

Impact of Gamma COVID-19 variant on the prognosis of pregnant and postpartum women with cardiovascular disease

Codes and outputs

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Description

This file presents the documentation of the analysis of article “Impact of Gamma COVID-19 variant on the prognosis of pregnant and postpartum women with cardiovascular disease” with authors Carolina Testa, Luciana Godoi, Nátaly Monroy, Maria Rita Bortolotto, Agatha Rodrigues and Rossana Francisco.

R packages used, functions and dataset import

The data are analyzed using the free-software R (<https://www.R-project.org>) in version 4.3.1. Next, we present and load the libraries used in the data analysis process.

```
#loadlibrary <- function(x) {  
#   if (!require(x, character.only = TRUE)) {  
#     install.packages(x, dependencies = TRUE)  
#     if (!require(x, character.only = TRUE))  
#       stop("Package not found")  
#   }  
#}  
  
packages <- c(  
  "dplyr",  
  "MatchIt",  
  "lubridate",  
  "readr",  
  "readxl",  
  "ggplot2",  
  "kableExtra",  
  "tables",  
  "questionr",  
  "car",  
  "data.table",  
  "magrittr",  
  "tidyverse",  
  "readxl",  
  "summarytools",  
  "modelsummary",  
  "RColorBrewer",  
  "zoo",
```

```

    "WeightIt",
    "jtools",
    "cobalt",
    "weights",
    "cleaner"
  )

lapply(packages, require, character.only = TRUE)

data <- read_csv("dados_cardiopatia_v2.csv", na = c("NA"))

```

We searched the SIVEP-influenza database on May 5, 2021 for cases reported in the period between the eighth epidemiological week of 2020 (which corresponds to the beginning of the COVID-19 epidemic in Brazil), and the 17th epidemiological week of 2021 (immediately before the start of vaccination of pregnant and postpartum women, which began on the 18th epidemiological week of 2021), between February 16, 2020 and May 1, 2021.

There are 10784 confirmed and hospitalized cases of COVID-19 in pregnant and postpartum women aged 10 to 55 years. We identify 61.07% of these notifications without any information about the presence or absence of cardiovascular diseases (CVD).

```

#Creating the CVD variable
data<- data %>%
  mutate(CVD = case_when(CARDIOPATI == 1 ~ "yes", CARDIOPATI == 2 ~ "no", TRUE ~ NA_character_ ))

#Changing the column name - ano to years
data <- data %>%
  rename("year" = "ano")

with(data, ctable(CVD, year, prop = "c", chisq = FALSE, useNA = "no"))

```

```

## Cross-Tabulation, Column Proportions
## CVD * year
## Data Frame: data
##
## -----
##      year      2020      2021      Total
## CVD
## no      2032 ( 83.3%)  1463 ( 83.1%)  3495 ( 83.3%)
## yes      406 ( 16.7%)   297 ( 16.9%)   703 ( 16.7%)
## Total    2438 (100.0%)  1760 (100.0%)  4198 (100.0%)
## -----

```

The next selection consists of selecting only pregnant and postpartum women with CVD, hospitalized with confirmed COVID-19 in the years 2020 and 2021. For this, we select the cases where CVD variable **yes**:

```

data <- data %>%
  dplyr::mutate(
    dt_sin_pri = as.Date(DT_SIN_PRI, format = "%d/%m/%Y"),
    dt_evoluca = as.Date(DT_EVOLUCA, format = "%d/%m/%Y"),
    dt_notific = as.Date(DT_NOTIFIC, format = "%d/%m/%Y"),
  )

```

```
### Filtering only patients with CVD.
```

```
data <- data %>%
  filter(CVD == "yes")

freq(x = data$year,
     markdown = FALSE,
     title = "Frequency of CVD cases in the years 2020 and 2021",
     header = FALSE,
     quote = FALSE)
```

```
## Frequency of CVD cases in the years 2020 and 2021
```

```
##
##
##
##      Item      Count      Percent      Cum. Count      Cum. Percent
## ---  -
## 1      2020        406      57.75%          406          57.75%
## 2      2021        297      42.25%          703          100.00%
```

The variable CRITERIO presents the criterion used for the final classification of the confirmed cases of COVID-19, 1 - laboratory, 2 - clinical epidemiological, 3 - clinical and 4 - clinical by image (chest x-ray/tomography).

```
with(data, freq(CRITERIO), useNA="yes")
```

```
##
##
## **Frequency table**
##
## Class:      numeric
## Length:     703
## Available:  692 (98.44%, NA: 11 = 1.56%)
## Unique:     4
##
## Mean:       1.23
## SD:         0.77 (CV: 0.63, MAD: 0)
## Five-Num:   1 | 1 | 1 | 1 | 4 (IQR: 0, CQV: 0)
## Outliers:   57 (8.24%)
##
##
## |  | Item | Count | Percent | Cum. Count | Cum. Percent |
## |:-|-----:|-----:|-----:|-----:|-----:|
## |1 | 1 | 635 | 91.76% | 635 | 91.76% |
## |2 | 4 | 44 | 6.36% | 679 | 98.12% |
## |3 | 3 | 11 | 1.59% | 690 | 99.71% |
## |4 | 2 | 2 | 0.29% | 692 | 100.00% |
```

We note that some observations with the variable CRITERIO as 2 - clinical epidemiological, 3 - clinical and 4 - clinical by image (chest x-ray/tomography) or empty cell had positive laboratory results. To evaluate this cases, we considered a new variable named as **Final_criterion**.


```
round(prop.table(table(data$Final_criterion, useNA="ifany"))*100, 2)
```

```
##
##           clinical      clinical by image clinical epidemiological
##           1.14          6.26          0.14
##           laboratory      <NA>
##           91.89          0.57
```

One can see below the functions that will be used in the data analysis.

```
#funções para medidas-resumo
Mean_ <- function(x)
  mean(x, na.rm = TRUE)
Median_ <- function(x)
  median(x, na.rm = TRUE)
SD <- function(x)
  sd(x, na.rm = TRUE)
Min <- function(x)
  base::min(x, na.rm = TRUE)
Max <- function(x)
  base::max(x, na.rm = TRUE)
q25 <- function(x)
  stats::quantile(x, p = 0.25, na.rm = TRUE)
q75 <- function(x)
  stats::quantile(x, p = 0.75, na.rm = TRUE)
IQR <- function(x)
  round(q75(x) - q25(x), 2)
n <- function(x)
  sum(!is.na(x))
```

Data treatment

```
## CVD in the years 2020 and 2021

data <- data %>% mutate(CVD_by_year = case_when(year == "2020" ~ "2020",
  year == "2021" ~ "2021",
  TRUE ~ NA_character_))

## Ethnicity
data <- data %>%
  mutate(ethnicity = case_when(CS_RACA == 1 ~ "white",
    CS_RACA == 2 ~ "black",
    CS_RACA == 3 ~ "yellow",
    CS_RACA == 4 ~ "brown",
    CS_RACA == 5 ~ "indigenous",
    TRUE ~ NA_character_))

## Education
data <- data %>%
  mutate(education = case_when(CS_ESCOL_N == 0 ~ "No schooling",
    CS_ESCOL_N == 1 ~ "1st to 5th grade",
```

```

        CS_ESCOL_N == 2 ~ "6th to 9th grade",
        CS_ESCOL_N == 3 ~ "High school",
        CS_ESCOL_N == 4 ~ "Higher education",
        TRUE ~ NA_character_))

data$education <- factor(data$education,
                        levels = c("No schooling", "1st to 5th grade", "6th to 9th grade",
                                   "High school", "Higher education"))

## Age group
data <- data %>%
  mutate(
    age_group = case_when(
      NU_IDADE_N <= 19 ~ "<20",
      NU_IDADE_N >= 20
      & NU_IDADE_N <= 34 ~ "20-34",
      NU_IDADE_N > 34 ~ ">=35",
      TRUE ~ NA_character_
    )
  )
data$age_group <-
  factor(data$age_group, levels = c("<20", "20-34", ">=35"))

## Residence area
data <- data %>%
  mutate(zone = case_when(CS_ZONA ==1 ~ "Urban",
                          CS_ZONA == 2 ~ "Rural",
                          CS_ZONA == 3 ~ "Periurban",
                          TRUE ~ NA_character_))

## Hospital-acquired infection
data <- data %>%
  mutate(hospital_infection = case_when(NOSOCOMIAL ==1 ~ "yes",
                                         NOSOCOMIAL == 2 ~ "no",
                                         TRUE ~ NA_character_))

## Fever
data <- data %>%
  mutate(fever = case_when(FEBRE == 1 ~ "yes",
                           FEBRE == 2 ~ "no",
                           TRUE ~ NA_character_))

## Cough
data <- data %>%
  mutate(cough = case_when(TOSSE == 1 ~ "yes",
                           TOSSE == 2 ~ "no",
                           TRUE ~ NA_character_))

## Sore throat
data <- data %>%
  mutate(sore_throat = case_when(GARGANTA == 1 ~ "yes",
                                  GARGANTA == 2 ~ "no",

```

```

TRUE ~ NA_character_))

## Dyspnea
data <- data %>%
  mutate(dyspnea = case_when(DISPNEIA == 1 ~ "yes",
                             DISPNEIA == 2 ~ "no",
                             TRUE ~ NA_character_))

## Respiratory distress
data <- data %>%
  mutate(resp_dist = case_when(DESC_RESP == 1 ~ "yes",
                                DESC_RESP == 2 ~ "no",
                                TRUE ~ NA_character_))

## Saturation
data <- data %>%
  mutate(saturation = case_when(SATURACAO == 1 ~ "yes",
                                 SATURACAO == 2 ~ "no",
                                 TRUE ~ NA_character_))

## Diarrhea
data <- data %>%
  mutate(diarrhea = case_when(DIARREIA == 1 ~ "yes",
                               DIARREIA == 2 ~ "no",
                               TRUE ~ NA_character_))

## Vomit
data <- data %>%
  mutate(vomit = case_when(VOMITO == 1 ~ "yes",
                            VOMITO == 2 ~ "no",
                            TRUE ~ NA_character_))

## Abdominal pain
data <- data %>%
  mutate(abd_pain = case_when(DOR_ABD == 1 ~ "yes",
                               DOR_ABD == 2 ~ "no",
                               TRUE ~ NA_character_))

## Fatigue
data <- data %>%
  mutate(fatigue = case_when(FADIGA == 1 ~ "yes",
                              FADIGA == 2 ~ "no",
                              TRUE ~ NA_character_))

## Loss of smell
data <- data %>%
  mutate(loss_smell = case_when(PERD_OLFT == 1 ~ "yes",
                                 PERD_OLFT == 2 ~ "no",
                                 TRUE ~ NA_character_))

## Loss of taste

```

```

data <- data %>%
  mutate(loss_taste = case_when(PERD_PALA == 1 ~ "yes",
                                PERD_PALA == 2 ~ "no",
                                TRUE ~ NA_character_))

## Any respiratory symptom

df <- select(data,dyspnea,fatigue, saturation, resp_dist)
soma <- function(x){
  if (sum(is.na(x))==4)
    return(NA_character_)
  else
    return(sum(!is.na(x) & x=="yes"))
}
data$qt_sintomas_resp_aux <- apply(df,1,soma)

## Presence of respiratory symptoms

data <- data %>%
  mutate(resp_symp = case_when(qt_sintomas_resp_aux >=1 ~ "yes",
                                qt_sintomas_resp_aux ==0 ~ "no",
                                TRUE ~ NA_character_))

## Number of respiratory symptoms
data <- data %>%
  mutate(qt_resp_symp = case_when(qt_sintomas_resp_aux == 4 ~ "4 symptoms",
                                   qt_sintomas_resp_aux == 3 ~ "3 symptoms",
                                   qt_sintomas_resp_aux == 2 ~ "2 symptoms",
                                   qt_sintomas_resp_aux == 1 ~ "1 symptom",
                                   qt_sintomas_resp_aux == 0 ~ "No respiratory symptom",
                                   TRUE ~ NA_character_))

data$qt_resp_symp <-
  ordered(data$qt_resp_symp, levels = c("No respiratory symptom", "1 symptom", "2 symptoms", "3 symptoms", "4 symptoms"))

## Any symptom

df <- select(data,dyspnea,fatigue, saturation, resp_dist,fever,cough,sore_throat,diarrhea,
             vomit,abd_pain,loss_smell,loss_taste)
soma <- function(x){
  if (sum(is.na(x))==12)
    return(NA_character_)
  else
    return(sum(!is.na(x) & x=="yes"))
}
data$qt_sintomas_aux <- apply(df,1,soma)

## Presence of any symptom

data <- data %>%
  mutate(symp = case_when(qt_sintomas_aux >=1 ~ "yes",
                           qt_sintomas_aux == 0 ~ "no",
                           TRUE ~ NA_character_))

```



```

## Number of any symptom
data <- data %>%
  mutate(qt_symp = case_when(qt_sintomas_aux == 12 ~ "12 symptoms",
                             qt_sintomas_aux == 11 ~ "11 symptoms",
                             qt_sintomas_aux == 10 ~ "10 symptoms",
                             qt_sintomas_aux == 9 ~ "9 symptoms",
                             qt_sintomas_aux == 8 ~ "8 symptoms",
                             qt_sintomas_aux == 7 ~ "7 symptoms",
                             qt_sintomas_aux == 6 ~ "6 symptoms",
                             qt_sintomas_aux == 5 ~ "5 symptoms",
                             qt_sintomas_aux == 4 ~ "4 symptoms",
                             qt_sintomas_aux == 3 ~ "3 symptoms",
                             qt_sintomas_aux == 2 ~ "2 symptoms",
                             qt_sintomas_aux == 1 ~ "1 symptom",
                             qt_sintomas_aux == 0 ~ "No symptom",
                             TRUE ~ NA_character_))

data$qt_symp <-
  ordered(data$qt_symp, levels = c("No symptom", "1 symptom", "2 symptoms", "3 symptoms", "4 symptoms",

## Hematologic
data <- data %>%
mutate(hematologic = case_when(HEMATOLOGI == 1 ~ "yes",
                              HEMATOLOGI == 2 ~ "no",
                              TRUE ~ NA_character_))

## Immunodeficiencies
data <- data %>%
mutate(imunodepre = case_when(IMUNODEPRE == 1 ~ "yes",
                              IMUNODEPRE == 2 ~ "no",
                              TRUE ~ NA_character_))

## Liver diseases
data <- data %>%
mutate(hepatic = case_when(HEPATICA == 1 ~ "yes",
                          HEPATICA == 2 ~ "no",
                          TRUE ~ NA_character_))

## Asthma
data <- data %>%
mutate(asthma = case_when(ASMA == 1 ~ "yes",
                          ASMA == 2 ~ "no",
                          TRUE ~ NA_character_))

## Diabetes
data <- data %>%
mutate(diabetes = case_when(DIABETES == 1 ~ "yes",
                          DIABETES == 2 ~ "no",
                          TRUE ~ NA_character_))

## Neuropathies
data <- data %>%
mutate(neurologic = case_when(NEUROLOGIC == 1 ~ "yes",
                              NEUROLOGIC == 2 ~ "no",
                              TRUE ~ NA_character_))

## Lung diseases
data <- data %>%
mutate(pneumologic = case_when(PNEUMOPATI == 1 ~ "yes",

```

```

PNEUMOPATI == 2 ~ "no",
TRUE ~ NA_character_))

## Kidney disease
data <- data %>%
mutate(renal = case_when(RENAL == 1 ~ "yes",
                        RENAL == 2 ~ "no",
                        TRUE ~ NA_character_))

## Obesity
data <- data %>%
mutate(obesity = case_when(OBESIDADE == 1 ~ "yes",
                          OBESIDADE == 2 ~ "no",
                          TRUE ~ NA_character_))

## At least one associated disease
df <- select(data,obesity,hematologic,hepatic,asthma,diabetes,neurologic,pneumologic,imunodepre,renal)
soma <- function(x){
  if (sum(is.na(x))==9)
    return(NA_character_)
  else
    return(sum(!is.na(x) & x=="yes"))
}
data$qt_comorb_aux <- apply(df,1,soma)

data <- data %>%
  mutate(comorbidities = case_when(qt_comorb_aux >=1 ~ "yes",
                                   qt_comorb_aux ==0 ~ "no",
                                   TRUE ~ NA_character_))

## Number of associated diseases
data <- data %>%
  mutate(qt_comorb = case_when(qt_comorb_aux== 9 ~ "9 comorbidities",
                              qt_comorb_aux== 8 ~ "8 comorbidities",
                              qt_comorb_aux == 7 ~ "7 comorbidities",
                              qt_comorb_aux== 6 ~ "6 comorbidities",
                              qt_comorb_aux == 5 ~ "5 comorbidities",
                              qt_comorb_aux== 4 ~ "4 comorbidities",
                              qt_comorb_aux == 3 ~ "3 comorbidities",
                              qt_comorb_aux == 2 ~ "2 comorbidities",
                              qt_comorb_aux == 1 ~ "1 comorbidity",
                              qt_comorb_aux == 0 ~ "No comorbidity",
                              TRUE ~ NA_character_))

data$qt_comorb <-
  factor(data$qt_comorb, levels = c("No comorbidity", "1 comorbidity", "2 comorbidities", "3 comorbidities"))

data <- data %>%
  mutate(comorbidities_grupo3 = case_when(qt_comorb_aux == 0 ~ "No comorbidity",
                                           qt_comorb_aux == 1 ~ "1 comorbidity",
                                           qt_comorb_aux == 2 ~ "2 comorbidities",
                                           qt_comorb_aux > 2 ~ ">2 comorbidities",
                                           TRUE ~ NA_character_))

data$comorbidities_grupo3 <-

```

```

ordered(data$comorbidities_grupo3, levels = c("No comorbidity", "1 comorbidity", "2 comorbidities", "3 comorbidities"))

## ICU
data <- data %>%
  mutate(icu = case_when(UTI == 1 ~ "yes",
                        UTI == 2 ~ "no",
                        TRUE ~ NA_character_))

# Ventilatory support
data <- data %>%
  mutate(ven_support = case_when(SUPPORT_VEN == 1 ~ "yes, invasive",
                                SUPPORT_VEN == 2 ~ "yes, noninvasive",
                                SUPPORT_VEN == 3 ~ "No",
                                TRUE ~ NA_character_))

## Evolution
data <- data %>%
  mutate(evolution = case_when(EVOLUCAO == 1 ~ "recovery",
                              EVOLUCAO == 2 ~ "death",
                              EVOLUCAO == 3 ~ "death",
                              TRUE ~ NA_character_))

data$evolution <-
  ordered(data$evolution, levels = c("recovery", "death"))

## Orotracheal intubation
data <- data %>%
  mutate(intubation = case_when(SUPPORT_VEN == 1 ~ "yes",
                                SUPPORT_VEN == 2 ~ "no",
                                SUPPORT_VEN == 3 ~ "no",
                                TRUE ~ NA_character_))

## Time elapsed between the start of symptoms and the outcome (days)
data <- data %>%
  dplyr::mutate(
    dt_sin_pri = as.Date(DT_SIN_PRI, format = "%d/%m/%Y"),
    dt_evoluca = as.Date(DT_EVOLUCA, format = "%d/%m/%Y"),
    days_symp_evol = as.numeric(dt_evoluca-dt_sin_pri))

## Days of hospitalization in ICU
data <- data %>%
  dplyr::mutate(
    dt_entuti = as.Date(DT_ENTUTI, format = "%d/%m/%Y"),
    dt_saiduti = as.Date(DT_SAIDUTI, format = "%d/%m/%Y"),
    icu_days = as.numeric(dt_saiduti-dt_entuti)
  )

```

Epidemiologic characteristics

Ethnicity

```
with(data, ctable(ethnicity,CVD_by_year, prop = "c", useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Column Proportions
## ethnicity * CVD_by_year
## Data Frame: data
##
## -----
##           CVD_by_year      2020      2021      Total
## ethnicity
##   black          32 ( 9.4%)    20 ( 7.8%)    52 ( 8.8%)
##   brown         181 (53.4%)   108 (42.4%)   289 (48.7%)
## indigenous        1 ( 0.3%)     1 ( 0.4%)     2 ( 0.3%)
##   white         124 (36.6%)   125 (49.0%)   249 (41.9%)
##   yellow          1 ( 0.3%)     1 ( 0.4%)     2 ( 0.3%)
##   Total          339 (100.0%)  255 (100.0%)  594 (100.0%)
## -----
```

```
fisher.test(data$ethnicity, data$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: data$ethnicity and data$CVD_by_year
## p-value = 0.01964
## alternative hypothesis: two.sided
```

Education

```
with(data, ctable(education,CVD_by_year, prop = "c", useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Column Proportions
## education * CVD_by_year
## Data Frame: data
##
## -----
##           CVD_by_year      2020      2021      Total
## education
##   No schooling          1 ( 0.6%)    1 ( 0.7%)    2 ( 0.6%)
##   1st to 5th grade      20 (11.0%)   19 (13.9%)   39 (12.3%)
##   6th to 9th grade      30 (16.6%)   29 (21.2%)   59 (18.6%)
##   High school           95 (52.5%)   70 (51.1%)  165 (51.9%)
##   Higher education       35 (19.3%)   18 (13.1%)   53 (16.7%)
##   Total                181 (100.0%)  137 (100.0%) 318 (100.0%)
## -----
```

```
fisher.test(data$education, data$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: data$education and data$CVD_by_year
## p-value = 0.4768
## alternative hypothesis: two.sided
```

Age (Years)

```
datasummary((CVD_by_year) ~ NU_IDADE_N*(n+Mean_+SD+Median_+Min+Max+q25+q75+IQR),
  data = data, output = 'markdown')
```

CVD_by_year	n	Mean_	SD	Median_	Min	Max	q25	q75	IQR
2020	406.00	33.96	8.11	34.00	15.00	55.00	28.00	39.00	11.00
2021	297.00	34.96	8.49	35.00	19.00	55.00	29.00	40.00	11.00

```
t.test(NU_IDADE_N ~CVD_by_year, data = data)
```

```
##
## Welch Two Sample t-test
##
## data: NU_IDADE_N by CVD_by_year
## t = -1.5695, df = 620.86, p-value = 0.1171
## alternative hypothesis: true difference in means between group 2020 and group 2021 is not equal to 0
## 95 percent confidence interval:
## -2.2469820 0.2507803
## sample estimates:
## mean in group 2020 mean in group 2021
## 33.95813 34.95623
```

Age group

```
with(data, ctable(age_group,CVD_by_year, prop = "c", useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Column Proportions
## age_group * CVD_by_year
## Data Frame: data
##
## -----
##          CVD_by_year      2020      2021      Total
## age_group
##   <20           10 ( 2.5%)    2 ( 0.7%)   12 ( 1.7%)
##   20-34          208 ( 51.2%)  145 ( 48.8%)  353 ( 50.2%)
##   >=35           188 ( 46.3%)  150 ( 50.5%)  338 ( 48.1%)
##   Total          406 (100.0%)  297 (100.0%)  703 (100.0%)
## -----
```

```
fisher.test(data$age_group, data$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: data$age_group and data$CVD_by_year
## p-value = 0.1282
## alternative hypothesis: two.sided
```

Residence area

```
with(data, ctable(zone,CVD_by_year, prop = "c", useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Column Proportions
## zone * CVD_by_year
## Data Frame: data
##
## -----
##           CVD_by_year      2020      2021      Total
## zone
## Periurban          2 ( 0.5%)      3 ( 1.1%)      5 ( 0.8%)
## Rural              15 ( 4.0%)     13 ( 4.9%)     28 ( 4.4%)
## Urban              356 ( 95.4%)    250 ( 94.0%)    606 ( 94.8%)
## Total              373 (100.0%)    266 (100.0%)    639 (100.0%)
## -----
```

```
fisher.test(data$zone, data$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: data$zone and data$CVD_by_year
## p-value = 0.6207
## alternative hypothesis: two.sided
```

Gestational moment

```
ctable(data$classi_gesta_puerp, data$CVD_by_year, prop="c", OR=TRUE, useNA = "no", chisq = TRUE)
```

```
## Cross-Tabulation, Column Proportions
## classi_gesta_puerp * CVD_by_year
## Data Frame: data
##
## -----
##           CVD_by_year      2020      2021      Total
## classi_gesta_puerp
```

```
##           1tri           20 (  4.9%)    27 (  9.1%)    47 (  6.7%)
##           2tri           74 ( 18.2%)    70 ( 23.6%)   144 ( 20.5%)
##           3tri          173 ( 42.6%)   111 ( 37.4%)   284 ( 40.4%)
##           IG_ig          18 (  4.4%)    16 (  5.4%)    34 (  4.8%)
##           puerp          121 ( 29.8%)    73 ( 24.6%)   194 ( 27.6%)
##           Total          406 (100.0%)   297 (100.0%)  703 (100.0%)
## -----
##
## -----
##  Chi.squared   df    p.value
## -----
##    10.0234     4      0.04
## -----
```

Hospital-acquired infection

```
with(data, ctable(CVD_by_year, hospital_infection, prop = "r", useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * hospital_infection
## Data Frame: data
##
## -----
##           hospital_infection           no           yes           Total
##  CVD_by_year
##      2020           291 (97.7%)    7 (2.3%)    298 (100.0%)
##      2021           240 (98.4%)    4 (1.6%)    244 (100.0%)
##      Total           531 (98.0%)   11 (2.0%)   542 (100.0%)
## -----
```

```
fisher.test(data$hospital_infection, data$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: data$hospital_infection and data$CVD_by_year
## p-value = 0.7616
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
##  0.1470473 2.7652021
## sample estimates:
## odds ratio
##  0.6933153
```

Symptom

fever

```
with(data, ctable(CVD_by_year, fever, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * fever
## Data Frame: data
##
##
## -----
##          fever          no          yes          Total
## CVD_by_year
##    2020          147 (39.2%)    228 (60.8%)    375 (100.0%)
##    2021           88 (33.1%)    178 (66.9%)    266 (100.0%)
##    Total          235 (36.7%)    406 (63.3%)    641 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##    2.2513      1  0.1335
## -----
##
## -----
## Odds Ratio  Lo - 95%  Hi - 95%
## -----
##    1.30        0.94    1.81
## -----
##
```

Cough

```
with(data, ctable(CVD_by_year, cough, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * cough
## Data Frame: data
##
##
## -----
##          cough          no          yes          Total
## CVD_by_year
##    2020           99 (26.0%)    282 (74.0%)    381 (100.0%)
##    2021           59 (21.2%)    219 (78.8%)    278 (100.0%)
##    Total          158 (24.0%)    501 (76.0%)    659 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##    1.7463      1  0.1863
## -----
##
```



```
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.30      0.90      1.88
## -----
```

Sore throat

```
with(data, ctable(CVD_by_year, sore_throat, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * sore_throat
## Data Frame: data
##
## -----
##      sore_throat      no      yes      Total
## CVD_by_year
##      2020      252 (74.6%)      86 (25.4%)      338 (100.0%)
##      2021      173 (74.9%)      58 (25.1%)      231 (100.0%)
##      Total      425 (74.7%)      144 (25.3%)      569 (100.0%)
## -----
##
## -----
##      Chi.squared      df      p.value
## -----
##      0      1      1
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      0.98      0.67      1.44
## -----
```

Dyspnea

```
with(data, ctable(CVD_by_year, dyspnea, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * dyspnea
## Data Frame: data
##
## -----
##      dyspnea      no      yes      Total
## CVD_by_year
##      2020      122 (32.4%)      255 (67.6%)      377 (100.0%)
##      2021      54 (19.6%)      222 (80.4%)      276 (100.0%)
```

```
##           Total           176 (27.0%)   477 (73.0%)   653 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##    12.6091     1    4e-04
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##    1.97       1.36     2.84
## -----
```

1st trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "1tri")

with(df4, ctable(CVD_by_year, dyspnea, prop="r", useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * dyspnea
## Data Frame: df4
##
## -----
##           dyspnea           no           yes           Total
## CVD_by_year
##    2020           6 (33.3%)   12 (66.7%)   18 (100.0%)
##    2021           5 (19.2%)   21 (80.8%)   26 (100.0%)
##    Total          11 (25.0%)   33 (75.0%)   44 (100.0%)
## -----
```

```
fisher.test(df4$CVD_by_year, df4$qt_resp_symp)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: df4$CVD_by_year and df4$qt_resp_symp
## p-value = 0.3471
## alternative hypothesis: two.sided
```

2nd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "2tri")

with(df4, ctable(CVD_by_year, dyspnea, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * dyspnea
## Data Frame: df4
##
##
## -----
##      dyspnea      no      yes      Total
## CVD_by_year
##      2020      17 (24.6%)  52 (75.4%)  69 (100.0%)
##      2021       9 (14.1%)  55 (85.9%)  64 (100.0%)
##      Total     26 (19.5%) 107 (80.5%) 133 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      1.7365    1  0.1876
## -----
```

3rd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "3tri")

with(df4, ctable(CVD_by_year, dyspnea, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * dyspnea
## Data Frame: df4
##
##
## -----
##      dyspnea      no      yes      Total
## CVD_by_year
##      2020      70 (42.9%)  93 (57.1%) 163 (100.0%)
##      2021      22 (21.8%)  79 (78.2%) 101 (100.0%)
##      Total     92 (34.8%) 172 (65.2%) 264 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      11.3864    1  7e-04
## -----
```

Puerperium

```
df4 <- data %>%
  filter(classi_gesta_puerp == "puerp")
```

```
with(df4, ctable(CVD_by_year, dyspnea, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * dyspnea
## Data Frame: df4
##
##
## -----
##          dyspnea          no          yes          Total
## CVD_by_year
##      2020          24 (22.0%)      85 (78.0%)      109 (100.0%)
##      2021          13 (18.3%)      58 (81.7%)       71 (100.0%)
##      Total          37 (20.6%)     143 (79.4%)      180 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      0.1706      1   0.6796
## -----
```

Respiratory distress

```
with(data, ctable(CVD_by_year, resp_dist, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * resp_dist
## Data Frame: data
##
##
## -----
##          resp_dist          no          yes          Total
## CVD_by_year
##      2020          161 (44.1%)      204 (55.9%)      365 (100.0%)
##      2021           87 (34.4%)      166 (65.6%)      253 (100.0%)
##      Total          248 (40.1%)      370 (59.9%)      618 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      5.481      1   0.0192
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.51      1.08      2.10
## -----
```

1st trimester

```
df4 <- data %>%  
  filter(classi_gesta_puerp == "1tri")  
  
with(df4, ctable(CVD_by_year, resp_dist, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions  
## CVD_by_year * resp_dist  
## Data Frame: df4  
##  
##  
## -----  
##      resp_dist      no      yes      Total  
## CVD_by_year  
##      2020      8 (42.1%)  11 (57.9%)  19 (100.0%)  
##      2021     10 (47.6%)  11 (52.4%)  21 (100.0%)  
##      Total     18 (45.0%)  22 (55.0%)  40 (100.0%)  
## -----  
##  
## -----  
## Chi.squared  df  p.value  
## -----  
##      0.001      1  0.9746  
## -----
```

2nd trimester

```
df4 <- data %>%  
  filter(classi_gesta_puerp == "2tri")  
  
with(df4, ctable(CVD_by_year, resp_dist, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions  
## CVD_by_year * resp_dist  
## Data Frame: df4  
##  
##  
## -----  
##      resp_dist      no      yes      Total  
## CVD_by_year  
##      2020     25 (37.3%)  42 (62.7%)  67 (100.0%)  
##      2021     18 (30.5%)  41 (69.5%)  59 (100.0%)  
##      Total     43 (34.1%)  83 (65.9%) 126 (100.0%)  
## -----  
##  
## -----  
## Chi.squared  df  p.value  
## -----  
##      0.379      1  0.5381  
## -----
```

3rd trimester

```
df4 <- data %>%  
  filter(classi_gesta_puerp == "3tri")  
  
with(df4, ctable(CVD_by_year, resp_dist, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions  
## CVD_by_year * resp_dist  
## Data Frame: df4  
##  
##  
## -----  
##      resp_dist      no      yes      Total  
## CVD_by_year  
##      2020      85 (53.8%)  73 (46.2%)  158 (100.0%)  
##      2021      32 (35.6%)  58 (64.4%)   90 (100.0%)  
##      Total     117 (47.2%)  131 (52.8%)  248 (100.0%)  
## -----  
##  
## -----  
## Chi.squared  df  p.value  
## -----  
##      6.9421    1  0.0084  
## -----
```

Puerperium

```
df4 <- data %>%  
  filter(classi_gesta_puerp == "puerp")  
  
with(df4, ctable(CVD_by_year, resp_dist, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions  
## CVD_by_year * resp_dist  
## Data Frame: df4  
##  
##  
## -----  
##      resp_dist      no      yes      Total  
## CVD_by_year  
##      2020      38 (36.5%)  66 (63.5%)  104 (100.0%)  
##      2021      22 (31.4%)  48 (68.6%)   70 (100.0%)  
##      Total      60 (34.5%)  114 (65.5%)  174 (100.0%)  
## -----  
##  
## -----  
## Chi.squared  df  p.value  
## -----  
##      0.2838    1  0.5942  
## -----
```

Saturation

```
with(data, ctable(CVD_by_year, saturation, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * saturation
## Data Frame: data
##
## -----
##           saturation          no          yes          Total
## CVD_by_year
##      2020           179 (49.7%)   181 (50.3%)   360 (100.0%)
##      2021            82 (30.8%)   184 (69.2%)   266 (100.0%)
##      Total           261 (41.7%)   365 (58.3%)   626 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      21.6955    1       0
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      2.22       1.59     3.09
## -----
```

1st trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "1tri")

with(df4, ctable(CVD_by_year, saturation, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * saturation
## Data Frame: df4
##
## -----
##           saturation          no          yes          Total
## CVD_by_year
##      2020             7 (41.2%)   10 (58.8%)   17 (100.0%)
##      2021             6 (25.0%)   18 (75.0%)   24 (100.0%)
##      Total            13 (31.7%)   28 (68.3%)   41 (100.0%)
## -----
##
## -----
```

```
## Chi.squared  df  p.value
## -----
##      0.5715    1   0.4496
## -----
```

2nd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "2tri")

with(df4, ctable(CVD_by_year, saturation, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * saturation
## Data Frame: df4
##
## -----
##      saturation      no      yes      Total
## CVD_by_year
##      2020      24 (35.3%)  44 (64.7%)  68 (100.0%)
##      2021      18 (28.6%)  45 (71.4%)  63 (100.0%)
##      Total      42 (32.1%)  89 (67.9%) 131 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      0.405    1   0.5245
## -----
```

3rd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "3tri")

with(df4, ctable(CVD_by_year, saturation, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * saturation
## Data Frame: df4
##
## -----
##      saturation      no      yes      Total
## CVD_by_year
##      2020      100 (65.8%)  52 (34.2%) 152 (100.0%)
##      2021       30 (31.6%)  65 (68.4%)  95 (100.0%)
##      Total      130 (52.6%) 117 (47.4%) 247 (100.0%)
```



```
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      26.0894    1      0
## -----
```

Puerperium

```
df4 <- data %>%
  filter(classi_gesta_puerp == "puerp")

with(df4, ctable(CVD_by_year, saturation, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * saturation
## Data Frame: df4
##
## -----
##      saturation      no      yes      Total
## CVD_by_year
##      2020      40 (38.1%)  65 (61.9%)  105 (100.0%)
##      2021      24 (34.3%)  46 (65.7%)   70 (100.0%)
##      Total      64 (36.6%) 111 (63.4%)  175 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      0.1242    1   0.7245
## -----
```

Diarrhea

```
with(data, ctable(CVD_by_year, diarrhea, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * diarrhea
## Data Frame: data
##
## -----
##      diarrhea      no      yes      Total
## CVD_by_year
##      2020      292 (87.7%)  41 (12.3%)  333 (100.0%)
##      2021      199 (85.8%)  33 (14.2%)  232 (100.0%)
##      Total      491 (86.9%)  74 (13.1%)  565 (100.0%)
```

```
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      0.2872    1    0.592
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.18      0.72     1.93
## -----
```

Vomit

```
with(data, ctable(CVD_by_year, vomit, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * vomit
## Data Frame: data
##
## -----
##      vomit      no      yes      Total
## CVD_by_year
##      2020      293 (88.3%)  39 (11.7%)  332 (100.0%)
##      2021      198 (86.8%)  30 (13.2%)  228 (100.0%)
##      Total      491 (87.7%)  69 (12.3%)  560 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      0.1356    1    0.7127
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.14      0.68     1.89
## -----
```

Fatigue

```
with(data, ctable(CVD_by_year, fatigue, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * fatigue
```

```
## Data Frame: data
##
##
## -----
##           fatigue           no           yes           Total
## CVD_by_year
##      2020           131 (71.2%)      53 (28.8%)      184 (100.0%)
##      2021           163 (67.9%)      77 (32.1%)      240 (100.0%)
##      Total           294 (69.3%)     130 (30.7%)     424 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      0.3838      1   0.5356
## -----
##
## -----
## Odds Ratio    Lo - 95%    Hi - 95%
## -----
##      1.17        0.77      1.77
## -----
```

1st trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "1tri")

with(df4, ctable(CVD_by_year, fatigue, prop="r", useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * fatigue
## Data Frame: df4
##
## -----
##           fatigue           no           yes           Total
## CVD_by_year
##      2020           8 (72.7%)      3 (27.3%)      11 (100.0%)
##      2021          15 (68.2%)      7 (31.8%)      22 (100.0%)
##      Total          23 (69.7%)     10 (30.3%)      33 (100.0%)
## -----
```

```
fisher.test(df4$CVD_by_year, df4$qt_resp_symp)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: df4$CVD_by_year and df4$qt_resp_symp
## p-value = 0.3471
## alternative hypothesis: two.sided
```

2nd trimester

```
df4 <- data %>%  
  filter(classi_gesta_puerp == "2tri")  
  
with(df4, ctable(CVD_by_year, fatigue, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions  
## CVD_by_year * fatigue  
## Data Frame: df4  
##  
##  
## -----  
##          fatigue          no          yes          Total  
## CVD_by_year  
##    2020          23 (63.9%)    13 (36.1%)    36 (100.0%)  
##    2021          34 (60.7%)    22 (39.3%)    56 (100.0%)  
##    Total          57 (62.0%)    35 (38.0%)    92 (100.0%)  
## -----  
##  
## -----  
## Chi.squared   df    p.value  
## -----  
##    0.0074      1    0.9314  
## -----
```

3rd trimester

```
df4 <- data %>%  
  filter(classi_gesta_puerp == "3tri")  
  
with(df4, ctable(CVD_by_year, fatigue, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions  
## CVD_by_year * fatigue  
## Data Frame: df4  
##  
##  
## -----  
##          fatigue          no          yes          Total  
## CVD_by_year  
##    2020          59 (73.8%)    21 (26.2%)    80 (100.0%)  
##    2021          58 (69.0%)    26 (31.0%)    84 (100.0%)  
##    Total         117 (71.3%)    47 (28.7%)   164 (100.0%)  
## -----  
##  
## -----  
## Chi.squared   df    p.value  
## -----  
##    0.243      1    0.622  
## -----
```

Puerperium

```
df4 <- data %>%  
  filter(classi_gesta_puerp == "puerp")  
  
with(df4, ctable(CVD_by_year, fatigue, prop="r", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions  
## CVD_by_year * fatigue  
## Data Frame: df4  
##  
##  
## -----  
##          fatigue          no          yes          Total  
## CVD_by_year  
##      2020          35 (74.5%)   12 (25.5%)   47 (100.0%)  
##      2021          46 (70.8%)   19 (29.2%)   65 (100.0%)  
##      Total          81 (72.3%)   31 (27.7%)  112 (100.0%)  
## -----  
##  
## -----  
## Chi.squared  df    p.value  
## -----  
##      0.0474      1    0.8276  
## -----
```

Loss of smell

```
with(data, ctable(CVD_by_year, loss_smell, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions  
## CVD_by_year * loss_smell  
## Data Frame: data  
##  
##  
## -----  
##          loss_smell          no          yes          Total  
## CVD_by_year  
##      2020          140 (76.9%)   42 (23.1%)   182 (100.0%)  
##      2021          168 (71.8%)   66 (28.2%)   234 (100.0%)  
##      Total          308 (74.0%)  108 (26.0%)   416 (100.0%)  
## -----  
##  
## -----  
## Chi.squared  df    p.value  
## -----  
##      1.1466      1    0.2843  
## -----  
##  
## -----
```

```
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.31         0.84     2.05
## -----
```

Loss of taste

```
with(data, ctable(CVD_by_year, loss_taste, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * loss_taste
## Data Frame: data
##
##
## -----
##      loss_taste      no      yes      Total
## CVD_by_year
##      2020      136 (74.7%)   46 (25.3%)  182 (100.0%)
##      2021      177 (74.4%)   61 (25.6%)  238 (100.0%)
##      Total      313 (74.5%)  107 (25.5%)  420 (100.0%)
## -----
##
## -----
##      Chi.squared   df   p.value
## -----
##           0         1         1
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.02         0.65     1.59
## -----
```

Abdominal pain

```
with(data, ctable(CVD_by_year, abd_pain, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * abd_pain
## Data Frame: data
##
##
## -----
##      abd_pain      no      yes      Total
## CVD_by_year
##      2020      156 (88.1%)   21 (11.9%)  177 (100.0%)
##      2021      207 (90.8%)   21 ( 9.2%)  228 (100.0%)
##      Total      363 (89.6%)   42 (10.4%)  405 (100.0%)
```

```
## -----
##
## -----
##  Chi.squared   df   p.value
## -----
##    0.4965      1    0.481
## -----
##
## -----
##  Odds Ratio    Lo - 95%    Hi - 95%
## -----
##    0.75        0.40      1.43
## -----
```

Now we are going to analysis the variable `resp_symp` indicating the presence of at least one respiratory symptom (Dyspnea, Fadigue, Saturation, Respiratory distress). Empty cells are considered missing data (`<NA>`). The variable `qt_resp_symp` indicates the number of respiratory symptoms of each case.

Frequency table indicating the cases of respiratory symptoms by year.

```
with(data, ctable(CVD_by_year, resp_symp, prop="r", OR=TRUE, useNA = "no", chisq = TRUE)
)
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * resp_symp
## Data Frame: data
##
##
## -----
##      resp_symp      no      yes      Total
## CVD_by_year
##      2020      78 (19.9%)  314 (80.1%)  392 (100.0%)
##      2021      27 ( 9.4%)  259 (90.6%)  286 (100.0%)
##      Total     105 (15.5%)  573 (84.5%)  678 (100.0%)
## -----
##
## -----
##  Chi.squared   df   p.value
## -----
##    13.0287     1    3e-04
## -----
##
## -----
##  Odds Ratio    Lo - 95%    Hi - 95%
## -----
##    2.38        1.49      3.80
## -----
```

Frequency table of number of respiratory symptoms by year.

```
with(data, ctable(qt_resp_symp, CVD_by_year, prop="c", useNA = "no", chisq = TRUE)
)
```

```
## Cross-Tabulation, Column Proportions
## qt_resp_symp * CVD_by_year
## Data Frame: data
##
##
## -----
##               CVD_by_year      2020      2021      Total
## qt_resp_symp
## No respiratory symptom      78 ( 19.9%)    27 (  9.4%)   105 ( 15.5%)
##           1 symptom        82 ( 20.9%)    51 ( 17.8%)   133 ( 19.6%)
##           2 symptoms       107 ( 27.3%)    69 ( 24.1%)   176 ( 26.0%)
##           3 symptoms       103 ( 26.3%)    96 ( 33.6%)   199 ( 29.4%)
##           4 symptoms        22 (  5.6%)    43 ( 15.0%)    65 (  9.6%)
##           Total          392 (100.0%)   286 (100.0%)   678 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      31.4283    4       0
## -----
```

1st trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "1tri")

with(df4, ctable(qt_resp_symp, CVD_by_year, prop="c", useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Column Proportions
## qt_resp_symp * CVD_by_year
## Data Frame: df4
##
## -----
##               CVD_by_year      2020      2021      Total
## qt_resp_symp
## No respiratory symptom      4 ( 20.0%)    4 ( 15.4%)    8 ( 17.4%)
##           1 symptom        5 ( 25.0%)    3 ( 11.5%)    8 ( 17.4%)
##           2 symptoms       3 ( 15.0%)    8 ( 30.8%)   11 ( 23.9%)
##           3 symptoms       7 ( 35.0%)    6 ( 23.1%)   13 ( 28.3%)
##           4 symptoms       1 (  5.0%)    5 ( 19.2%)    6 ( 13.0%)
##           Total          20 (100.0%)   26 (100.0%)   46 (100.0%)
## -----
```

```
fisher.test(df4$CVD_by_year, df4$qt_resp_symp)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: df4$CVD_by_year and df4$qt_resp_symp
## p-value = 0.3471
## alternative hypothesis: two.sided
```


2nd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "2tri")

with(df4, ctable(qt_resp_symp, CVD_by_year, prop="c", useNA = "no", chisq = TRUE))

## Cross-Tabulation, Column Proportions
## qt_resp_symp * CVD_by_year
## Data Frame: df4
##
##
## -----
##               CVD_by_year      2020      2021      Total
## qt_resp_symp
## No respiratory symptom      7 ( 9.7%)      5 ( 7.4%)     12 ( 8.6%)
##      1 symptom             14 (19.4%)     10 (14.7%)     24 (17.1%)
##      2 symptoms            22 (30.6%)     17 (25.0%)     39 (27.9%)
##      3 symptoms            23 (31.9%)     25 (36.8%)     48 (34.3%)
##      4 symptoms              6 ( 8.3%)     11 (16.2%)     17 (12.1%)
##      Total                 72 (100.0%)    68 (100.0%)    140 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      3.0832      4      0.544
## -----
```

3rd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "3tri")

with(df4, ctable(qt_resp_symp, CVD_by_year, prop="c", useNA = "no", chisq = TRUE))

## Cross-Tabulation, Column Proportions
## qt_resp_symp * CVD_by_year
## Data Frame: df4
##
##
## -----
##               CVD_by_year      2020      2021      Total
## qt_resp_symp
## No respiratory symptom     50 (29.8%)     11 (10.5%)     61 (22.3%)
##      1 symptom             39 (23.2%)     20 (19.0%)     59 (21.6%)
##      2 symptoms            41 (24.4%)     29 (27.6%)     70 (25.6%)
##      3 symptoms            34 (20.2%)     30 (28.6%)     64 (23.4%)
##      4 symptoms              4 ( 2.4%)     15 (14.3%)     19 ( 7.0%)
##      Total                 168 (100.0%)   105 (100.0%)   273 (100.0%)
```

```
## -----
##
## -----
##  Chi.squared   df   p.value
## -----
##    26.6071     4     0
## -----
```

Puerperium

```
df4 <- data %>%
  filter(classi_gesta_puerp == "puerp")

with(df4, ctable(qt_resp_symp, CVD_by_year, prop="c", useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Column Proportions
## qt_resp_symp * CVD_by_year
## Data Frame: df4
##
## -----
##               CVD_by_year      2020      2021      Total
## qt_resp_symp
## No respiratory symptom      16 ( 14.0%)    4 (  5.6%)    20 ( 10.8%)
##      1 symptom              19 ( 16.7%)   15 ( 20.8%)    34 ( 18.3%)
##      2 symptoms              37 ( 32.5%)   13 ( 18.1%)    50 ( 26.9%)
##      3 symptoms              33 ( 28.9%)   30 ( 41.7%)    63 ( 33.9%)
##      4 symptoms               9 (  7.9%)   10 ( 13.9%)    19 ( 10.2%)
##      Total                 114 (100.0%)   72 (100.0%)   186 (100.0%)
## -----
##
## -----
##  Chi.squared   df   p.value
## -----
##    10.4342     4   0.0337
## -----
```

Similar to the analysis of any respiratory symptom, we are going to create the variable `symp` indicating the presence of at least one symptom (Dyspnea, Fatigue, Saturation, Respiratory distress, Fever, Cough, Sore throat, Diarrhea, Vomit, Abdominal pain, Loss of smell, Loss of taste). Empty cells are considered missing data (<NA>).

Frequency table indicating the cases with at least 1 symptom versus no symptom by year.

```
with(data, ctable(CVD_by_year, symp, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * symp
## Data Frame: data
##
##
```

```
## -----
##      symp      no      yes      Total
## CVD_by_year
##   2020      18 (4.4%)  387 (95.6%)  405 (100.0%)
##   2021       6 (2.1%)  286 (97.9%)  292 (100.0%)
##   Total      24 (3.4%)  673 (96.6%)  697 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##    2.2397     1  0.1345
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##    2.22       0.87      5.66
## -----
```

```
fisher.test(data$symp, data$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data:  data$symp and data$CVD_by_year
## p-value = 0.09602
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
##  0.8289675 6.9045943
## sample estimates:
## odds ratio
##  2.214729
```

Frequency table of number of symptoms by year.

```
with(data, ctable(qt_symp, CVD_by_year, prop="c", useNA = "no", chisq=FALSE, OR=TRUE))
```

```
## Cross-Tabulation, Column Proportions
## qt_symp * CVD_by_year
## Data Frame: data
##
## -----
##      CVD_by_year      2020      2021      Total
## qt_symp
## No symptom      18 ( 4.4%)    6 ( 2.1%)   24 ( 3.4%)
## 1 symptom       37 ( 9.1%)   16 ( 5.5%)   53 ( 7.6%)
## 2 symptoms      70 (17.3%)   32 (11.0%)  102 (14.6%)
## 3 symptoms      83 (20.5%)   54 (18.5%)  137 (19.7%)
## 4 symptoms      71 (17.5%)   48 (16.4%)  119 (17.1%)
## 5 symptoms      53 (13.1%)   54 (18.5%)  107 (15.4%)
## 6 symptoms      36 ( 8.9%)   23 ( 7.9%)   59 ( 8.5%)
```

```
##      7 symptoms      21 ( 5.2%)      29 ( 9.9%)      50 ( 7.2%)
##      8 symptoms      8 ( 2.0%)      12 ( 4.1%)      20 ( 2.9%)
##      9 symptoms      5 ( 1.2%)      11 ( 3.8%)      16 ( 2.3%)
##     10 symptoms      2 ( 0.5%)      4 ( 1.4%)      6 ( 0.9%)
##     11 symptoms      1 ( 0.2%)      1 ( 0.3%)      2 ( 0.3%)
##     12 symptoms      0 ( 0.0%)      2 ( 0.7%)      2 ( 0.3%)
##      Total      405 (100.0%)      292 (100.0%)      697 (100.0%)
## -----
```

```
fisher.test(data$qt_symp, data$CVD_by_year, simulate.p.value = TRUE)
```

```
##
## Fisher's Exact Test for Count Data with simulated p-value (based on
## 2000 replicates)
##
## data: data$qt_symp and data$CVD_by_year
## p-value = 0.0009995
## alternative hypothesis: two.sided
```

Comorbidities

Hematologic

```
with(data, ctable(CVD_by_year, hematologic, prop = "r", useNA = "no", chisq = TRUE, OR=TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * hematologic
## Data Frame: data
##
## -----
##      hematologic      no      yes      Total
## CVD_by_year
##      2020      284 (97.3%)      8 (2.7%)      292 (100.0%)
##      2021      223 (99.1%)      2 (0.9%)      225 (100.0%)
##      Total      507 (98.1%)      10 (1.9%)      517 (100.0%)
## -----
##
## -----
##      Chi.squared      df      p.value
## -----
##      1.423      1      0.2329
## -----
##
## -----
##      Odds Ratio      Lo - 95%      Hi - 95%
## -----
##      0.318      0.067      1.514
## -----
```

```
fisher.test(data$hematologic, data$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: data$hematologic and data$CVD_by_year
## p-value = 0.1984
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
## 0.03268656 1.62030450
## sample estimates:
## odds ratio
## 0.3189996
```

Diabetes

```
ctable(data$CVD_by_year, data$diabetes, chisq=TRUE, prop="r", OR=TRUE, useNA = "no")
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * diabetes
## Data Frame: data
##
## -----
##          diabetes          no          yes          Total
## CVD_by_year
##      2020          210 (67.5%)    101 (32.5%)    311 (100.0%)
##      2021          162 (66.7%)     81 (33.3%)    243 (100.0%)
##      Total          372 (67.1%)    182 (32.9%)    554 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      0.0149      1   0.9028
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.04      0.73      1.49
## -----
```

Obesity

```
ctable(data$CVD_by_year, data$obesity, chisq=TRUE, prop="r", OR=TRUE, useNA = "no")
```

```
## Cross-Tabulation, Row Proportions
```

```
## CVD_by_year * obesity
## Data Frame: data
##
##
## -----
##      obesity      no      yes      Total
## CVD_by_year
##      2020      232 (78.4%)    64 (21.6%)    296 (100.0%)
##      2021      168 (70.6%)    70 (29.4%)    238 (100.0%)
##      Total      400 (74.9%)   134 (25.1%)   534 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      3.8549    1  0.0496
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.51      1.02      2.24
## -----
```

1st trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "1tri")

with(df4, ctable(CVD_by_year, obesity, prop="r", chisq=TRUE, OR=TRUE, useNA = "no"))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * obesity
## Data Frame: df4
##
##
## -----
##      obesity      no      yes      Total
## CVD_by_year
##      2020      8 (57.1%)    6 (42.9%)    14 (100.0%)
##      2021     12 (60.0%)    8 (40.0%)    20 (100.0%)
##      Total     20 (58.8%)   14 (41.2%)   34 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      0        1    1
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
```

```
## -----
##      0.89      0.22      3.55
## -----
```

2nd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "2tri")

with(df4, ctable(CVD_by_year, obesity, prop="r", chisq=TRUE, OR=TRUE, useNA = "no"))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * obesity
## Data Frame: df4
##
## -----
##      obesity      no      yes      Total
## CVD_by_year
##      2020      43 (78.2%)  12 (21.8%)  55 (100.0%)
##      2021      38 (67.9%)  18 (32.1%)  56 (100.0%)
##      Total      81 (73.0%)  30 (27.0%) 111 (100.0%)
## -----
##
## -----
##      Chi.squared  df  p.value
## -----
##      1.0219      1  0.3121
## -----
##
## -----
##      Odds Ratio  Lo - 95%  Hi - 95%
## -----
##      1.70      0.72      3.97
## -----
```

3rd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "3tri")

with(df4, ctable(CVD_by_year, obesity, prop="r", chisq=TRUE, OR=TRUE, useNA = "no"))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * obesity
## Data Frame: df4
##
## -----
```

```
##          obesity          no          yes          Total
## CVD_by_year
##      2020          104 (81.2%)   24 (18.8%)   128 (100.0%)
##      2021           55 (66.3%)   28 (33.7%)    83 (100.0%)
##      Total          159 (75.4%)   52 (24.6%)   211 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      5.3079      1   0.0212
## -----
##
## -----
## Odds Ratio    Lo - 95%    Hi - 95%
## -----
##      2.21       1.17      4.17
## -----
```

Puerperium

```
df4 <- data %>%
  filter(classi_gesta_puerp == "puerp")

with(df4, ctable(CVD_by_year, obesity, prop="r", chisq=TRUE, OR=TRUE, useNA = "no"))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * obesity
## Data Frame: df4
##
##
## -----
##          obesity          no          yes          Total
## CVD_by_year
##      2020          63 (75.9%)   20 (24.1%)    83 (100.0%)
##      2021          52 (80.0%)   13 (20.0%)    65 (100.0%)
##      Total          115 (77.7%)   33 (22.3%)   148 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      0.1562      1   0.6927
## -----
##
## -----
## Odds Ratio    Lo - 95%    Hi - 95%
## -----
##      0.79       0.36      1.73
## -----
```


Asthma

```
ctable(data$CVD_by_year, data$asthma, chisq=TRUE, prop="r", OR=TRUE, useNA = "no")
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * asthma
## Data Frame: data
##
## -----
##          asthma          no          yes          Total
## CVD_by_year
##   2020          266 (91.1%)   26 (8.9%)   292 (100.0%)
##   2021          206 (92.0%)   18 (8.0%)   224 (100.0%)
##   Total          472 (91.5%)   44 (8.5%)   516 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##    0.0365      1    0.8485
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##    0.89       0.48       1.67
## -----
```

Liver diseases

```
ctable(data$CVD_by_year, data$hepatic, chisq=FALSE, prop="r", OR=TRUE, useNA = "no")
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * hepatic
## Data Frame: data
##
## -----
##          hepatic          no          yes          Total
## CVD_by_year
##   2020          283 (99.0%)    3 (1.0%)   286 (100.0%)
##   2021          222 (99.1%)    2 (0.9%)   224 (100.0%)
##   Total          505 (99.0%)    5 (1.0%)   510 (100.0%)
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##    0.85       0.14       5.13
## -----
```

```
fisher.test(data$hepatic, data$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: data$hepatic and data$CVD_by_year
## p-value = 1
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
## 0.07041066 7.48788375
## sample estimates:
## odds ratio
## 0.850119
```

Neuropathies

```
ctable(data$CVD_by_year, data$neurologic, chisq=TRUE, prop="r", OR=TRUE, useNA = "no")
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * neurologic
## Data Frame: data
##
##
## -----
##      neurologic      no      yes      Total
## CVD_by_year
##      2020      281 (98.3%)    5 (1.7%)  286 (100.0%)
##      2021      217 (96.9%)    7 (3.1%)  224 (100.0%)
##      Total      498 (97.6%)   12 (2.4%)  510 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      0.5237    1  0.4693
## -----
##
## -----
## Odds Ratio  Lo - 95%  Hi - 95%
## -----
##      1.81      0.57    5.79
## -----
```

Lung diseases

```
ctable(data$CVD_by_year, data$pneumologic, chisq=TRUE, prop="r", OR=TRUE, useNA = "no")
```

```
## Cross-Tabulation, Row Proportions
```

```
## CVD_by_year * pneumologic
## Data Frame: data
##
##
## -----
##      pneumologic      no      yes      Total
## CVD_by_year
##      2020      282 (96.6%)  10 (3.4%)  292 (100.0%)
##      2021      221 (98.7%)   3 (1.3%)  224 (100.0%)
##      Total      503 (97.5%)  13 (2.5%)  516 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      1.4758      1  0.2244
## -----
##
## -----
## Odds Ratio  Lo - 95%  Hi - 95%
## -----
##      0.38      0.10      1.41
## -----
```

Immunodeficiencias

```
ctable(data$CVD_by_year, data$imunodepre, chisq=TRUE, prop="r", OR=TRUE, useNA = "no")
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * imunodepre
## Data Frame: data
##
##
## -----
##      imunodepre      no      yes      Total
## CVD_by_year
##      2020      279 (96.5%)  10 (3.5%)  289 (100.0%)
##      2021      216 (96.9%)   7 (3.1%)  223 (100.0%)
##      Total      495 (96.7%)  17 (3.3%)  512 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      0      1      1
## -----
##
## -----
## Odds Ratio  Lo - 95%  Hi - 95%
## -----
##      0.90      0.34      2.41
## -----
```

Kidney disease

```
ctable(data$CVD_by_year, data$renal, chisq=TRUE, prop="r", OR=TRUE, useNA = "no")
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * renal
## Data Frame: data
##
## -----
##          renal          no          yes          Total
## CVD_by_year
##      2020          276 (96.2%)    11 (3.8%)    287 (100.0%)
##      2021          214 (95.1%)    11 (4.9%)    225 (100.0%)
##      Total          490 (95.7%)    22 (4.3%)    512 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      0.1335      1   0.7149
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.29      0.55      3.03
## -----
```

Now we are going to analysis the variable `comorbidities` indicating the presence of at least one comorbidities versus no comorbidity. Empty cells are considered missing data (<NA>). The variable `qt_resp_symp` indicates the number of respiratory symptoms of each case.

```
freq(x = data$comorbidities,
      markdown = TRUE,
      title = "Frequency table to the presence of comorbidities",
      header = FALSE,
      quote = FALSE)
```

```
##
##
## **Frequency table to the presence of comorbidities**
##
##
##
## |   |Item| Count| Percent| Cum. Count| Cum. Percent|
## |:-|:---|:-----|:-----:|:-----:|:-----:|
## |1 |yes |   319|   53.79%|       319|       53.79%|
## |2 |no  |   274|   46.21%|       593|      100.00%|
```

```
with(data, ctable(CVD_by_year, comorbidities, prop="r", useNA = "no", chisq = TRUE, OR = TRUE))
```

```
## Cross-Tabulation, Row Proportions
```

```
## CVD_by_year * comorbidities
```

```
## Data Frame: data
```

```
##
```

```
##
```

```
## -----
##          comorbidities          no          yes          Total
## CVD_by_year
##      2020          161 (48.3%)    172 (51.7%)    333 (100.0%)
##      2021          113 (43.5%)    147 (56.5%)    260 (100.0%)
##      Total          274 (46.2%)    319 (53.8%)    593 (100.0%)
## -----
```

```
##
```

```
## -----
## Chi.squared  df  p.value
## -----
```

```
##      1.213      1    0.2707
## -----
```

```
##
```

```
## -----
## Odds Ratio  Lo - 95%  Hi - 95%
## -----
```

```
##      1.22      0.88      1.69
## -----
```

```
##
```

```
freq(x = data$comorbidities_grupo3,
      markdown = TRUE,
      title = "Frequency table to the number of comorbidities",
      header = FALSE,
      quote = FALSE)
```

```
##
```

```
##
```

```
## **Frequency table to the number of comorbidities**
```

```
##
```

```
##
```

```
##
```

```
##
```

```
## |   |Item          | Count| Percent| Cum. Count| Cum. Percent|
## |:-|:-----|:-----:|:-----:|:-----:|:-----:|
## |1 |No comorbidity |    274|  46.21%|    274|    46.21%|
## |2 |1 comorbidity  |    229|  38.62%|    503|    84.82%|
## |3 |2 comorbidities|     71|  11.97%|    574|    96.80%|
## |4 |>2 comorbidities|     19|   3.20%|    593|   100.00%|
```

```
with(data, ctable(comorbidities_grupo3,CVD_by_year, prop="c", useNA = "no", chisq = TRUE, OR = TRUE))
```

```
## Cross-Tabulation, Column Proportions
```

```
## comorbidities_grupo3 * CVD_by_year
```

```
## Data Frame: data
##
##
## -----
##          CVD_by_year      2020      2021      Total
## comorbidities_grupo3
##   No comorbidity      161 ( 48.3%)   113 ( 43.5%)   274 ( 46.2%)
##   1 comorbidity      121 ( 36.3%)   108 ( 41.5%)   229 ( 38.6%)
##   2 comorbidities      41 ( 12.3%)    30 ( 11.5%)    71 ( 12.0%)
##   >2 comorbidities     10 (  3.0%)     9 (  3.5%)    19 (  3.2%)
##          Total      333 (100.0%)   260 (100.0%)   593 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      1.9466      3   0.5836
## -----
```

```
fisher.test(data$comorbidities_grupo3, data$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: data$comorbidities_grupo3 and data$CVD_by_year
## p-value = 0.577
## alternative hypothesis: two.sided
```

```
freq(x = data$qt_comorb,
     markdown = TRUE,
     title = "Frequency table to the number of comorbidities expanded",
     header = FALSE,
     quote = FALSE,
     na.rm = FALSE,
     sort.count = FALSE)
```

```
##
##
## **Frequency table to the number of comorbidities expanded**
##
##
##
## |  |Item|  Count|  Percent|  Cum. Count|  Cum. Percent|
## |:-:|:-----|:-----:|:-----:|:-----:|:-----:|
## |1| 1|      274| 38.98%|      274| 38.98%|
## |2| 2|      229| 32.57%|      503| 71.55%|
## |3| 3|       71| 10.10%|      574| 81.65%|
## |4| 4|       14|  1.99%|      588| 83.64%|
## |5| 5|        3|  0.43%|      591| 84.07%|
## |6| 6|        1|  0.14%|      592| 84.21%|
## |7| 7|        1|  0.14%|      593| 84.35%|
## |8| NA|       110| 15.65%|      703| 100.00%|
```

```
with(data, ctable(qt_comorb,CVD_by_year, prop="c", useNA = "no"))
```

```
## Cross-Tabulation, Column Proportions
```

```
## qt_comorb * CVD_by_year
```

```
## Data Frame: data
```

```
##
```

```
## -----
##          CVD_by_year      2020      2021      Total
## qt_comorb
## No comorbidity      161 ( 48.3%)    113 ( 43.5%)    274 ( 46.2%)
## 1 comorbidity       121 ( 36.3%)    108 ( 41.5%)    229 ( 38.6%)
## 2 comorbidities      41 ( 12.3%)     30 ( 11.5%)     71 ( 12.0%)
## 3 comorbidities       6 (  1.8%)      8 (  3.1%)     14 (  2.4%)
## 4 comorbidities       3 (  0.9%)      0 (  0.0%)      3 (  0.5%)
## 5 comorbidities       1 (  0.3%)      0 (  0.0%)      1 (  0.2%)
## 6 comorbidities       0 (  0.0%)      0 (  0.0%)      0 (  0.0%)
## 7 comorbidities       0 (  0.0%)      0 (  0.0%)      0 (  0.0%)
## 8 comorbidities       0 (  0.0%)      0 (  0.0%)      0 (  0.0%)
## 9 comorbidities       0 (  0.0%)      1 (  0.4%)      1 (  0.2%)
## Total              333 (100.0%)    260 (100.0%)    593 (100.0%)
## -----
```

```
fisher.test(data$qt_comorb, data$CVD_by_year, simulate.p.value=TRUE)
```

```
##
```

```
## Fisher's Exact Test for Count Data with simulated p-value (based on
```

```
## 2000 replicates)
```

```
##
```

```
## data: data$qt_comorb and data$CVD_by_year
```

```
## p-value = 0.2909
```

```
## alternative hypothesis: two.sided
```

Outcome - recovery x death

ICU

```
with(data, ctable(CVD_by_year, icu, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
```

```
## CVD_by_year * icu
```

```
## Data Frame: data
```

```
##
```

```
##
```

```
## -----
##          icu          no          yes          Total
## CVD_by_year
## 2020         251 (65.7%)    131 (34.3%)    382 (100.0%)
## 2021         151 (53.4%)    132 (46.6%)    283 (100.0%)
## Total         402 (60.5%)    263 (39.5%)    665 (100.0%)
## -----
```

```
##
## -----
##   Chi.squared   df   p.value
## -----
##      9.8608      1   0.0017
## -----
##
## -----
##   Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.67      1.22      2.29
## -----
```

1st trimester

```
df43 <- data %>%
  filter(classi_gesta_puerp == "1tri")

with(df43, ctable(CVD_by_year, icu, prop="r", useNA = "no", OR=TRUE, chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * icu
## Data Frame: df43
##
## -----
##           icu           no           yes           Total
## CVD_by_year
##      2020          12 (60.0%)      8 (40.0%)      20 (100.0%)
##      2021          17 (68.0%)      8 (32.0%)      25 (100.0%)
##      Total          29 (64.4%)     16 (35.6%)      45 (100.0%)
## -----
##
## -----
##   Chi.squared   df   p.value
## -----
##      0.0594      1   0.8074
## -----
##
## -----
##   Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      0.71      0.21      2.41
## -----
```

2nd trimester

```
df43 <- data %>%
  filter(classi_gesta_puerp == "2tri")
```



```
with(df43, ctable(CVD_by_year, icu, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * icu
## Data Frame: df43
##
##
## -----
##           icu           no           yes           Total
## CVD_by_year
##      2020         43 (60.6%)    28 (39.4%)    71 (100.0%)
##      2021         34 (51.5%)    32 (48.5%)    66 (100.0%)
##      Total         77 (56.2%)    60 (43.8%)   137 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      0.7998      1   0.3712
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.45      0.73      2.85
## -----
```

3rd trimester

```
df43 <- data %>%
  filter(classi_gesta_puerp == "3tri")
with(df43, ctable(CVD_by_year, icu, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * icu
## Data Frame: df43
##
##
## -----
##           icu           no           yes           Total
## CVD_by_year
##      2020        118 (73.3%)    43 (26.7%)   161 (100.0%)
##      2021         55 (51.4%)    52 (48.6%)   107 (100.0%)
##      Total        173 (64.6%)    95 (35.4%)   268 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
```

```
##      12.5211      1      4e-04
## -----
##
## -----
## Odds Ratio    Lo - 95%    Hi - 95%
## -----
##      2.59      1.55      4.34
## -----
```

Puerperium

```
df43 <- data %>%
  filter(classi_gesta_puerp == "puerp")

with(df43, ctable(CVD_by_year, icu, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * icu
## Data Frame: df43
##
## -----
##          icu          no          yes          Total
## CVD_by_year
##      2020          65 (57.0%)  49 (43.0%)  114 (100.0%)
##      2021          36 (51.4%)  34 (48.6%)   70 (100.0%)
##      Total          101 (54.9%)  83 (45.1%)  184 (100.0%)
## -----
##
## -----
## Chi.squared    df    p.value
## -----
##      0.3447      1    0.5571
## -----
##
## -----
## Odds Ratio    Lo - 95%    Hi - 95%
## -----
##      1.25      0.69      2.28
## -----
```

Days of hospitalization in ICU

O gráfico de dispersão apresenta a quantidade de dias de internação de cada paciente em UTI no ano de 2021 e sua associação com a presença ou não de cardiopata.

```
df <- data[data$UTI==1 & !is.na(data$UTI) & !is.na(data$icu_days),]

datasummary((CVD_by_year) ~ icu_days*(n+Mean_+SD+Median_+Min+Max+q25+q75+IQR),
  data = df, output = 'markdown')
```

CVD_by_year	n	Mean_	SD	Median_	Min	Max	q25	q75	IQR
2020	66.00	13.67	16.39	8.00	0.00	105.00	3.25	17.75	14.50
2021	85.00	14.95	13.10	12.00	0.00	62.00	5.00	20.00	15.00

```
wilcox.test(icu_days ~CVD_by_year, data = df)
```

```
##
## Wilcoxon rank sum test with continuity correction
##
## data: icu_days by CVD_by_year
## W = 2477, p-value = 0.2188
## alternative hypothesis: true location shift is not equal to 0
```

Ventilatory support

```
with(data, ctable(CVD_by_year, ven_support, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * ven_support
## Data Frame: data
##
##
## -----
##          ven_support      No  yes, invasive  yes, noninvasive      Total
## CVD_by_year
##      2020          172 (46.1%)      62 (16.6%)      139 (37.3%)      373 (100.0%)
##      2021           69 (24.7%)      84 (30.1%)      126 (45.2%)      279 (100.0%)
##      Total          241 (37.0%)      146 (22.4%)      265 (40.6%)      652 (100.0%)
## -----
##
## -----
## Chi.squared  df  p.value
## -----
##      35.1521    2      0
## -----
```

Orotracheal intubation

```
with(data, ctable(CVD_by_year, intubation, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * intubation
## Data Frame: data
##
##
## -----
##          intubation      no      yes      Total
```

```
## CVD_by_year
##      2020      311 (83.4%)    62 (16.6%)    373 (100.0%)
##      2021      195 (69.9%)    84 (30.1%)    279 (100.0%)
##      Total      506 (77.6%)   146 (22.4%)    652 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      15.936      1     1e-04
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      2.16      1.49      3.14
## -----
```

1st trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "1tri")

with(df4, ctable(CVD_by_year, intubation, prop="r", OR=TRUE, useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * intubation
## Data Frame: df4
##
## -----
##      intubation      no      yes      Total
## CVD_by_year
##      2020      15 (83.3%)    3 (16.7%)    18 (100.0%)
##      2021      17 (73.9%)    6 (26.1%)    23 (100.0%)
##      Total      32 (78.0%)    9 (22.0%)    41 (100.0%)
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.76      0.37      8.32
## -----
```

```
fisher.test(df4$intubation, df4$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: df4$intubation and df4$CVD_by_year
## p-value = 0.7061
```

```
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
##    0.3047912 12.6661457
## sample estimates:
## odds ratio
##    1.740908
```

2nd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "2tri")

with(df4, ctable(CVD_by_year, intubation, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * intubation
## Data Frame: df4
##
##
## -----
##          intubation          no          yes          Total
## CVD_by_year
##    2020             54 (79.4%)    14 (20.6%)    68 (100.0%)
##    2021             46 (70.8%)    19 (29.2%)    65 (100.0%)
##    Total            100 (75.2%)    33 (24.8%)   133 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##    0.9076      1   0.3407
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##    1.59       0.72      3.53
## -----
```

3rd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "3tri")

with(df4, ctable(CVD_by_year, intubation, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * intubation
## Data Frame: df4
```

```
##
##
## -----
##          intubation          no          yes          Total
## CVD_by_year
##      2020          144 (91.1%)   14 ( 8.9%)   158 (100.0%)
##      2021          78 (72.2%)   30 (27.8%)   108 (100.0%)
##      Total          222 (83.5%)   44 (16.5%)   266 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      15.2868    1    1e-04
## -----
##
## -----
## Odds Ratio    Lo - 95%    Hi - 95%
## -----
##      3.96      1.98      7.90
## -----
```

Puerperium

```
df4 <- data %>%
  filter(classi_gesta_puerp == "puerp")

with(df4, ctable(CVD_by_year, intubation, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * intubation
## Data Frame: df4
##
##
## -----
##          intubation          no          yes          Total
## CVD_by_year
##      2020          85 (75.2%)   28 (24.8%)   113 (100.0%)
##      2021          44 (64.7%)   24 (35.3%)    68 (100.0%)
##      Total          129 (71.3%)   52 (28.7%)   181 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      1.8078    1    0.1788
## -----
##
## -----
## Odds Ratio    Lo - 95%    Hi - 95%
## -----
##      1.66      0.86      3.19
```

```
## -----
```

```
df4 <- data %>%
  filter(intubation == "yes")

with(df4, ctable(CVD_by_year, evolution, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

Fixed cases of intubated women, we present the distribution of evolution.

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * evolution
## Data Frame: df4
##
## -----
##      evolution      recovery      death      Total
## CVD_by_year
##      2020           24 (38.7%)    38 (61.3%)    62 (100.0%)
##      2021           35 (41.7%)    49 (58.3%)    84 (100.0%)
##      Total          59 (40.4%)    87 (59.6%)   146 (100.0%)
## -----
##
## -----
##      Chi.squared    df    p.value
## -----
##      0.0358         1    0.8499
## -----
##
## -----
##      Odds Ratio    Lo - 95%    Hi - 95%
## -----
##      0.88          0.45        1.73
## -----
```

Outcome - recovery x death

```
with(data, ctable(CVD_by_year, evolution, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * evolution
## Data Frame: data
##
## -----
##      evolution      recovery      death      Total
## CVD_by_year
##      2020           343 (84.5%)    63 (15.5%)   406 (100.0%)
##      2021           221 (74.4%)    76 (25.6%)   297 (100.0%)
```

```
##           Total           564 (80.2%)   139 (19.8%)   703 (100.0%)
## -----
##
## -----
##  Chi.squared   df   p.value
## -----
##    10.3434     1   0.0013
## -----
##
## -----
##  Odds Ratio   Lo - 95%   Hi - 95%
## -----
##    1.87       1.29      2.72
## -----
```

1st trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "1tri")

with(df4, ctable(CVD_by_year, evolution, prop="r", OR=TRUE, useNA = "no", chisq = FALSE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * evolution
## Data Frame: df4
##
## -----
##           evolution   recovery   death   Total
##  CVD_by_year
##    2020           17 (85.0%)    3 (15.0%)  20 (100.0%)
##    2021           22 (81.5%)    5 (18.5%)  27 (100.0%)
##    Total           39 (83.0%)    8 (17.0%)  47 (100.0%)
## -----
##
## -----
##  Odds Ratio   Lo - 95%   Hi - 95%
## -----
##    1.29       0.27      6.16
## -----
```

```
fisher.test(df4$evolution, df4$CVD_by_year)
```

```
##
## Fisher's Exact Test for Count Data
##
## data: df4$evolution and df4$CVD_by_year
## p-value = 1
## alternative hypothesis: true odds ratio is not equal to 1
## 95 percent confidence interval:
##  0.2133741 9.4226736
```



```
## sample estimates:
## odds ratio
## 1.281057
```

2nd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "2tri")

with(df4, ctable(CVD_by_year, evolution, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * evolution
## Data Frame: df4
##
## -----
##          evolution      recovery      death      Total
## CVD_by_year
##      2020           59 (79.7%)   15 (20.3%)   74 (100.0%)
##      2021           53 (75.7%)   17 (24.3%)   70 (100.0%)
##      Total          112 (77.8%)   32 (22.2%)  144 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##      0.1435      1   0.7049
## -----
##
## -----
## Odds Ratio   Lo - 95%   Hi - 95%
## -----
##      1.26      0.57      2.77
## -----
```

3rd trimester

```
df4 <- data %>%
  filter(classi_gesta_puerp == "3tri")

with(df4, ctable(CVD_by_year, evolution, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * evolution
## Data Frame: df4
##
## -----
```

```
##           evolution      recovery      death      Total
## CVD_by_year
##   2020           155 (89.6%)   18 (10.4%)   173 (100.0%)
##   2021           87 (78.4%)   24 (21.6%)   111 (100.0%)
##   Total          242 (85.2%)   42 (14.8%)   284 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##    5.8903      1   0.0152
## -----
##
## -----
## Odds Ratio    Lo - 95%    Hi - 95%
## -----
##    2.38        1.22       4.62
## -----
```

Puerperium

```
df4 <- data %>%
  filter(classi_gesta_puerp == "puerp")

with(df4, ctable(CVD_by_year, evolution, prop="r", OR=TRUE, useNA = "no", chisq = TRUE))
```

```
## Cross-Tabulation, Row Proportions
## CVD_by_year * evolution
## Data Frame: df4
##
## -----
##           evolution      recovery      death      Total
## CVD_by_year
##   2020           98 (81.0%)   23 (19.0%)   121 (100.0%)
##   2021           49 (67.1%)   24 (32.9%)   73 (100.0%)
##   Total          147 (75.8%)   47 (24.2%)   194 (100.0%)
## -----
##
## -----
## Chi.squared   df   p.value
## -----
##    4.0448      1   0.0443
## -----
##
## -----
## Odds Ratio    Lo - 95%    Hi - 95%
## -----
##    2.09        1.07       4.07
## -----
```

Time elapsed between the start of symptoms and the outcome (days)

```
df <- data[!is.na(data$days_symp_evol) & !is.na(data$CVD_by_year),]  
  
datasummary((CVD_by_year) ~ days_symp_evol*(n+Mean_+SD+Median_+Min+Max+q25+q75+IQR),  
  data = df, output = 'markdown')
```

CVD_by_year	n	Mean_	SD	Median_	Min	Max	q25	q75	IQR
2020	397.00	16.52	12.98	14.00	0.00	113.00	9.00	19.00	10.00
2021	291.00	20.59	14.47	16.00	1.00	117.00	12.00	26.00	14.00

```
t.test(days_symp_evol ~CVD_by_year, data = df)
```

```
##  
## Welch Two Sample t-test  
##  
## data: days_symp_evol by CVD_by_year  
## t = -3.8099, df = 584.26, p-value = 0.0001537  
## alternative hypothesis: true difference in means between group 2020 and group 2021 is not equal to 0  
## 95 percent confidence interval:  
## -6.175218 -1.974167  
## sample estimates:  
## mean in group 2020 mean in group 2021  
## 16.51637 20.59107
```

Time elapsed between the start of symptoms and the outcome (days) considering only death cases

```
df <- data[!is.na(data$days_symp_evol) & !is.na(data$CVD_by_year),]  
df <- df %>%  
  filter(evolution == "death")  
  
datasummary((CVD_by_year) ~ days_symp_evol*(n+Mean_+SD+Median_+Min+Max+q25+q75+IQR),  
  data = df, output = 'markdown')
```

CVD_by_year	n	Mean_	SD	Median_	Min	Max	q25	q75	IQR
2020	63.00	19.56	16.03	17.00	0.00	113.00	11.00	24.50	13.50
2021	76.00	23.24	12.85	21.50	3.00	60.00	13.00	32.00	19.00

```
wilcox.test(days_symp_evol ~CVD_by_year, data = df)
```

```
##  
## Wilcoxon rank sum test with continuity correction  
##  
## data: days_symp_evol by CVD_by_year  
## W = 1897, p-value = 0.03553  
## alternative hypothesis: true location shift is not equal to 0
```

Considering only recovered cases

```
df <- data[!is.na(data$days_symp_evol) & !is.na(data$CVD_by_year),]  
df <- df %>%  
  filter(evolution == "recovery")  
  
datasummary((CVD_by_year) ~ days_symp_evol*(n+Mean_+SD+Median_+Min+Max+q25+q75+IQR),  
  data = df, output = 'markdown')
```

CVD_by_year	n	Mean_	SD	Median_	Min	Max	q25	q75	IQR
2020	334.00	15.94	12.27	13.00	0.00	85.00	8.00	18.00	10.00
2021	215.00	19.66	14.91	16.00	1.00	117.00	11.00	21.50	10.50

```
t.test(days_symp_evol ~CVD_by_year, data = df)
```

```
##  
## Welch Two Sample t-test  
##  
## data: days_symp_evol by CVD_by_year  
## t = -3.0465, df = 393.04, p-value = 0.002471  
## alternative hypothesis: true difference in means between group 2020 and group 2021 is not equal to 0  
## 95 percent confidence interval:  
## -6.108616 -1.316785  
## sample estimates:  
## mean in group 2020 mean in group 2021  
## 15.94311 19.65581
```