



Food intake of Tibetan children living in Kashin-Beck disease endemic areas in Central Tibet

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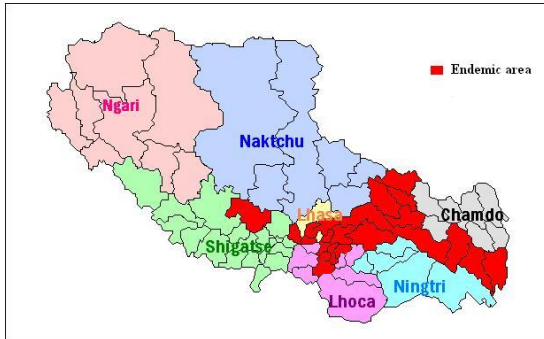
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Preliminary data



- Kashin-Beck Disease:
 - Endemic bone and joint disease in Central Tibet



- Short stature, deformities, lack of mobility and pain
- Unknow etiology



- High prevalence of growth retardation, rickets, signs of chronic malnutrition

NUTRITIONAL AND HEALTH STATUS OF TIBETAN CHILDREN LIVING AT HIGH ALTITUDES

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→ **Need for a precise evaluation of the food intake**



Methodology (1)



- Location:
 - Lhasa and Lhoca prefectures
- Period:
 - January, March, July and September 2002
 - For at least 2 days during each season
- Population:
 - Children (♀ and ♂) aged 9 to 16 years
- Data collection:
 - Direct observation at home / in schools
 - Precise description of recipes
 - Observation of the preparation
 - Weighing of
 - the different food items before preparation
 - the prepared food
 - the food given to the child
 - the food left by the child

→ enabling precise calculation of the amount of food eaten



Methodology (2)

- Data obtained:
 - food consumption data
 - for 44 children
 - for 1 to 4 seasons
 - for 1 to 4 days per season
- Exclusion of some files in order to keep the most precise information
 - minimum 3 seasons per child
 - minimum of 2 days per season

- Utilisation of the data:
 - As such
 - Translation of volume units (standardized cups and bowls) in weight unit
 - Extrapolation of some recipes

→ Inclusion of 36 children

Methodology (3)



- Software and tables of food composition used:
 - Encoding of the data in Kid Menu^R and Microsoft Office Excel
 - American table of food composition: USDA Nutrient data
 - For the vitamin D, use of the Souci Fachmann table
- The nutrient intake was compared to the Dietary Reference Intake (DRI) of the US Food and Nutrition Board
- Anthropometrical data (weight and height) were compared to WHO child growth standards (www.who.int/childgrowth/en)

Results (1)

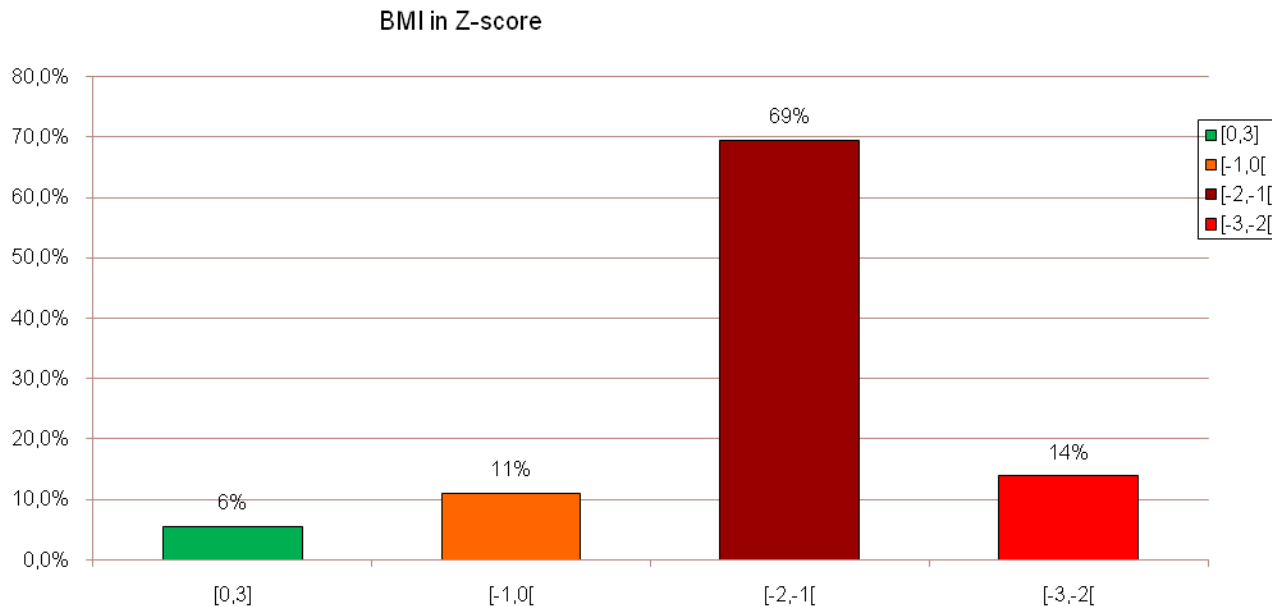


- General observation:
 - Poorly diversified diet, essentially cereals, butter and tea
 - Very few vegetables, meat, eggs
 - No fish
 - Consumption of alcohol



Results (2)

- Weigth and heigth data:
 - Mean Body Mass Index : -1.1 ± 0.81 Z-score; Max: 0.25 Z-score; Min: -3 Z-score



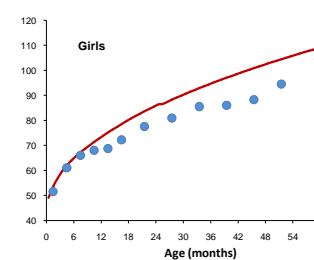
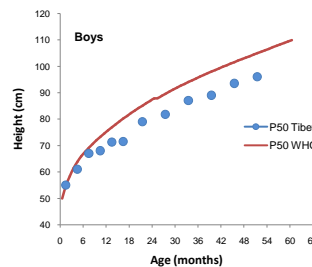
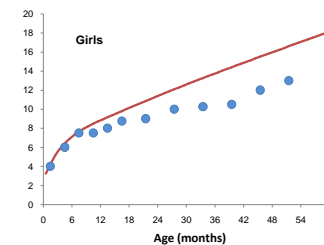
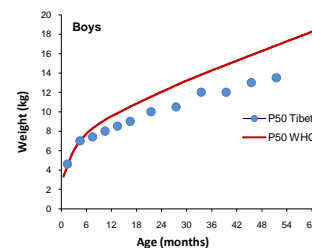
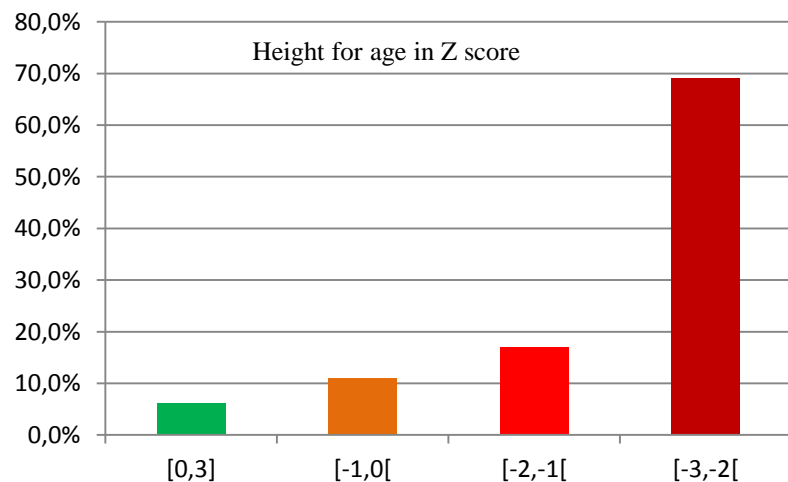


- Weight and height data:

Mean Height for age ratio : -1.7 ± 1.02 Z-score; Max: 2.75 Z-score
 Min: -3 Z-score

Growth, nutritional status, and signs of rickets in 0–5-year-old children in a Kashin–Beck disease endemic area of Central Tibet

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 Françoise Mathieu • Pascale Bally • Dikki Yangzom •
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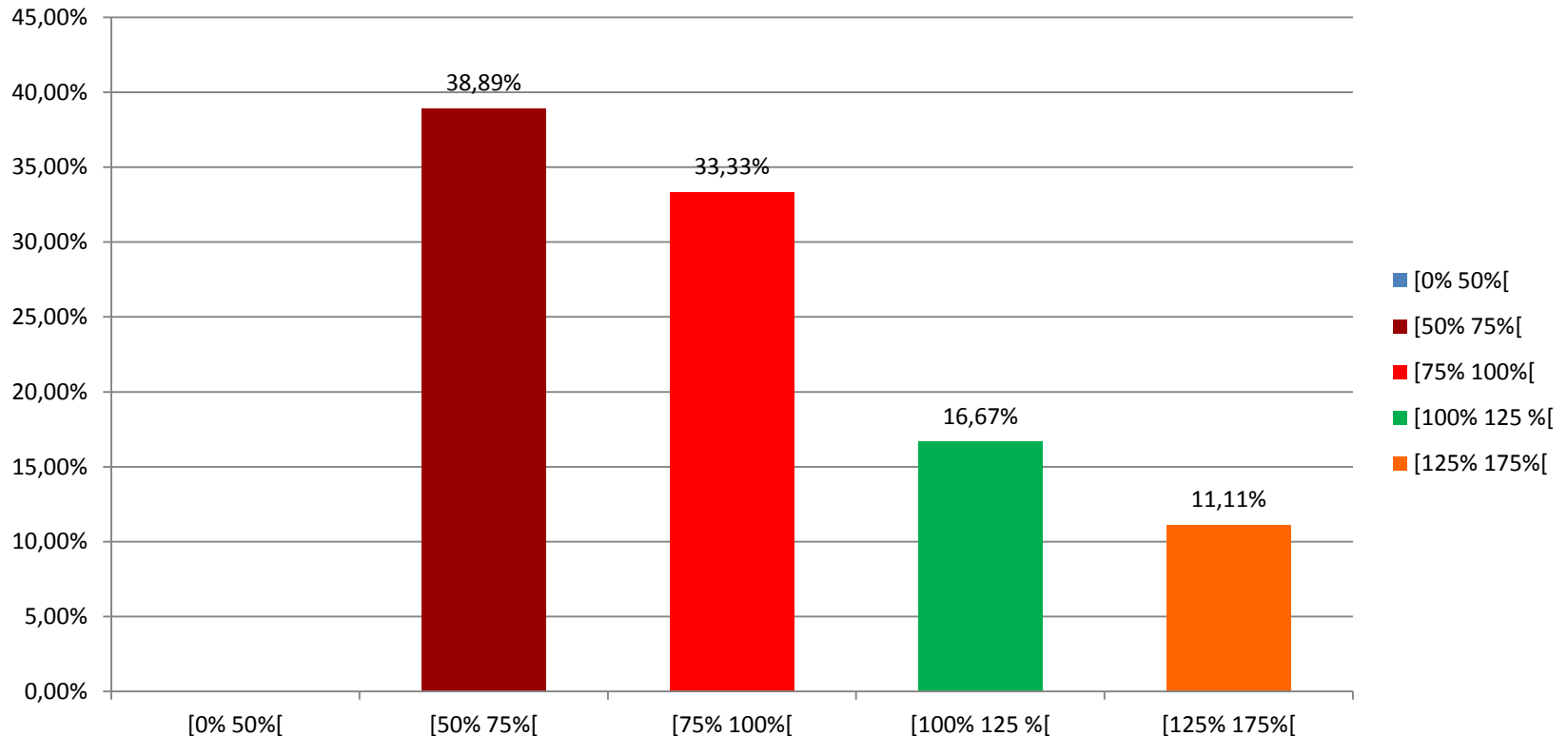
Results (4)



Nutrient data:

- Mean energy intake : 87% +/- 0.26 of DRI; Max: 157%, Min: 57%

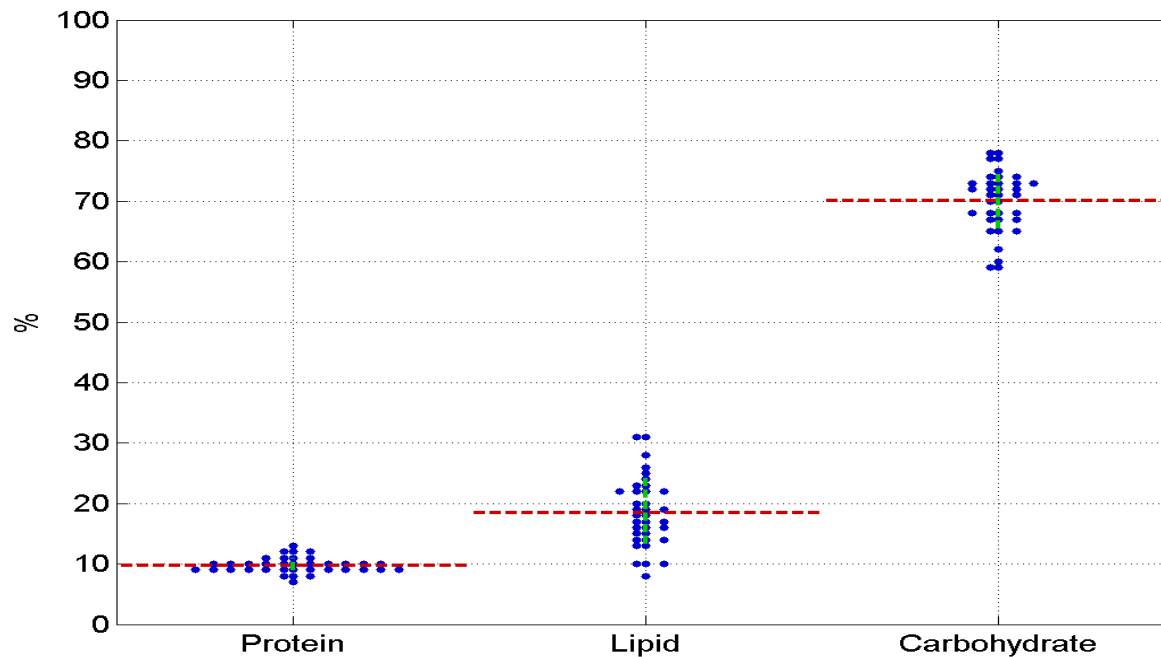
Total energy intake



Results (5)



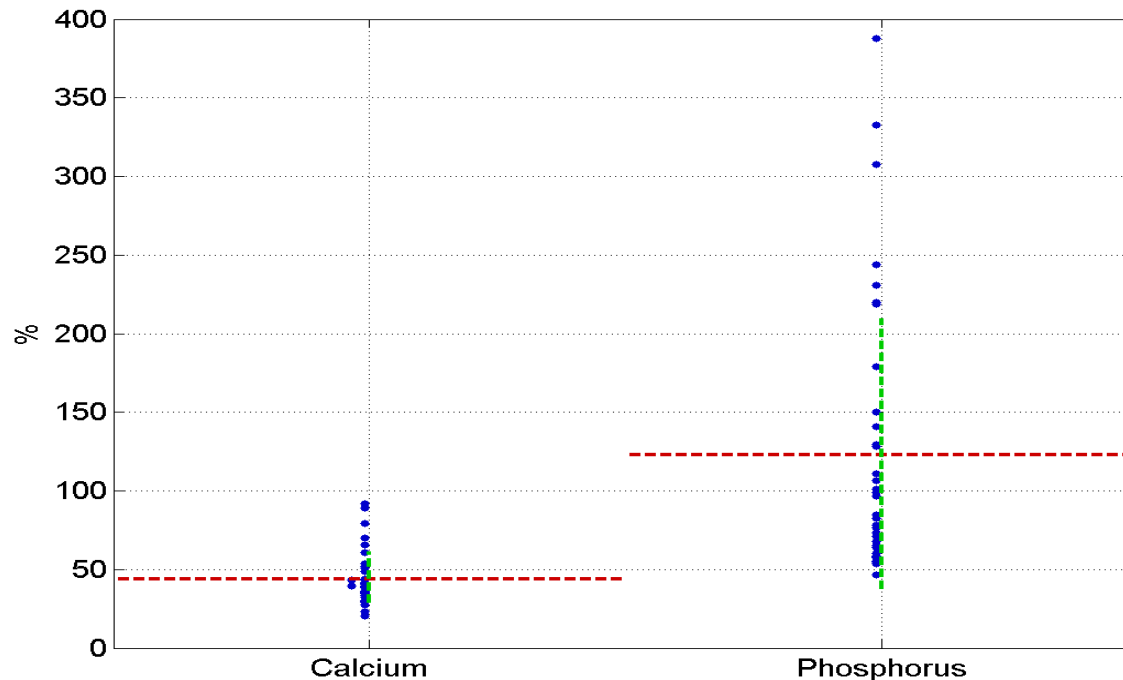
- Nutrient data: Protein, Lipid and carbohydrate intake
 - Mean energy intake due to protein: 10% +/- 0.01 of total energy intake; Max: 13%, Min: 7%
 - Mean energy intake due to lipid: 19% +/- 0.05 of total energy intake; Max: 31%, Min: 8%
 - Mean energy intake due to carbohydrate: 70% +/- 0.05 of total energy intake; Max: 78%, Min: 59%



Results (6)



- Nutrient data:
 - Mean Calcium intake : 20.6% +/- 0.17 of DRI; Max: 91.8%; Min: 20.6%
 - Mean Phosphorus intake : 97.4% +/- 0.87 of DRI; Max: 387%; Min: 46%



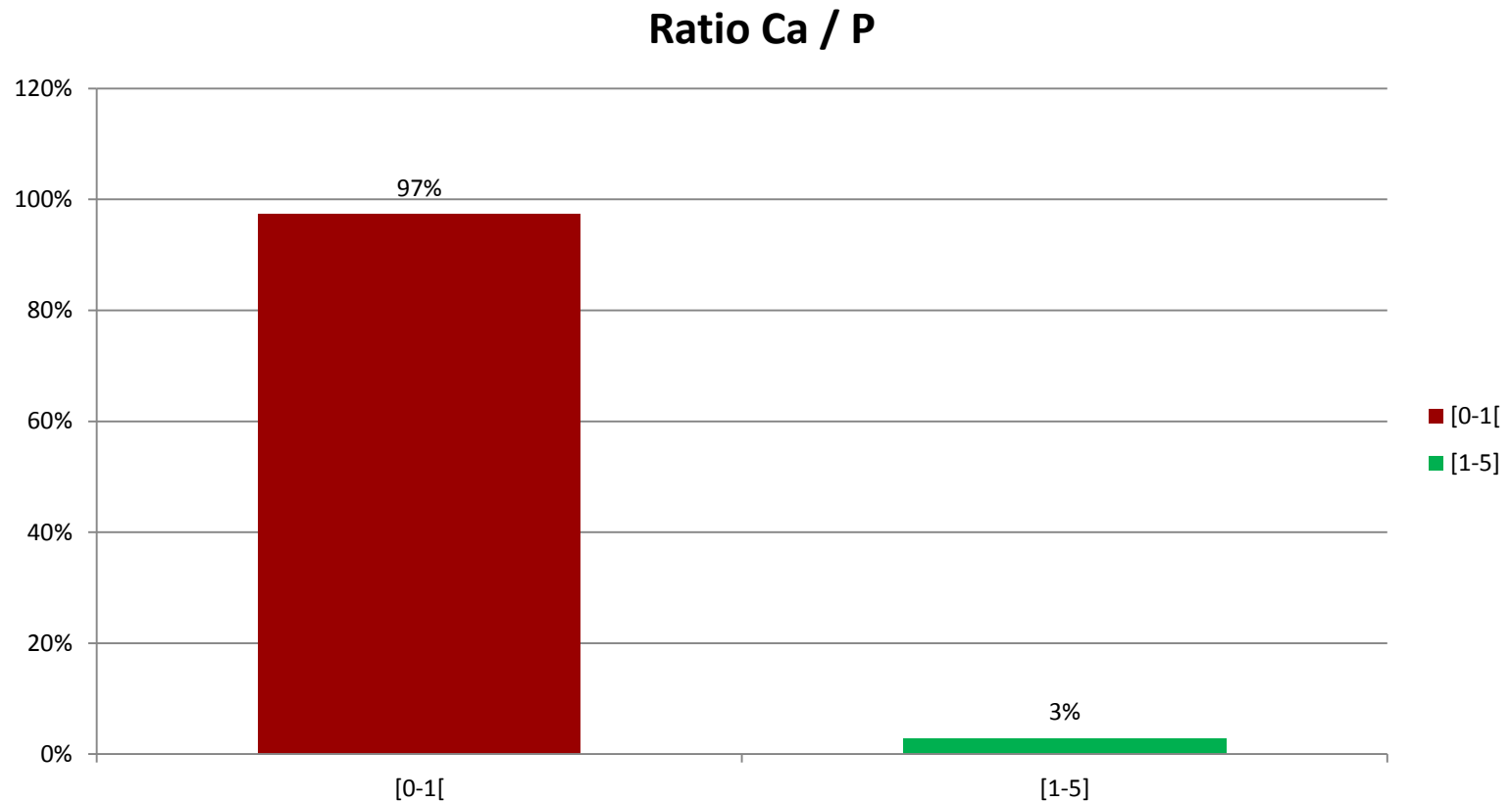


Results (7)



Nutrient data:

- Mean calcium / phoshorus ratio : 0,56 +/- 0.25, Max: 1.1, Min: 0.18

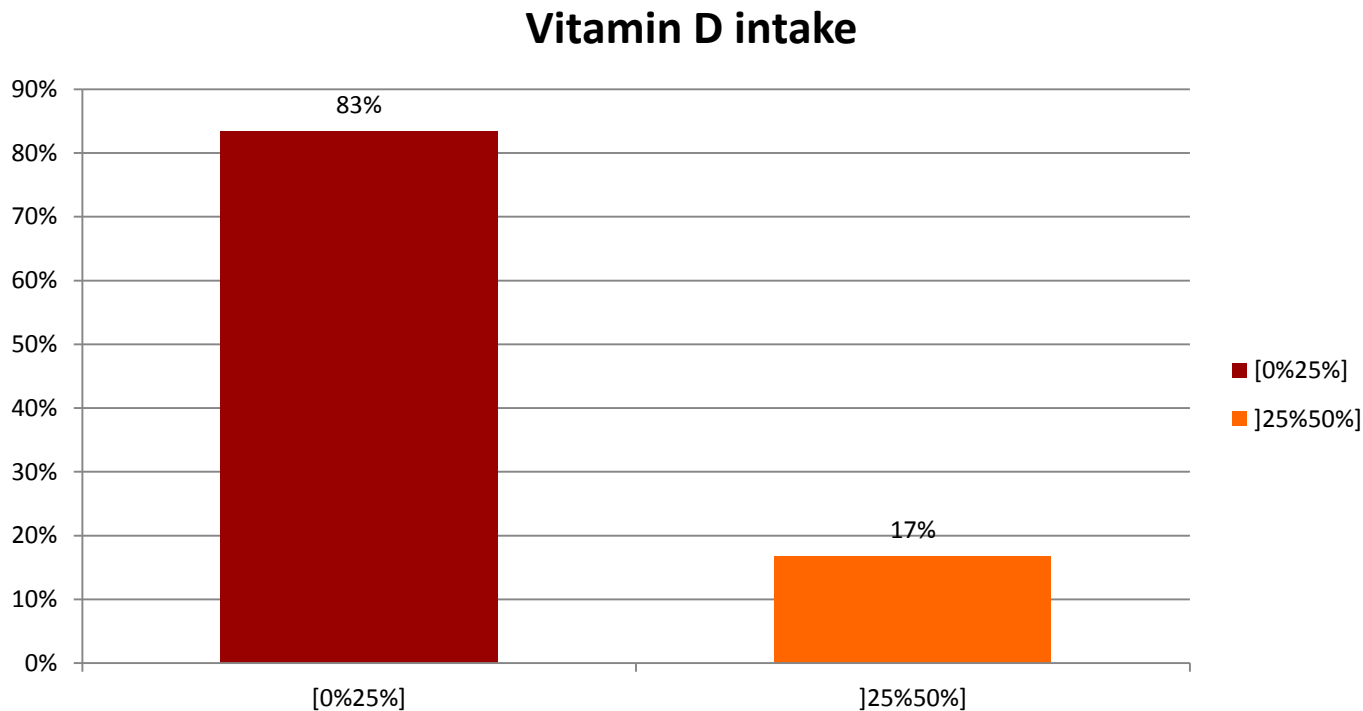


Results (8)



Nutrient data:

- Mean vitamin D intake : 14.2% +/- 0.1 of DRI, Max: 41%, Min: 1.3%



None of the children has an adequate vitamin D intake, all of them have less than 50% of the DRI



Conclusions (1)

- High prevalence of severe stunting (low height / age ratio)
- Lower prevalence of wasting (low weight / height ratio)
- Low energy intake
- Very low fat consumption
- Very low calcium intake
- High phosphorus intake
→ low Ca/P ratio
- Low vitamin D intake



Conclusions (2)

- Confirmation of previous clinical and biological observations
 - High prevalence of stunting
 - Lower prevalence of wasting
 - High prevalence of rickets
 - Very low levels of serum calcium
 - High levels of serum phosphorus
 - Low levels of vitamin D

- Suggests other deficiencies :
 - Trace elements : zinc, selenium, iron ...
 - Low intake of fat soluble vitamins : A and E

Conclusions (3)



- New studies:
 - Supplementation in vitamin D and Calcium
 - Nutritional assessment of minerals intakes
- Both in Kashin-Beck Disease endemic area



Calcium and vitamin D supplementation (1)



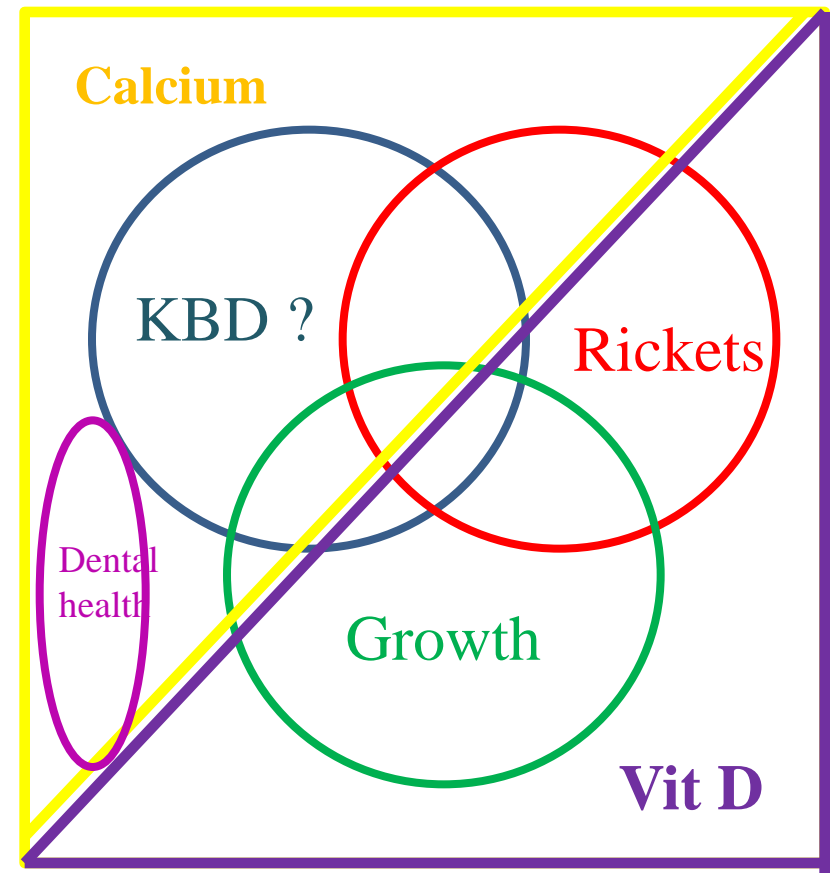
- Compare in a rural endemic area the effect of calcium or vitamin D, both of them or none on:
 - Sign of rickets
 - Growth
 - Kashin Beck disease
 - Dental statut



- Prospective study on 207 children living in rural endemic area for KDB in Central Tibet
- From January 2010 until January 2013
- 4 groups
 - Vit D 25000 UI/ mouth
 - VitD 25000 UI/ mouth + Calcium 1500 mg/ day (carbonate)
 - Calcium 1500 mg/day
 - None
- Children from 0-5 years old



- Final results not already known
- Different effects of each supplement on the several aspect: dental health, growth, rickets, Kashin-Beck Disease
- Different mechanisms disturb bone and joint metabolisms with different clinical disease





(1)

Aim of the study:

- Assessment of minerals intakes of young children living in endemic areas for Kashin-Beck disease
- Compare the calculated intakes with Chinese and internationale DRI's

Secondary objective:

- Set up a food composition table for local and traditional foods



Nutritional assessment of minerals intakes (2)



- Cross-sectional survey
- 250 children of Lhasa prefecture, 3 counties, 2 seasons
- Interactive 24-hour food recall
- Food sampling and analysis (\pm 1200 samples, ICP-MS, in CFSA, Beijing)
- China food composition table (for non local foods)



Nutritional assessment of minerals intakes

(3)



Preliminary results:

- Significant differences between food composition tables and traditional food in Central Tibet
- Original data for special food items such as dry yak meat and traditional cheese

General conclusion



- Central Tibet is an endemic area for bone and joint diseases
- Nutritional status of children is poor
- Lack in vitamin D and calcium may play a role, effect of a supplement will help us to prevent bone and joint diseases and to better understand physiopathology of the diseases
- Exact composition of the food will permit to have a better evaluation of the mineral deficiencies