Personal Level screening for COPD and COPD Patient Management Survey

Personal Level screening for COPD

Data pre-prepossessing

```
#rm(list = ls())
```

```
library(readxl)
data0<- read_excel("Personal Level screening for COPD.xlsx",
    sheet = "Sheet6")
#View(data0)

library(tidyverse)
library(knitr)
library(gtsummary)

#glimpse(data0)
```

Demographic and other characteristics of participants

```
##| label: tbl-tfrequency
##| tbl-cap: Demographic and other characteristics of participants

#glimpse(data0)

data0[,c(3:10,12,14)] %>%
  tbl_summary(statistic = list(all_continuous() ~ "{mean} ({sd})"),
              label =list(`Do you have any member in your family have experienced the same co
```

Characteristic	N = 250
Age	
18-30	59 (24%)
31-45	40 (16%)
46-60	81 (32%)
60-70	39 (16%)
70+	31 (12%)
Gender	
Female	125 (50%)
Male	125 (50%)
Education	
5th class	1 (0.4%)
B.Pharm	2 (0.8%)
Diploma	35 (14%)
FCPS	1 (0.4%)
Graduate	15 (6.0%)
H.S.C	2 (0.8%)
High school	28 (11%)
Higher secondary	13 (5.2%)
M.Pharm	4 (1.6%)
Masters	36 (14%)
MBBS	7 (2.8%)
No formal education	16 (6.4%)
PhD	3 (1.2%)
Post Graduate	27 (11%)
Primary level	13 (5.2%)
Secondary level	15 (6.0%)
Undergraduate	32 (13%)
Profession	
Actor	2 (0.8%)
Auto rickshaw driver	1 (0.4%)
Beautician	1 (0.4%)
Business	27 (11%)
Carpenter	1 (0.4%)
Chemist	1 (0.4%)
Construction worker	1 (0.4%)
Doctor	5 (2.0%)
Domestic Worker	2 (0.8%)
Driver	1 (0.4%)
Engineer	3 (1.2%)

Characteristic	N = 250
Enteprenure	1 (0.4%)
Factory worker	1 (0.4%)
Farmer	14 (5.6%)
Fisherman	2 (0.8%)
Formar farmer	1 (0.4%)
Garment Worker	2 (0.8%)
Graduate Assistant	1 (0.4%)
Home maker	6 (2.4%)
Housemaid	2 (0.8%)
Housewife	10 (4.0%)
Intern Doctor	1 (0.4%)
Jobless	1 (0.4%)
Laborer	1 (0.4%)
Librarian	1 (0.4%)
Musician	1 (0.4%)
Nurse	1 (0.4%)
Office assistant	2 (0.8%)
Officer,Supply chain	1 (0.4%)
Other	10 (4.0%)
Peon	2 (0.8%)
Pharmacist	3 (1.2%)
Private service	26 (10%)
QA manager	1 (0.4%)
Retired	20 (8.0%)
Retired Army officer	1 (0.4%)
Retired banker	1 (0.4%)
Retired day laborer	1 (0.4%)
Retired factory worker	1 (0.4%)
Retired govt officer	3 (1.2%)
Retired Hawker	1 (0.4%)
Retired policeman	1 (0.4%)
Retired rickshaw puller	1 (0.4%)
Retired security guard	1 (0.4%)
Retired tecaher	3 (1.2%)
Rickshaw puller	2 (0.8%)
Salon Owner	1 (0.4%)
Shop owner	1 (0.4%)
Shopkeeper	6 (2.4%)
Small Business	1 (0.4%)
Software Engineer	1 (0.4%)
Street vendor	1 (0.4%)

Characteristic	N = 250
Student	33 (13%)
Tailor	5 (2.0%)
Teacher	29 (12%)
How many months in the last year have you had bronchitis or chronic coughing with sputum from the chest?	6.0 (3.3)
Unknown	2
For how many years you had bronchitis or chronic coughing with sputum from the chest?	15 (11)
Unknown	2
Have you feel short of breath over the past 12 months?	
Maybe	2 (0.8%)
No	95 (38%)
Yes	153 (61%)
Do you have any member in your family have experienced the same condition? (Yes)	142 (57%)
Do you have a previous history of smoking?	
No	118 (47%)
Yes	73 (29%)
Yes and on going	59 (24%)
Do you kNow about COPD and its affect in your quality of life?	
I can't go outside without mask due to severe dust allergy. It always triggers asthma.I am becoming unsocial.	1 (0.4%)
Know the pros n cons	1 (0.4%)
No	9 (3.6%)
Not aware	60 (24%)
Somewhat aware	64 (26%)
Yeah i know as my father in law passed away due to this disease	1 (0.4%)
Yes	32 (13%)
Yes, affects outdoor activities	4 (1.6%)
Yes, but limited knowledge	1 (0.4%)
Yes, but not well-informed.	2 (0.8%)
Yes, difficulty in breathing affects work	1 (0.4%)
Yes, due to this problem I do skip visit places those have dry weather	1 (0.4%)
Yes, Frequent hospital visit	1 (0.4%)
Yes, Frequent lung infection	1 (0.4%)
Yes, fully aware	53 (21%)
Yes, I am aware	7 (2.8%)
Yes, impacts life quality	1 (0.4%)
Yes, it worsen mobility	1 (0.4%)

Characteristic	N = 250
Yes, requires frequent care	1 (0.4%)
Yes, severe breathing issue	1 (0.4%)
Yes, severely affects movement, or limited movement	2 (0.8%)
Yes, Worsening breathing capacity	1 (0.4%)
Yes, worsening lung function	1 (0.4%)
Yes. It affects the sleep cycle	3 (1.2%)

Summary statistics of "Duration of having bronchitis or chronic coughing with sputum from the chest in the last year" and "Duration of having bronchitis or chronic coughing with sputum from the chest"

```
data0 %>%select(`How many months in the last year have you had bronchitis or chronic coughing
  group_by(Variable) %>%
  summarise(
    Min = min(Duration, na.rm = TRUE),
    Max = max(Duration, na.rm = TRUE),
    Mean = mean(Duration, na.rm = TRUE),
    SD = sd(Duration, na.rm = TRUE)
  )->s1

s1 %>% kable(digits = 2)
```

Table 2: Summary statistics of duarion of bronchitis or chronic coughing with sputum from the chest (in months)

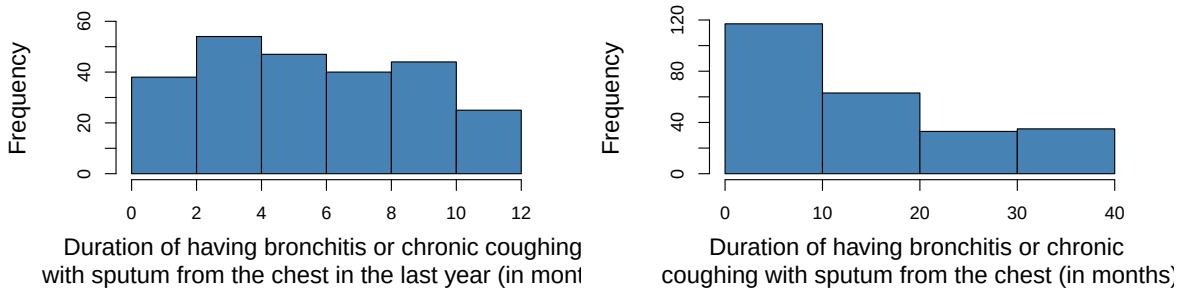
Variable	Min	Max	Mean	SD
For how many years you had bronchitis or chronic coughing with sputum from the chest?	0	40	14.76	10.96
How many months in the last year have you had bronchitis or chronic coughing with sputum from the chest?	0	12	5.99	3.34

```
par(mar = c(6, 6, 4, 2))  # Adjust as needed
par(mgp = c(4, 1, 0))  # First value controls axis title distance

par(cex.lab = 1.3)  # Set larger axis labels globally
par(cex.axis=1)
```

```r
hist(data0$`How many months in the last year have you had bronchitis or chronic coughing with
     xlab = "Duration of having bronchitis or chronic coughing \n with sputum from the chest
     main = "",col = "steelblue",ylim = c(0,59),)

hist(data0$`For how many years you had bronchitis or chronic coughing with sputum from the ch
     xlab = "Duration of having bronchitis or chronic \n coughing with sputum from the chest
```



(a) Variable 1

(b) Variable 2

Figure 1: Frequency histogram of duration of having bronchitis or chronic coughing

Do you have previous history of vaccination? if yes, write the name of vaccine

```r
##| label: tbl-tvaccine_stat
##| tbl-cap: Previous history of vaccination

#data0$`Do you have previous history of vaccination? if yes, write the name of vaccine.`


data0 %>%
  separate_rows(`Do you have previous history of vaccination? if yes, write the name of vacci
  count(`Do you have previous history of vaccination? if yes, write the name of vaccine.`, so


vaccine_stat %>% filter(`Do you have previous history of vaccination? if yes, write the name
  mutate(Percent=n*100/250) %>%
  kable(col.names = c("Do you have previous history of vaccination?","N","Percent (out of 250
```

Do you have previous history of vaccination?	N	Percent (out of 250)
No	65	26

```
vaccine_stat %>% filter(`Do you have previous history of vaccination? if yes, write the name
  mutate(Percent=n*100/250) %>%
  kable(col.names = c("If yes, write the name of vaccine","N","Percent (out of 250)"),digits
```

If yes, write the name of vaccine	N	Percent (out of 250)
Covid	70	28.0
Influenza	64	25.6
Pneumococcal	56	22.4
Titenus	2	0.8
DPT	2	0.8
HPV	2	0.8
Morderna	2	0.8
TT	2	0.8
DPT	1	0.4
All the vaccines available in bd	1	0.4
EPI	1	0.4
Flu vaccine	1	0.4
Hepatitis B	1	0.4
Pnemococcal	1	0.4
Titenus	1	0.4
Yes	1	0.4

```
vaccine_stat %>% filter(`Do you have previous history of vaccination? if yes, write the name
  ggplot(aes(x=reorder(`Do you have previous history of vaccination? if yes, write the name
  geom_col()+labs(x="Previous history of vaccination")+
  coord_flip()+
  theme_bw()+
  theme(axis.text = element_text(angle = 0,size = 12),
        axis.title = element_text(size=14))
```

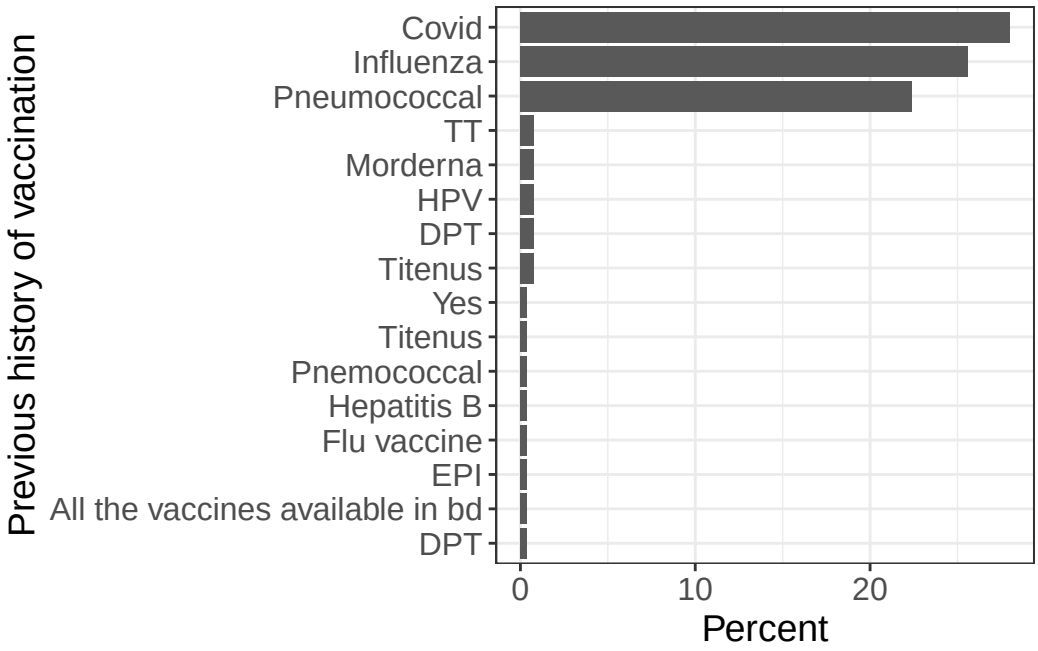


Figure 2: Distribution of vaccination history

Which medication you are taking for COPD?

```
data0<- read_excel("Personal Level screening for COPD.xlsx",
    sheet = "Sheet6")

#glimpse(data0)
#view(data0)

data0 %>%
  separate_rows(`Which medication you are taking for COPD?`,sep = ",") %>%
  count(`Which medication you are taking for COPD?`, name = "Frequency")%>%
  #print(n=55)
  mutate(Percentage = Frequency*100/250) %>%
  arrange(-Frequency) %>%
  kable(digits = 2,col.names = c("Medication taking for COPD?`","Frequency","Percentage (out
```

Medication taking for COPD?‘	Frequency	Percentage (out of 30)
Corticosteroids	81	32.4
Oxygen therapy	55	22.0
Bronchodilators	47	18.8
Leukotriene receptor antagonists	33	13.2
None	33	13.2
Phosphodiesterase Inhibitors	29	11.6
MethylXanthines	18	7.2
Beta-2 Agonist	13	5.2
Mucolytic drugs	13	5.2
Combination therapy	11	4.4
Antibiotics	8	3.2
Xanthines	8	3.2
Anti cholinergic	6	2.4
Long acting beta agonists	6	2.4
Long-acting selective -adrenoceptor stimulants	6	2.4
leukotriene receptor antagonists	4	1.6
short-acting beta-2 adrenergic agonist	4	1.6
Long acting Selective Beta-2 Adrenoceptor Stimulants	2	0.8
Theophylline	2	0.8
selective beta-2-adrenoreceptor agonists	2	0.8
Antihistamine	1	0.4
Beta-2 Agonist + Anticholinergic + Corticosteroid (Combination therapy)	1	0.4
Beta-2 adrenergic agonist	1	0.4
Bronchodilators + Long acting beta agonists	1	0.4
Bronchodilators and beta-2 agonist+corticosteroid	1	0.4
Long acting beta agonists + Anti cholinergic	1	0.4
adrenergic inhalants	1	0.4
antihistamines	1	0.4
fluoroquinolone antibiotic	1	0.4
glucocorticosteroid	1	0.4
long-acting muscarinic antagonis + long-acting 2-adrenergic agonist	1	0.4
long-acting 2-agonist + corticosteroid	1	0.4

Corticosteroids, Oxygen therapy ,Bronchodilators data preparation

```r
# Data preparation for multiple response:: "`Which medication you are taking for COPD?`"| Ty

# Function to one-hot encode a column
one_hot_encode <- function(data, column_name) {
  data %>%
    separate_rows(!!sym(column_name), sep = ",") %>%  # Split into multiple rows
    mutate(Value = 1) %>%
    pivot_wider(names_from = !!sym(column_name), values_from = Value, values_fill = 0)  # Co
}


############################
#data0$`Which medication you are taking for COPD?`
library(janitor)
clean_names(data0)->data1

#data1$which_medication_you_are_taking_for_copd
#data1$do_you_have_a_previous_history_of_smoking

# One-hot encode Symptoms
df_medication <- one_hot_encode(data1,"which_medication_you_are_taking_for_copd")

df_encoded <- data1 %>% select(id, age,gender,do_you_have_a_previous_history_of_smoking) %>%
  left_join(df_medication %>% select(-age,-gender,-do_you_have_a_previous_history_of_smoking

#df_encoded %>% view()


#df_encoded$`Oxygen therapy`

df_encoded %>% select(age,gender,do_you_have_a_previous_history_of_smoking,Corticosteroids,`
```

A) Is there any association between medication (Corticosteroids) and smoking?

```r
# Function to extract chi-square test statistic
chisq_test_stat <- function(data, variable, by, ...) {
  chisq.test(table(data[[variable]], data[[by]])) %>%
  broom::tidy() %>%
    select(statistic, p.value)
}
```

```
association_data %>% select(Corticosteroids,do_you_have_a_previous_history_of_smoking) %>%
 # mutate_if(is.numeric,as.factor) %>%
  tbl_summary(by=do_you_have_a_previous_history_of_smoking,
              label=list(do_you_have_a_previous_history_of_smoking~"Smoking status",
                         Corticosteroids~"Corticosteroids (Yes)"))%>%
  add_stat(fns = everything() ~ chisq_test_stat) %>%
  modify_header(statistic = "**Chi-square**", p.value = "**p-value**") %>%
  add_p(pvalue_fun = ~ style_pvalue(.x, digits = 3)) %>%
  modify_spanning_header(starts_with("stat_") ~ "**Smoking status**")  # Column variable name
```

Table 6: Association between smoking status and prevelance of Corticosteroids

Characteristic	**No**, N = 118	**Yes**, N = 73	**Yes and on going**, N = 59	**Chi-square**	**p-value**
Corticosteroids (Yes)	33 (28%)	30 (41%)	18 (31%)	3.68	0.159

The prevalence of *Corticosteroids* was the most in group of participants/ patients who previously smoke (41%), followed by the participants who still smoking (31%) and who did not smoke (28%). But the proportions of prevalence of *Corticosteroids* are not significantly different among the groups, $\chi^2 = 3.68$, p-value=0.159 (Table 6).

B) Is there any association between medication (Oxygen therapy) and smoking?

```
association_data %>% select(`Oxygen therapy`,do_you_have_a_previous_history_of_smoking) %>%
  tbl_summary(by=do_you_have_a_previous_history_of_smoking,
              label=list(do_you_have_a_previous_history_of_smoking~"Smoking status",
                         `Oxygen therapy`~"Oxygen therapy (Yes)"))%>%
  add_stat(fns = everything() ~ chisq_test_stat) %>%
  modify_header(statistic = "**Chi-square**", p.value = "**p-value**") %>%
  add_p(pvalue_fun = ~ style_pvalue(.x, digits = 3)) %>%
  modify_spanning_header(starts_with("stat_") ~ "**Smoking status**")  # Column variable name
```

Characteristic	No, N = 118	Yes, N = 73	Yes and on going, N = 59	Chi-square	p-value
Oxygen therapy (Yes)	27 (23%)	14 (19%)	14 (24%)	0.495	0.781

Please describe same as Table 6.

C) Is there any association between medication (Bronchodilators) and smoking?

```
association_data %>%
  select(Bronchodilators,do_you_have_a_previous_history_of_smoking) %>%
  tbl_summary(by=do_you_have_a_previous_history_of_smoking,
              label=list(do_you_have_a_previous_history_of_smoking~"Smoking status",
                         Bronchodilators~"Bronchodilators (Yes)"))%>%
  add_stat(fns = everything() ~ chisq_test_stat) %>%
  modify_header(statistic = "**Chi-square**", p.value = "**p-value**") %>%
  add_p(pvalue_fun = ~ style_pvalue(.x, digits = 3)) %>%
  modify_spanning_header(starts_with("stat_") ~ "**Smoking status**")  # Column variable name
```

Characteristic	No, N = 118	Yes, N = 73	Yes and on going, N = 59	Chi-square	p-value
Bronchodilators (Yes)	19 (16%)	16 (22%)	12 (20%)	1.12	0.571

```
glm(Corticosteroids~age+gender+do_you_have_a_previous_history_of_smoking,
    family="binomial", data=association_data)->glm1
#tbl_regression(glm1, exponentiate = TRUE)


glm(`Oxygen therapy`~age+gender+do_you_have_a_previous_history_of_smoking,
    family="binomial", data=association_data)->glm2
#tbl_regression(glm2,exponentiate = TRUE)
```

COPD Patient Management Survey (n=30)

```
#rm(list = ls())
```

Specialization

Specialization of physicians.

```
library(readxl)

Survey <- read_excel("COPD Patient Management Survey.xlsx",
    sheet = "Doctor")

#glimpse(Survey)

Survey %>%
  separate_rows(Specialization,sep = ",") %>%
  count(Specialization, name = "Frequency") %>% # Count occurrences
  mutate(Percentage = Frequency*100/30) %>%arrange(-Frequency) %>%
  kable(digits = 2,col.names = c("Specialization","Frequency","Percentage (out of 30)"))
```

Specialization	Frequency	Percentage (out of 30)
MBBS	8	26.67
Pulmonologist	4	13.33
Chest Specialist	3	10.00
Respiratory Specialist	3	10.00
NA	3	10.00
FCPS	2	6.67
General practitioner	2	6.67
MD	2	6.67
DTCD	1	3.33
MD	1	3.33
MRCP	1	3.33
Pulmonologist	1	3.33
Thoracic Surgeon	1	3.33
Doctor	1	3.33
FRCS	1	3.33
General Practitioner	1	3.33
MACP(USA)	1	3.33
MS	1	3.33
Medicine	1	3.33

Specialization	Frequency	Percentage (out of 30)
Medicine specialist	1	3.33
None	1	3.33
Pulmonary medicine	1	3.33

The most common age group of COPD patient, Age group comes for recurrent treatment

```
Survey[,5:6] %>% tbl_summary()
```

Characteristic	**N = 30**
What is the most common age group of COPD patient you treat?	
30-40	2 (6.7%)
40-50	8 (27%)
50-60	14 (47%)
60-70	4 (13%)
70+	2 (6.7%)
Which age group comes for recurrent treatment?	
30-40	1 (3.3%)
40-50	7 (23%)
50-60	13 (43%)
60-70	7 (23%)
70+	2 (6.7%)

What are the most common symptoms presented by COPD patients?

```
Survey %>%
  separate_rows(`What are the most common symptoms presented by COPD patients?`,sep = ";") %
  count(`What are the most common symptoms presented by COPD patients?`, name = "Frequency")
  mutate(Percentage = Frequency*100/30) %>%arrange(-Frequency) %>%
  kable(digits = 2,col.names = c("Most common symptoms presented by COPD patients","Frequency
```

Most common symptoms presented by COPD patients	Frequency	Percentage (out of 30)
Shortness of Breath	21	70.00

Most common symptoms presented by COPD patients	Frequency	Percentage (out of 30)
Chronic cough	19	63.33
Chest tightness	10	33.33
Excess mucus production	7	23.33
Wheezing	6	20.00
others	5	16.67

Write symptom if the previous answer is "others"

```
Survey %>%
  separate_rows(`write symptom if the previous answer is "others"`,sep = ",") %>%
  count(`write symptom if the previous answer is "others"`, name = "Frequency") %>% # Count
  mutate(Percentage = Frequency*100/30) %>%arrange(-Frequency) %>%
  kable(digits = 2,col.names = c("Symptom if the previous answer is others","Frequency","Per
```

Symptom if the previous answer is others	Frequency	Percentage (out of 30)
NA	22	73.33
Fatigue	2	6.67
difficulty breathing	1	3.33
emphysema	1	3.33
exertional dyspnea	1	3.33
frequent respiratory infections	1	3.33
respiratory infections	1	3.33
Asthma exacerbation	1	3.33
Chronic bronchitis	1	3.33
Chronic mucus production	1	3.33
Difficulty in movement	1	3.33
Dyspnea	1	3.33
Persistent cough	1	3.33
Productive cough	1	3.33

Which diagnostic tests do you commonly use for diagnosis and monitoring COPD?

```
#glimpse(Survey)
```

```r
Survey %>%
  separate_rows(`Which diagnostic tests do you commonly use for diagnosis and monitoring COPD`
  count(`Which diagnostic tests do you commonly use for diagnosis and monitoring COPD?`, name
  mutate(Percentage = Frequency*100/30) %>%arrange(-Frequency) %>%
  kable(digits = 2,col.names = c("Diagnostic tests do you commonly use for diagnosis and moni
```

Diagnostic tests do you commonly use for diagnosis and monitoring COPD	Frequency	Percentage (out of 30)
Spirometry	18	60.00
Pulmonary function test	13	43.33
Peak airflow	7	23.33
Others	6	20.00
Arterial blood gas analysis	2	6.67
Bronchodilator	1	3.33

write diagnostic test if the previous answer is "others"

```r
#glimpse(Survey)

Survey %>%
  separate_rows(`write diagnostic test if the previous answer is "others"`,sep = ",") %>%
  count(`write diagnostic test if the previous answer is "others"`, name = "Frequency") %>% #
  mutate(Percentage = Frequency*100/30) %>%arrange(-Frequency) %>%
  kable(digits = 2,col.names = c("Diagnostic test if the previous answer is others","Frequenc
```

Diagnostic test if the previous answer is others	Frequency	Percentage (out of 30)
NA	14	46.67
Chest X-ray	9	30.00
CT scan	2	6.67
Chest CT	2	6.67
Bronchoscopy	1	3.33
Chest CT	1	3.33
Lung volume measurement	1	3.33
Periodic lung function tests	1	3.33
Sputum culture	1	3.33
blood oxygen levels	1	3.33
blood test	1	3.33

Diagnostic test if the previous answer is others	Frequency	Percentage (out of 30)
ABG test	1	3.33
Bronchoscopy	1	3.33
CT scan	1	3.33
Diffusion capacity tests	1	3.33
High-resolution CT scan	1	3.33

Which medication do you typically prescribe for COPD patients?

```
#glimpse(Survey)

Survey %>%
  separate_rows(`Which medication do you typically prescribe for COPD patients?`,sep = ";") %
  count(`Which medication do you typically prescribe for COPD patients?`, name = "Frequency")
  mutate(Percentage = Frequency*100/30) %>%arrange(-Frequency) %>%
  kable(digits = 2,col.names = c("Medication do you typically prescribe for COPD patients?","
```

Medication do you typically prescribe for COPD patients?	Frequency	Percentage (out of 30)
Combination inhalers (Bronchodilators+ steroids)	17	56.67
Bronchodialators	12	40.00
Inhaled corticosteroids	11	36.67
Antibiotics	8	26.67
Phosphodiesterase-4 inhibitors (PDE-4 inhibitors)	5	16.67
Methylxanthines	4	13.33
Anticholinergics	2	6.67
Mucolytics	2	6.67
Other	1	3.33
Respiratory Stimulants	1	3.33

If previous answer is other, Kindly specify-

Two answers-Long acting and Long-acting beta-agonists.

What is the average cost of a month's worth of COPD medication for a patient (estimate in local currency)?

```
Survey %>% select(`What is the average cost of a month's worth of COPD medication for a patie
  tbl_summary()
```

Characteristic	N = 30
What is the average cost of a month's worth of COPD medication for a patient (estimate in local currency)?	
10-12 thousand tk	1 (3.3%)
10,000tk	1 (3.3%)
10000 tk	1 (3.3%)
1500-5000 tk	1 (3.3%)
15000-20000 tk	1 (3.3%)
15000 tk	1 (3.3%)
2000-6000 tk	1 (3.3%)
2000 tk	5 (17%)
3-5K tk	1 (3.3%)
3000-4000 tk	1 (3.3%)
3000-4500 tk	1 (3.3%)
4 Thousands	1 (3.3%)
5000 tk	1 (3.3%)
5000+ tk	1 (3.3%)
8-10,000 tk	1 (3.3%)
About 10000 tk	1 (3.3%)
About 5-6k tk	1 (3.3%)
Around 1000-1200 tk	1 (3.3%)
Consultation and treatment costs vary	1 (3.3%)
Consultation fees vary; medication costs depend on prescription	1 (3.3%)
Depends on treatment plan	1 (3.3%)
Sorry	1 (3.3%)
variable	3 (10%)
Varies based on procedures and medications	1 (3.3%)

Do you observe any differences in medication response between smokers and non-smokers? If yes please describe-

```
Survey %>% select(`Do you observe any differences in medication response between smokers and
  tbl_summary()
```

Characteristic	N = 30
Do you observe any differences in medication response between smokers and non-smokers?	29 (97%)
If Yes, Please describe-	
Medications works better in non-smokers and early recovery than smokers	1 (10%)
Non-smokers has early response after drug administration.	1 (10%)
Non smokers response rapidly after medication	1 (10%)
Nonsmokers improves more	1 (10%)
Significant improvement in non smokers	1 (10%)
Smokers has frequent sputum production than non smokers	1 (10%)
Smokers response slowly and recurrence rate is more	1 (10%)
Smokers takes long time for recovery	1 (10%)
Symptoms are prominent in smokers	1 (10%)
Treatment required less for non smokers	1 (10%)
Unknown	20

How often do you recommend follow up tests for COPD patient (e.g. spirometry)?+

How frequently do COPD patients require hospitalization due to exacerbations? +

What lifestyle changes do you most commonly recommend to COPD patients? +

Please specify if previous answer is "Others" +

Are there any new treatments or medication for COPD that you find promising?

```
Survey %>% select(`How often do you recommend follow up tests for COPD patient (e.g. spirome
  tbl_summary()
```

Characteristic	N = 30
How often do you recommend follow up tests for COPD patient (e.g. spirometry)?	
Annually	10 (33%)
As needed depending on symptom	14 (47%)

Characteristic	N = 30
Every 3 months	3 (10%)
Every 6 months	3 (10%)
How frequently do COPD patients require hospitalization due to exacerbations?	
Frequently (3+ times in a year)	1 (3.3%)
Occasionally (1-2 times a year)	12 (40%)
Rarely	17 (57%)
What lifestyle changes do you most commonly recommend to COPD patients?	
Diet and Exercise	2 (6.7%)
Plumonary rehabilitation	2 (6.7%)
Smoking cessation	26 (87%)
Please specify if previous answer is “Others”	
Avoid allergen, monitor air quality	1 (8.3%)
Avoidance of pollutants	1 (8.3%)
Avoiding allergens, lifestyle modifications, vaccinations	1 (8.3%)
Diet and regularity in medication	1 (8.3%)
Diet, manage stress level	1 (8.3%)
Exercise for lung	1 (8.3%)
Exercise, avoid pollution, stay hydrated	1 (8.3%)
Maintain optimal body weight, avoid pollution	1 (8.3%)
Nutritional support	1 (8.3%)
Oxygen therapy	1 (8.3%)
pulmonary rehabilitation	1 (8.3%)
Vaccinations (e.g., influenza, pneumococcal)	1 (8.3%)
Unknown	18
Are there any new treatments or medication for COPD that you find promising?	
Alpha 1 antitrypsin replacement therapy	1 (7.1%)
Benralizumab	1 (7.1%)
Biologics for severe asthma	1 (7.1%)
Community-based support groups	1 (7.1%)
Dual bronchodilator inhalers	1 (7.1%)
Implementation of remote pulmonary rehabilitation programs	1 (7.1%)
Inhaled combination therapies (ICS+LABA)	1 (7.1%)
Inhaled corticosteroid and long acting beta agoinst	1 (7.1%)
N/A	1 (7.1%)
Oxygen inhalation	1 (7.1%)
p38 MAPK inhibitor	1 (7.1%)
Patient education program	1 (7.1%)
Patient education programs	1 (7.1%)
Telemedicine consultations	1 (7.1%)

Characteristic	**N = 30**
Unknown	16