutritional deficiencies and illness that occur during the most critical periods for growth and development in early life. Most countries have stunting rates that are much higher than their underweight rates, and in some countries, more than half of children under five years are stunted (1).

Stunting is now acknowledged as the best proxy measure for child health inequalities (16). This is because stunting captures the multiple dimensions of children's health, development and the environment where they live.

Analysis of the data from MISC 2000, 2005 and ADHS 2008-09, indicate a decrease in overall rates of stunting with persistent and increasing gap between the rich and the poor.

While wealth index remains a strong predictor of stunting along with age of the child, sex and region of residence, the rural urban residence, starting from 2005, is not any more a predictor of stunting.

This could be explained with rapid urbanization and considerable internal population movements from rural remote to urban and peri-urban areas resulting in similar prevalence rates of stunting among rural and urban. It may be also due to increased vulnerability of urban children.

On the other hand, according to UNICEF (17) the scale of inequities within the urban areas is a matter of concern. According to ADHS, poor children living in urban areas are two times more likely to be stunted as compared to children living in rich families in urban areas (P<0.10) while the gap between the rich and the poor is not significant in rural areas.

In multivariate analysis based on ADHS 2008-09 data, stunting appears to be positively associated with age of the child, sex of the child, birth order, wealth index and region, and inversely associated with urban/rural residence.

According to this analysis, the most vulnerable appear to be very young children under six months of age followed by those 6-23 months, girls, children living in urban areas whose mothers have the lowest level of education, children living in the poorest families and those in mountainous areas.

Identified risk factors for stunting are comparable to those shown in other studies in CIS countries, Nepal, Sri Lanka, India, DRC, and include low household income, age of the child and gender (18-22).

Although being overweight is a problem most often associated with industrialized countries, some developing countries and countries in transition also have a high prevalence of overweight in children. Some countries are experiencing a "double burden" of malnutrition having higher rates of both stunting and overweight (1).

Psychosocial problems, diabetes mellitus, and cardiovascular disease are associated with obesity (23). Analysis of the data from MISC 2005 and ADHS 2008-09, indicate an increase in overall rates of overweight among children under five years, with burden shifting progressively to the poor.

While in 2005 children under five years living in urban areas were 1.3 times more likely to be overweight as compared to those living in rural areas (24% vs.18%), in 2009 there is no significant difference (24-26).

Mother's education was a strong predictor of overweight in the early stages of nutrition transition. According to MICS 2005, children of mothers with secondary or higher education were 2.4 times more likely to be overweight as compared to children of mothers with no education (21% vs. 9%). If we consider that higher education is a prerequisite for better employment opportunities for the mothers and a predictor of better economic status of the family, situation in Albania is in line with findings in the literature on the initial burden of overweight among the rich with shifting of this burden to the poor later in the nutrition transition process (7,24,26). In multivariate analysis based on ADHS 2008-09 data, age of the child and wealth index is positively associated to overweight, while age of the mother and region are inversely associated.

Studies in Brazilian children indicate that prevalence of overweight was highest among children living in households with a more privileged socioeconomic status (27). While other studies have found an association between low socioeconomic status and overweight in childhood, taking into account factors such as mothers with low education status, occupation, education and income (28-30).

Among the youngest age group, children living in rural areas and girls have an increased likelihood for overweight while among the children of families in the poor wealth quintile children living in rural areas are more at risk of being overweight. This is a clear indication that burden of overweight is moving to the poor and people living in rural areas.

The double burden of malnutrition with coexistence of both under nutrition (measured by stunting rates) and over nutrition (measured by overweight rates) is present in Albania as indicated by results of recent surveys (14). Stunting and wasting coexist with overweight and obesity among children under five in Albania. While 22% of children under five are overweight, yet 19% of those in the same age group are stunted.

According to Popkin, the "nutrition transition" refers to changes in body composition patterns, diet and physical activity due to complex interactions among economic, demographic and environmental factors (10). Nutrition transition is linked to changes in dietary and physical activity patterns due to underlying factors such as urbanization, economic development, educational and health care improvements, and market globalization. Characteristics of nutrition transition include rapid changes, coexistence of diseases related to under nutrition and obesity, and affects people from all socioeconomic groups. It may initially affect the higher SES groups followed by a shift to lower SES groups (31).

The country needs to prepare a specific programmatic response to address the consequences of the nutrition transition that as noted in the literature (32), include higher risks in adulthood of NCDs and an increased risk of childhood obesity as well due to high rates of stunting and a very challenging process of priority setting to address the dual problems of under and over nutrition.

Summarizing the characteristics of nutrition transition in Albania, we observe that the country is still facing the double burden of malnutrition, with stunting being on the decline but still a public health problem and overweight in raising trend. Burden of overweight in Albania has moved from children living in urban areas, belonging to mothers with secondary or higher education and living in better off families, in 2005, to children living in poor families and rural areas, in 2009, as latest ADHS confirms.

Recommendations

Global experience indicates that efforts are needed in "double burden" countries to promote good infant and young child feeding practices that support linear growth without causing excessive weight gain. Although causes at the basis of malnutrition including both under and over nutrition are similar, behavior change strategies are not. They should be tailored according to specific characteristics of target groups as impact of various sets of interventions varies by socio economic status and level of education.

Economic growth is not sufficient to address the double burden of malnutrition. A combination of nutrition specific and nutrition sensitive, multi sectoral interventions is required to address this significant public health problem.

Conflicts of interest: None declared.

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