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The Nutritional Double Burden in Benin

Waliou AMOUSSA HOUNKPATIN & Sam BODJRENOU
Ecole de Nutrition, des Sciences et Technologies Alimentaire, Faculté des Sciences Agronomiques, Université d’Abomey-Calavi, Bénin.

INDICO/Abstract : 15

Background : Developing countries are faced not only the problem of malnutrition caused by micronutrients deficiencies but also the emergency and the increasing of overweight and obesity. Benin is a West African country with 11 million inhabitants facing also such situation

Objective : The objective of this paper is to describe the situation of nutritional double burden in Benin and to reveal associated factors.

Methods: In order to characterize the global situation, we based our study essentially on literature review. However, graphs and tables presented had been produced by ourselves.

Results: Chronic malnutrition is highly prevalent in Benin (34%). Underweight and wasting affect respectively 18% and 4.5% of children. People suffering from Anaemia are decreasing in the population but the percentage is still high notably 58% of children and 41% of women in 2011/2012. In the same time, overweight and obesity become an issue with 1.7% of children affected. From 2001 to 2011/2012, women aged 15-49 years obesity assessed by Body Mass Index was increasing from 6% to 7.2% while chronic energy deficiency was decreasing (11% to 6.2%). In some districts, percentage of mothers overweighted or obese with stunted children is important (graph). These show the coexistence of over and undernutrition in the same Benin population (double burden). High socioeconomic situation, living in urban area are positively associated with overweight and obesity. Household poverty, food insecurity, parents’ illiteracy and inadequate feeding practices lead mostly to stunting.

Conclusion: The nutritional double burden is a tangible reality nowadays in Benin. In order to overcome the problem, we suggest firstly to develop nutritional education programmes which promote adequate feeding practices and care for children and women in general and physical activities for households with high socioeconomic status; Secondly, to promote women empowerment and education initiatives in order to improve their life conditions and impact children feeding and care.

Finally, to struggle rural exodus by promoting local inclusive development and small income generating activities which could enhance agricultural production and allow fathers to support financially their family.
Evolution of the double burden of malnutrition during 15 years in the Cuban adult population

Authors: Diaz Maria Elena, Jiménez Santa y García Roche René
Affiliations: National Institute of Hygiene, Epidemiology and Microbiology, Havana, Cuba

Background:
Globally, the trend of overweight and obesity continues to rise, which causes significant consequences for the health and the economy of the countries, because this increases the risk of other non-communicable diseases in the adult population, also coexisting with a weight deficit, which is representative in the poorest countries. This problem is promoter of a double burden of malnutrition in low and middle income countries, its reduction depends on different factors including the elimination of poverty, improvement of the quality of food, increasing the physical activity and sustainable food systems, among others. In Cuba, the deficit of weight does not constitute a public health problem, while the excess of weight is in ascending progression.

The purpose was to analyze in Cuba the changes in the prevalence of overweight, obesity and chronic energy deficiency (CED) in a period of 15 years, between 1995 and 2010, defined by the three national surveys of risk factors, carried out as independent epidemiological studies.

Methods:
Sample: A complex, stratified, multi-stage cluster sampling design, based on the households survey system in the Cuban population over 15 years of age. ≥20 years were taken who were part of the self-weighted samples obtained in three surveys.
- I and II surveys: urban areas. Years: 1995 (N = 14203) and 2001 (N = 228514), respectively. National representation.
- III survey of 2010 (N = 7928). National and urban/rural residence area representation,

Pregnant women were excluded of data analyses.

Measurements: Weight, Height, Waist and Hip circumferences

Chronic Energy Deficiency (CED), Overweight and Obesity by Body Mass Index (BMI). WHO cutoff points (BMI <18.4 kg/m² for CED; BMI 25–29.9 kg/m² for overweight; BMI ≥30 kg/m² for obesity).

Regional distribution of adipose tissue: by waist-to-hip ratio. Seidell cutoff point: men: ≥1.00; women: ≥0.85.

Prevalence was estimated, with confidence intervals at 95% of CED, overweight, obesity and central adiposity by sex and age intervals for comparative purposes.

The trend in Cuba between 1995 and 2010 has shown a reduction in weight deficiency and a significant increase in excess weight and abdominal adiposity.

Results:
- Evolutionary increase of overweight and obesity in the Cuban population, in 6% and 5.9% percentage points respectively in 15 years.
- The obesity was more marked between the years 2001-2010, with predominance in females and in ages up to 59 years.
- Although the increase in overweight was slight in the last decade, the prevalence of obesity was higher, with a central predisposition.
- The CED has been reduced in the country, in men the prevalence has dropped to 4.9% and in women it is 6.7%.
INTRODUCTION

Nutrition transition, MENA Region.
- High prevalence of obesity, particularly abdominal obesity, among women.
- Persistence of anaemia among children.

Double burden of malnutrition at household level?

OBJECTIVES

- To assess the magnitude of within household double burden of child anaemia with mother abdominal adiposity?
- To test if the co-occurrence at child-mother pair level is independent, synergetic or antagonistic?
- To explore the associated factors?

METHODS

Population: Greater Tunis, child (6-59 mo)-mother (20-49 y) pairs.
Sample: two stage random cluster, n=437 child-mother pairs.
Variables:
  - Children
    Anaemia: Hb <110g/l
  - Mothers
    Abdominal obesity: WC ≥ 88 cm

RESULTS

R1_ A third of the children were anaemic.
More than half of the mothers suffered from abdominal obesity.

R2_ The coexistence of anaemic child and central obesity in mother was significant.

R3_ No synergistic nor antagonistic co-occurrence of either anaemic child and abdominal obesity in mother (P=0.80).

R4_ The anaemic child-abdominal obesity mother double burden was more prevalent among pairs with younger children.

A strong decreasing gradient of double burden with child age. Double burden was more prevalent with mothers with higher energy intake.

CONCLUSION

- A significant prevalence of the paradoxical co-occurrence of anaemia in child and abdominal obesity in mothers.
- There’s not a higher risk of child anaemia when the mother suffered from abdominal obesity, nor vice versa.
- Prevention programs which target anaemia in children together with abdominal adiposity among mothers?
A SECONDARY DATA ANALYSIS OF FOOD SECURITY INDICATORS IN HOUSEHOLDS AFFECTED BY A DOUBLE BURDEN OF MALNUTRITION IN SAHARAWI REFUGEE CAMPS IN SOUTHWEST ALGERIA

Silvia Barbazza1, Chaﬁk Meziani2, Nuria Salse-Ubach3, Philip James4, Antonio Vargas-Brizuela1, and Carlos Grijalva-Eternod5

Affiliations: 1 Action Against Hunger, Madrid, Spain; 2 United Nations High Commissioner for the Refugees, Tindouf, Algeria; 3 La Cooperativa Humanitaria, Girona, Spain; 4 London School of Hygiene & Tropical Medicine, London, UK; 5 UCL Institute for Global Health, London, UK. INDICO ID number 115

BACKGROUND

The simultaneous presence of seemingly opposite malnutrition types within households makes it more difficult to programme comprehensive nutrition interventions in humanitarian context.

There is a growing need to understand which are the main diet related factors that can lead to the coexistence of stunting and overweight in a household in emergency contexts.

OBJECTIVES

The main objective of the study was to assess whether differences exist in food security indicators in households affected by double burden of malnutrition compared to those unaffected in Saharawi refugee camps in Algeria.

METHODS

Secondary data analysis of a cross-sectional nutrition survey conducted in four Saharawi refugee camps in Algeria in 2010. Data was collected from 2,040 households of which only 651 had at least one eligible child and one eligible woman. Households were classified in four categories:

1. Double Burden, if at least one child was stunted and one woman had abdominal obesity;
2. Stunted only, if at least one child was stunted and no woman had abdominal obesity;
3. Overweight only, if at least one woman presented abdominal obesity and none of the children were stunted;
4. Normal, if no woman had abdominal obesity and no child was stunted.

Dietary adequacy in children aged 6-59 months was assessed by an age-specific Infant and Child Feeding Index (ICFI).

Household food security and diet diversity was defined by the Food Consumption Score (FCS) and the average number of 9 food groups consumed in a week, respectively.

RESULTS

Key results showed higher proportions of households having poor ICFI practices among those having at least a stunted child and no overweight women. No differences were found in food consumption score and food groups' consumption among households, showing similar dietary patterns independently from households' nutritional status.

CONCLUSIONS

In a humanitarian context where double burden of malnutrition is predominant, there is limited value in using food security indicators alone to guide nutritional interventions.

CONTACT: sbarbazza@accioncontraelhambre.org
**Introduction**

Pacific Island and Indian peoples represent extremes of obesity prevalence but both ethnic groups in adulthood have a high prevalence of type 2 diabetes mellitus (T2DM) and related traits. For the same BMI the two ethnic groups have substantially different fat and fat free masses.

We compared the body size, biochemistry and blood pressure variables of Pacific and Indian adolescent boys and girls.

**Results**

Despite their younger age, Pacific boys and girls were considerably heavier, taller and adipose, and had higher blood pressure and lipid concentrations (Table). Forty percent of Pacific Island children were obese while more than 40% of Indians were underweight. Measured with whole body dual X-ray absorptiometry Pacific Island adolescents had a substantially higher proportion of body fat and higher bone mineral density than Indian.

Difference within ethnic group by gender are more marked in Indian. Girls are relatively lighter and shorter and have much more fat (28 vs 16%) than boys while for Pacific the differential is 37% vs 28% (Figure). Bone mineral density in Indian girls is less than boys but in Pacific there is no gender difference.

Conversely Indian children had higher glycaemia particularly the boys. Pacific children had higher concentrations of total cholesterol, HDL and triglycerides than the Indian children. Average age of menarche in Pacific girls is 12 years (Ministry of Health, 2003) and in Indian girls is 13 years.

**Characteristics of Indian and Pacific boys and girls**

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<th>Characteristic</th>
<th>Indian</th>
<th>Pacific</th>
</tr>
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<tbody>
<tr>
<td>n</td>
<td>318</td>
<td>468</td>
</tr>
<tr>
<td>Birth weight, kg</td>
<td>2.7±0.4</td>
<td>3.6±0.6</td>
</tr>
<tr>
<td>Current age, y</td>
<td>18.2±0.5</td>
<td>14.3±0.4</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>56.5±10.8</td>
<td>81.9±23.4</td>
</tr>
<tr>
<td>Height, cm</td>
<td>169.6±6.7</td>
<td>171.6±7.6</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>19.5±3.3</td>
<td>27.6±6.9</td>
</tr>
<tr>
<td>BMI z (WHO)</td>
<td>-1.05±1.37</td>
<td>1.78±1.29</td>
</tr>
<tr>
<td>IOTF prevalence*</td>
<td>42.5±7.1</td>
<td>1.28±.243</td>
</tr>
<tr>
<td>Blood pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic mmHg</td>
<td>112±10</td>
<td>122±10</td>
</tr>
<tr>
<td>Diastolic mmHg</td>
<td>59±8</td>
<td>65±9</td>
</tr>
<tr>
<td>%fat</td>
<td>15.8±8.3</td>
<td>28.0±9.3</td>
</tr>
<tr>
<td>Bone mineral density, g/cm²</td>
<td>1.07±0.076</td>
<td>1.180±0.109</td>
</tr>
<tr>
<td>Biochemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fasting glucose, mmol/L</td>
<td>5.4±0.3</td>
<td>5.2±0.9</td>
</tr>
<tr>
<td>% blood glucose &gt;5.5 mmol/L</td>
<td>37.0</td>
<td>13.5</td>
</tr>
<tr>
<td>Total cholesterol, mmol/L</td>
<td>3.2±0.6</td>
<td>3.97±0.75</td>
</tr>
<tr>
<td>HDL-C, mmol/L</td>
<td>1.0±0.2</td>
<td>1.29±0.26</td>
</tr>
<tr>
<td>Triglycerides, mmol/L</td>
<td>0.7±0.3</td>
<td>1.07±0.51</td>
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**Discussion**

Possible candidates for such differences are genetic, migratory/natural selection, geographical and environmental stressors, socioeconomic, diet and food availability and intergenerational influences such as maternal nutrition (under- or over), and gestational diabetes mellitus.

Higher BMI and adiposity are usually associated with hyperglycaemia and insulin resistance but it has recently been demonstrated that a genetic variant CREBF found in 26% of Pacific people may be protective for diabetes (Minster et al, 2016). This may explain why Pacific islanders ‘tolerate’ higher BMI compared to other populations.

Comparison of birth weights suggests that foetal nutrition and growth patterns could have programmed these populations differently for later cardio-metabolic risk.

**Conclusion**

Lifecourse comparisons of populations with extreme ecological and ethnic characteristics is likely to improve our understanding of factors affecting cardiometabolic risk.

**References**


Acknowledgement and thanks to the Pacific Islands Families study participants, the New Zealand Health Research Council for funding the age 14 measurements. For the Pune study we acknowledge the help of the participants, the funding agencies and the staff members who helped with data collection.
1. INTRODUCTION

- Worldwide, vulnerable households experiencing epidemiological transitions are often concomitantly affected by undernutrition and overweight.
- This double burden of malnutrition has been shown to affect refugee populations.
- It is unknown how rapidly this double burden can change in a humanitarian context.

2. AIM

- To assess the change in the double burden of malnutrition among Sahrawi refugees living in a protracted emergency.

3. SETTING

- People from Western Sahara (Sahrawi) living in refugee camps near Tindouf city, Algeria (about 165,000 persons).
- Sahrawis have been living as refugees for over 43 years.
- Sahrawi refugees are mostly dependent on food assistance for survival.

4. METHODS

- In 2010 and 2016 we implemented two stratified, clustered nutrition surveys (both Oct-Nov). We surveyed 2,041 households (in four strata) in 2010 and 2,100 (in five strata) in 2016.
- In children aged 6-59 months we obtained weight, length/height, and oedema data. Anthropometric data were transformed to weight-for-length/height (WHZ), weight-for-age (WAZ) and height-for-age (HAZ) z-scores using the 2006 WHO growth standards. We defined acute malnutrition as WHZ<-2 and/or oedema, stunting as HAZ<-2, underweight as WAZ<-2, and overweight as WHZ>2.
- For women aged 15-49 years, who reported not being pregnant or lactating a child aged <6 months, we obtained weight and height data and calculated body mass index (BMI, kg/m²). We estimated HAZ using the 2007 WHO growth references assuming a maximum age of 19 years. We defined short stature as HAZ<-2, underweight as BMI<18.5, and overweight as BMI≥25.
- To quantify the proportion of households with a double burden of malnutrition, we selected households with at least two members surveyed. Households were classified as (1) undernourished if they contained under-nutrition cases in women (stunting or underweight) or children (acute malnutrition, stunting, underweight); (2) overweight if they contained overweight cases in women or children; and (3) double burden if they contained both cases.

ACKNOWLEDGEMENTS
We are extremely grateful to all the Sahrawi refugee families who took part in these nutrition surveys, the Sahrawi refugee authorities who provided support for the implementation of the surveys, and to all the survey teams.

5. MAIN FINDINGS

- In children, stunting is the most prevalent malnutrition form. Between 2010 and 2016 all malnutrition indicators decreased significantly, except overweight (Figure 1).
- In women, between 2010 and 2016 under-nutrition prevalence decreased significantly, but overweight prevalence increased significantly (Figure 2).
- In households, the double burden of malnutrition increased. This increase is driven by a large and significant increase of overweight coupled with a small but significant reduction of undernutrition (Figure 3).

Figure 1. Comparisons of malnutrition prevalence in Sahrawi refugee children (2010 vs 2016)

Figure 2. Comparisons of malnutrition prevalence in Sahrawi refugee women (2010 vs 2016)

Figure 3. Venn diagram comparing household level prevalence of malnutrition (2010 vs 2016)

FOR FURTHER INFORMATION
Please contact Carlos Grijalva-Eternod (c.eternod@ucl.ac.uk) if you would like further information regarding this study or to request a PDF version of this poster.
Introduction

Although progress has been made in the past decade, the burden of child malnutrition remains high in many low- and middle-income countries. They continue to be affected by a high burden of undernutrition, whilst the rate of childhood overweight/obesity is increasing substantially.

Objective

This study aimed to critically assess the multiple malnutrition burden in children under five in West Africa (WA).

Methods

- A mixed-method approach was applied.
- A secondary data analysis was conducted using the Demographic Health Surveys and Multiple Indicator Cluster Surveys data for all WA countries. We report on prevalence levels of US stunting (height-for-age Z-score < -2), US anaemia (hemoglobin < 110 g/l), low birth weight (LBW; birth weight < 2,500 g), US overweight/obesity (weight-for-height Z-score > 2), and US wasting (weight-for-height Z-score < -2). We applied standard prevalence cut-offs to identify severe country-level burdens: US stunting ≥ 30%, US anaemia ≥ 40%, LBW ≥ 10%, US overweight ≥ 3%, and US wasting ≥ 10%.
- A systematic mapping review identified and catalogued all peer-reviewed literature (MEDLINE) since January 1, 2010 that reported on any of these forms of US malnutrition, except for US anaemia. Information was extracted at abstract level.

Results

Figure 1: Multiple malnutrition burdens in US children for WA countries

- Stunting and anaemia
  - Benin and Nigeria
- Anemia and overweight
  - Gambia and Ivory Coast
- Stunting and overweight
  - Liberia
- Triple burden
  - Guinea, Mali, Sierra Leone and Niger

Figure 2: Number of publications reporting on US nutrition indicators (n=230)

- More than 1
  - 62
- Overweight/obesity
  - 7
- Wasting
  - 30
- Stunting
  - 22
- Low birth weight
  - 109

Figure 3: Number of publications per area of research reporting on US nutrition indicators (n=230)

- prevalence and drivers
  - 177
- Program
  - 36
- Policy
  - 17

Figure 4: Number of publications reporting on US overweight/obesity (ow/ob) (n=14)

- ow/ob
  - 7
- ow/ob and stunting
  - 1
- ow/ob and stunting and wasting
  - 1
- ow/ob and LBW
  - 6
- ow/ob and stunting and wasting and LBW
  - 3
- ow/ob and wasting
  - 1

Conclusion

West African countries experience multiple types of undernutrition in US children, whilst the burden of US overweight/obesity is increasingly prevalent alongside. Research reporting on multiple malnutrition burdens is lacking, and there is an urgent need for more studies to focus on both overweight and undernutrition simultaneously. These multiple burdens conceal many complexities both in causation and designing necessary interventions. Countries will need to better understand what drives these and how they coexist to address them simultaneously through adapted programs and policies.