**Exercise Vitamin A Deficiency and breast feeding**

**Explanations on the data set**

The data come from a field trial in rural northern Ghana on the effect of Vitamin A given in large doses to children under 5[[1]](#footnote-1). The data in this exercise were taken from the baseline survey. They include interview data provided by the mother or her substitute, clinical and laboratory data. You will find the data in **VASTCHS.csv** . Please note that in this csv file semi colons (;) have been used as field separators and comma’s as decimal-point characters. Take this into account when you import the dataset in R!

|  |  |  |
| --- | --- | --- |
| **Field name** | **Variable** | **Codes** |
| ID | Identification number |  |
| AGE | Age (months) |  |
| HB | Haemoglobin level (g/dl) |  |
| SEX | Sex | 1=male ; 2=female |
| WAZ | Weight for age z-score |  |
| HAZ | Height for age z-score |  |
| WHZ | Weight for height z-score |  |
| BCGSCAR | BCG scar | 1=present ; 2=absent |
| MEASLES | Ever had measles | 1=yes ; 2=no |
| ADMITTED | Admitted to hospital during past year | 1=yes ; 2=no |
| CURRBF | Currently breastfed | 1=yes ; 2=no |
| MOTHEDUC | Mother educated | 1=yes ; 2=no |
| HANDPUMP | Access to a bore hole with pump | 1=yes ; 2=not currently functioning ; 3=no |
| RETINOL | Serum retinol (µmol/l) |  |

# Objective of the analysis

* To identify risk factors for moderate to severe vitamin A deficiency.
* To formulate an evidence-based recommendation for the control of vitamin A deficiency, in particular to answer the question whether or not a campaign to promote breast feeding should be undertaken to control vitamin A deficiency in this setting.

This task involves the following steps:

## Part 1: Summary of study sample

1. Describe the sample in terms of **age** and **sex** of the children. You may treat age as a continuous variable or group it into appropriate categories.
2. Describe the data relating to **nutritional status** (anthropometric data, haemoglobin and retinol levels).  
     
   The **anthropometric indicators** are computed relative to the NCHS (National Center for Health Statistics of the US) standard. For example, a negative weight-for-age z-score indicates that the child weighs less than the average of its US counterparts. The **threshold of -2** is used to define a **nutritional deficiency**: “wasted”: whz < -2 ; “stunted”: haz < -2 ; “underweight”: waz < -2 .  
     
   **Haemoglobin levels** are used as an indicator of **anemia**. Threshold for moderate to severe anaemia: **hb < 8 g/dl** .  
     
   **Serum retinol levels** are an indicator of **vitamin A deficiency**. Threshold for moderate to severe deficiency: **retinol < 0.7 µmol/l.**  
     
   You may treat these variables as **continuous** ones or **regroup** them according to these **thresholds.**
3. How are the remaining **potential risk factors** distributed in the sample?

*For Part 1 you are expected to*

* *Recode appropriately if you opt for recoding*
* *Give appropriate summary statistics*
* *Present clear tables / graphs, with appropriate headings, labels, totals etc.*
* *Present your results for part 1 concisely (1 page maximum)*

## Part 2: Explore the association of potential risk factors for Vitamin A deficiency

## For the purpose of this exercise you are requested to use odds ratios rather than risk ratios, eventhough using the latter might be more correct because the disease is very common.

## Explore:

1. **Breast feeding** as a potential protective factor agains vitamin A deficiency
2. **Age** and **sex** as potential risk factors for vitamin A deficiency
3. **Anthropometric indicators** and **haemoglobin level** as potential risk factors for vitamin A deficiency
4. Association between **any other potential risk factors** and vitamin A deficiency

*For Part 2 you are expected to*

* *Choose correct significance tests according to the type of data.*
* *Choose appropriate tables and/or graphs and present them with appropriate headings, labels, totals etc.*
* *Interpret your findings correctly.*
* *Present your results for part 2 concisely (1 page maximum)*

Part 3: “Should an intervention to encourage breast feeding be recommended as a way to reduce Vitamin A deficiency?”

1. On the basis of individual risk factor analysis, how is **breastfeeding** associated with Vitamin A deficiency?
2. Which variables do you need to consider as **possible confounders** of the association between breastfeeding and Vitamin A deficiency?
3. Carry out the **necessary analyses** to draw conclusions about whether any variables confound the association between breastfeeding and Vitamin A deficiency.
4. State your **conclusions** about the association between breastfeeding and Vitamin A deficiency.
5. Explain whether, based on these data, you **would recommend** breastfeeding as an intervention to control Vitamin A deficiency.

*For part 3 you are expected to*

* *Interpret correctly the association between breast feeding and Vitamin A deficiency ignoring possible confounders.*
* *Identify correctly possible confounders, based on a valid reasoning.*
* *Choose appropriate tests and comparisons*
* *Present concise, appropriate tables with clear comprehensive layout and labelling etc.*
* *Interpret correctly the results.*
* *Present your results for part 3 concisely (2 pages maximum)*

Keep in mind that there are several ways to reach the objectives!

1. Ghana VAST study team. Vitamin A supplementation in northern Ghana: effects on clinic attendance, hospital admissions, and child mortality. Lancet 342 (8862):7-12, 1993. [↑](#footnote-ref-1)