CHRIS Study

Anthropometry

Version 1.1

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1. Introduction

The information on the anthropometric values was collected for all participants at the CHRIS study center in Schlanders Hospital by trained study nurses.

Participants book a morning appointment at the CHRIS study center, ranging from 7.45 to 8.45 a.m. Each study participant is assigned a workflow at the reception. If there are ten study participants (maximum capacity), there are ten different workflows, marked with the letters from "A" to "K". The current workflow is as follows: A-B-C-D-E-F-G-H-I-K. All the workflows can be found in the documentation of CHRIS Baseline/General information/Administrative data, in the file named “Workflows at baseline assessment”.

When making the appointment, participants are asked to stay fasting overnight and to drink only water before coming to the study center. They are also requested to avoid wearing jewelry, piercing, and alike. The precise set of instructions are available at CHRIS Baseline/General Information in the files named “Confirmation letter – German version” and “Confirmation letter – Italian version”. Participants can have breakfast only after the anthropometry assessment.

Height measurement

1. The participant must be barefoot or wear very thin socks.
2. The participant stands with their back to the measuring rod. The back and head must be straight. The back and head must be aligned straight. The ankles should be in contact and the tips of the feet are slightly spread (approximately 60°). The weight should be distributed bilaterally. The knees must not be bent. The hands should hang loosely, and the palms should be turned towards the thighs. The back of the head, shoulder blades, buttocks and heels must remain in contact with the measuring device or wall/floor, respectively. If the person has a pronounced hollow back, press lightly on the abdomen.
3. The measuring slide is pushed onto the head to that the measuring slide abuts without bending. The measuring slide is placed in such a way that voluminous hair is pressed and does not lead to distortion of the measurement result.
4. The study nurse reads off the body height at nearest 1 mm at the read-off mark and writes the measurement result down on the paper form.

Weight and body fat measurement

1. The study nurse prepares the machine OMRON BF508 for the measurement by entering the participant’s age, gender, and height.
2. The participant wears light clothing and must be barefoot.
3. The participant should take the display in his/her hands before he/she steps on the scale.
4. The study nurse instructs the participants how to take the correct position (to stand with knees and back straight and to look straight ahead. To raise the arms horizontally, and to extend the elbows straight. To extend the arms straight at a 90° angle to the body).
5. The instrument displays first the weight and then loads to measure the body fat. The measurement is completed as soon as the weight appears again on the display.
6. The study nurse reads off the weight, body fat, visceral fat, and body mass index (BMI) from the display and writes the measurement results down on the paper form.

In case of a weight higher than 150 kg, the weight is reported by the participant, due to the detection range of the instrument not exceeding this threshold.

The assessment of body fat and visceral fat cannot be pursued in case the participant carries an electronic medical device, such as a pacemaker, or suffers from edema, or carries a metallic implant, or has amputations that do not allow the positioning of the four electrodes. This information is reported orally by the participant to the study nurse.

Additionally, in the presence of a gypsum on any limb, or when the participant suffers from Parkinson or tremor or spams or cannot stand still, or at the latest stages of pregnancy (after the 20^{th} week), the weight, the body fat, and visceral fat cannot be assessed either.

For participants that have their body fat percentage below 5% or above 60%, the machine OMRON BF508 cannot assess properly the body fat and the visceral fat, so no measurement is reported in that case.

The measurement results are inserted in duplicate into the database, by the study nurse and by the receptionist. A consistency check is performed during the data entry process by calculating BMI as weight/height^2 and comparing the calculated BMI with the manual entry BMI. A tolerance of +/- 0.2 is allowed. In case of failed consistency check, the values are not accepted by the system.

2. History version changes

The cleaning process resulted in the following variables added:

variables added: x0an02q x0an03a x0an03b x0an03c x0an03q x0an04q x0an10a

3. Data cleaning

1. The variables x0an01- x0an05 had their missing and null values set to “unexpected missing” (-89).
2. The distribution of the variables x0an01-x0an05 was explored, to search for outliers.
3. If the annotation variable, x0annote, said that the participant reported their weight/height the respective value was set to “unexpected missing”, since it was not measured in the same methodology as for the other participants.
4. One participant showed their height in meter instead of in centimeter, so its BMI and height were used to compute the height, proving indeed the wrong unit of reporting. This was correcting by multiplying the reported height per 100.
5. BMI was computed from the height (x0an01) and weight (x0an02) variables and stored in a new variable names x0an03a. When either height or weight were “unexpected missing”, also the BMI was set to “unexpected missing”.
6. When the difference between the computed BMI (x0an03a) and the reported BMI (x0an03) were above 0.5, the variables of height, weight, and BMI were all set to “unexpected missing”.
7. The original reported BMI variable (x0an03) was dropped.
8. For the variable visceral fat (x0an05) no decimal place was expected, so it was replaced by “unexpected missing” if it was not an integer. This occurred for one participant.
9. The distribution of x0an01-x0an05 was additionally assessed, stratified by sex.
10. The weight variable was rounded at the first decimal, given the instrument’s precision.

11. When the annotation x0annote reported the weight to be above 150 kg, the variable x0an02 was assigned the value “>150”, while a <float> variable x0an02q was created with value “150.1”.
12. For the first participant, with annotation “above 150 kg”, the BMI was computed using the measured height and a weight of 150.1 kg, the result of 48.5 was considered as a lower bound, so x0an03a was replaced with “>48.5”. For the second one, the annotation reported “above 150 kg, self-reported 160 kg”, so this value was used to compute the BMI and xan03a was assigned the computed value.
13. A <float> clone variable of x0an03a was created, called x0an03q, with the values 48.5 and 41.4 for those special cases, and the same values of x0an03a otherwise.
14. The variable of body far, x0an04, was replaced as follows:
    a) by “<5” if the BMI was below 20 and the annotation reported values out of range
    b) by “>60” if the BMI was above 45, the annotation reported values out of range and the weight could be measured.
15. A <float> clone variable of x0an04, called x0an04q, the body fat, was created to store also the observations out of the measurement range as <float>. If below 5%, the observations were replaced by 4.9%, if above 6o% they were replaced by 60.1%.
16. The BMI was categorized into four categories (<18.5, 18.5-24.99, 25-29.99, ≥30) and saved as x0an03b, making use of the <float> variable x0an03q.
17. Another variable with a finer BMI categorization was created and called x0an03c.
18. The variables x0an06-x0an09 had their missing values set to “unexpected missing”.
19. Among the 13,389 participants, 999 reported some kind of implant.
20. If the participant reported no implant (x0an08=”No”), but in the free text x0an08a or in x0annote some implant was reported (e.g. a piercing or a screw), then the answer to x0an08 was changed into “Yes”.
21. The information on implants stored as free text in x0an08a was categorized into “type of transplant” (x0an08b), “location of transplant” (x0an08b), and “side of transplant” (x0an08d). The type of transplant is categorized into “piercing”, “stent/bypass”, “spiral”, “screw”, “plate”, “screw+plate”, “prothesis”, “brace”, “stay bolt”, “pin”, “hearing device”, “cochlear implant”, “metal clip”, “splinter”, “heart valve”, “(metal) splint”, “wire”, “nail”, “artificial joint”, “belt”, “canula”, “acampsia”, and “unclear”. The location of the implant is classified into “head”, “ear”, “eye”, “nose”, “mouth/jaw”, “shoulder”, “arm, not specified”, “upper arm”, “elbow”, “forearm”, “hand”, “finger”, “spine/intervertebral discs”, “chest”, “back”, “heart”, “liver”, “abdomen (navel, groin)”, “pelvis”, “hips”, “leg, not specified”, “thigh”, “knee”, “lower leg”, “ankle/ankle joint”, “foot”, “toe”, “trachea”, “unclear”. The side of the implant is either “link”, either “right”, or “both”, and “unclear” when not specified. If the type of transplant was not clear but some text was provided, an “unclear” was assigned to all the three variables. The only exception was when hips or knees were mentioned without specifying the implant type: an artificial joint implant was assumed.
22. For those participants with more than one implant type or location mentioned, three new variables were created to store the second implant type, second implant location, and second implant side.
23. The amputation variable, x0an09, had its observation changed from “No” to “Yes” if the free text of x0an09a reported an amputation. The variable x0an09a was substituted by a blank <character> where it contained only numbers.

24. The amputation description stored in x0an09b was categorized into the variable x0an09c. The answers were classified into “finger(s)”, “breast”, “testicle”, “lower leg”, “spleen”, “toe(s)”, “one foot”, “one leg”, “thigh”, and “forearm”.
25. The variable reporting the device used for the anthropometry assessment, x0an11, had its missing values replaced with “unexpected missing.”

4. Advices for the analysis

The analyst is encouraged to take into account the operator involved in the assessment of the anthropometry, x0an10, since the operator inserts manually the age, sex, and height of the participant and needs to instruct well the participant on their posture.

The choice on how to substitute the measurements out of the detection range (e.g. weight above 150 kg) should depend on the type of analysis and the research question.

In case of the amputation of limbs and of pregnancy, weight and BMI should be corrected appropriately or the participant excluded from the analysis.

5. References

WHO guidelines on BMI: https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi