Package 'BPpack'

April 19, 2022

Title Correct blood pressure in epidemilogoical studies for visit to visit and within vist measurment error

Version 0.1

Description
This package uses correction factor by age and sex calculated from NHANES III data to correct blood pressure for visit to visit and within vist measurment error.

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Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

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Imports dplyr,
tidyr,
purrr,
magrittr,
rlang,
progress,
splines,
survey,
formula.tools

Depends R (>= 4.0.0)

R topics documented:

correct_htn *Prevalence of hypertension (HT) corrected from sampling variability*

Description

This function allows to calculate the prevalence of HT in a population after correcting from variations due to blood pressure variability that occurs in an indivuidual between visits and within visit. For each individual, a correction factors adapted to scheme of BP prelevement (i.e. number of visits and number of measure within a visit, systolic or diastolic measure), age and sex, is calculated. These correction factor are derived from BP variances estimted from NHANES III datas. The corrections factors are then applied to indivuduals BP measures in the population under study to infer corrected HT prevalence.

Usage

```
correct_htn(
  form = htn ~ 1,
  subpop = NULL,
  n_samp = 1000,
  data_long = dt_nhanes,
  surv_des = NULL,
  correct = TRUE,
  tresh = dplyr::tibble(BP_typ = c("sys", "dia"), BP_tresh = c(140, 90))
)
```

Arguments

form	A formula giving covariates by which HT prevalence is calculated. If htn is placed in the left hand side of formula, then variation of prevalence according to the covariates given in the right hand side of are estimated with a glm (survey::svyglm if surv_des is not NULL) model with quasibinomial distribution. Else, prevalence is tabulated according to the covariates given in the right hand side (simple tabulation or survey::svyby if surv_des is not NUL).
subpop	A boolean covariate that defines a subpopulation over which to filter the calculation of prevalence. subpop must be given in a formula form, e.g. ~subpop. See Examples.
n_samp	The number of posterior sample of the correction factor to be used in the estimation. Default (NULL) resumes to the maximum number of available posterior samples.
data_long	Data frame giving the BP measurements of the population under study. Data must be given in a long format, e.g. one raw per BP measure (see dt_nhanes format). The data frame must have the following columns: • "id"Patient identifyer • "age"Age of the patient, in years • "sex"Sex of the patient • "tt_htn"Boolean with value TRUE if the patient is under anti-hypertensive treatment • "visit"Identifyer of the visit • "BP_typ"type of BP prelevement, "dia" for diastolic, "sys" for systolic

- "bp"Value of blood pressure measurement

`surv_des` If applicable, the survey design of the study, specifyed with `svydesign` from `survey` package.

`correct` Boolean set to `TRUE` (the default) to correct prevalence.

`tresh` A data frame giving the BP thresholds that defines hypertension. Default to 140 for systolic BP, 90 for diastolic.

Value

A data frame with the estimates of HT prevalance tabulated according to the covariates given in `form`

Author(s)

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Examples

```
data(dt_nhanes)

## Uncorrected HT prevalence by sex
correct_htn(form= ~ sex,
data_long = dt_nhanes,
correct = FALSE)

## Corrected HT prevalence by sex
correct_htn(form=htn ~ sex,
data_long = dt_nhanes,
n_samp = 10,
correct = TRUE)

## Same using quasi-binomial glm
correct_htn(form= ~ sex,
data_long = dt_nhanes,
n_samp = 10,
correct = TRUE)
```

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dt_nhanes *Nhanes III data in long format*

Description

Data from the NHANES-III study used to estimate compomnets of BP variability

Usage

```
data( dt_nhanes )
```

Format

A data frame with 121280 rows and 13 variables

Details

- id : Patient's identifying number
- age : Patient's age in years
- sex : Patient's sex (1 for men, 2 for women)
- BP_typ : Type of blood pressure measure : diastolic ("dia") or systolic ("sys")
- visit : Number of the visit (restricted to 1-2)
- meas : Number of the measure during the visit (only the last two measure are kept in case of more than 2 measurements)
- bp : BP measurement
- tt_htn : Boolean indicating if the patient takes a treatment for hypertention
- bmi : Body mass index of the patient
- diab : Boolean indicating wether the patient has diabet
- samp_weight : Sampling weights of the survey
- htn : Boolean indicating wether the patient is hypertensive (i.e. tt_htn to true, or mean BP measurement above the threshold)

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dt_post_samp *Samples from the posterior distribution of BP variance components*

Description

Samples from the posterior

Usage

```
data( dt_post_samp )
```

Format

A data frame with 2368000 rows and 8 variables

Details

- BP_typ : type of BP measure (diastolic (dia) or systolic (sys))
- tt_htn : if TRUE, variance components for the subpopulation of patients treated for HTN
- age : age, by year
- sex : sex, 1 for men, 2 for women
- samp : number of the sample, ordered by chain (i.e. 1-1000 : first chain; 1001:2000, second chain...).
- s_i : estimated standard deviation for BP between individuals
- s_v : estimated standard deviation for BP between within individual, between visits
- s_m : estimated standard deviation for BP between within individual, within visits, between measures

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