Investigate_a_Dataset

December 14, 2021

1 Project: Investigate a Dataset - [Medical Appointment No Shows]

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Introduction

1.1.1 Dataset Description

- This dataset collects information from 100k medical appointments in Brazil and is focused on the question of whether or not patients show up for their appointment.
- A number of characteristics about the patient are included in each row:
  - Gender: (str) F for female and M for male.
  - ScheduledDay : (str) tells us on what day the patient set up their appointment.
  - AppointmentDay : (str) the date on which the patient has to show up.
  - Age : (int64) the patient age in appointment set up day.
  - Neighbourhood: (str) indicates the location of the hospital.
  - Scholarship : (int64) [0 or 1] ndicates whether or not the patient is enrolled in Brasilian welfare program Bolsa Família.
  - Hipertension: (int64) [0,1]
  - Diabetes : (int64) [0,1]
  - Alcoholism : (int64) [0,1]
  - Handcap : (int64) [0,1,2,3,4] Handcap degree
  - SMS_received : (int64) [0,1]
  - No-show : (str) No for showing up and yes for not showing up

1.1.2 1- Question(s) for Analysis

Q1 - which gender shows up for thier appointment?

Q2 - Is any disease affect showing up for thier appointment?

Q3 - Is Alcoholism, Handcap degree and Scholarship affect showing up for thier appointment?

Q4 - Is reciving SMS- message affect showing up for thier appointment?

Q5 - Is appointment month/day/hour affect showing up for thier appointment?

Q6 - what age range was most showing up for thier appointment?

Q7 - Is the waiting days affect the patient's show?

2 Import Liberaries

```
In [1]: import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt
        import seaborn as sns
        %matplotlib inline

        sns.set()
```

3 Functions

```
In [2]: def clean_columns_name(df):
            df.rename(columns=lambda x:x.strip().lower().replace('-','_'),inplace=True)
```

1- Data Wrangling

3.0.1 a) Data Gathering

- Data Downloaded from Kaggle wibsite Medical Appointment No Shows

```
In [3]: df = pd.read_csv('Database_No_show_appointments/noshowappointments-kagglev2-may-2016.csv
        df.head()
```

```
Out[3]:       PatientId  AppointmentID Gender          ScheduledDay  \
        0  2.987250e+13        5642903      F  2016-04-29T18:38:08Z
        1  5.589978e+14        5642503      M  2016-04-29T16:08:27Z
        2  4.262962e+12        5642549      F  2016-04-29T16:19:04Z
        3  8.679512e+11        5642828      F  2016-04-29T17:29:31Z
        4  8.841186e+12        5642494      F  2016-04-29T16:07:23Z

                AppointmentDay  Age      Neighbourhood  Scholarship  Hipertension  \
        0  2016-04-29T00:00:00Z   62    JARDIM DA PENHA            0             1
```

```
1  2016-04-29T00:00:00Z   56    JARDIM DA PENHA            0             0
2  2016-04-29T00:00:00Z   62      MATA DA PRAIA            0             0
3  2016-04-29T00:00:00Z    8  PONTAL DE CAMBURI            0             0
4  2016-04-29T00:00:00Z   56    JARDIM DA PENHA            0             1

   Diabetes  Alcoholism  Handcap  SMS_received No-show
0         0           0        0             0      No
1         0           0        0             0      No
2         0           0        0             0      No
3         0           0        0             0      No
4         1           0        0             0      No
```

3.0.2 b) Assess data

```
In [4]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 110527 entries, 0 to 110526
Data columns (total 14 columns):
PatientId         110527 non-null float64
AppointmentID     110527 non-null int64
Gender            110527 non-null object
ScheduledDay      110527 non-null object
AppointmentDay    110527 non-null object
Age               110527 non-null int64
Neighbourhood     110527 non-null object
Scholarship       110527 non-null int64
Hipertension      110527 non-null int64
Diabetes          110527 non-null int64
Alcoholism        110527 non-null int64
Handcap           110527 non-null int64
SMS_received      110527 non-null int64
No-show           110527 non-null object
dtypes: float64(1), int64(8), object(5)
memory usage: 11.8+ MB
```

- ScheduledDay and AppointmentDay represented as string ,we must change types to date-time

```
In [5]: df.describe()
```

```
Out[5]:           PatientId  AppointmentID            Age    Scholarship  \
       count  1.105270e+05   1.105270e+05  110527.000000  110527.000000
       mean   1.474963e+14   5.675305e+06      37.088874       0.098266
       std    2.560949e+14   7.129575e+04      23.110205       0.297675
       min    3.921784e+04   5.030230e+06      -1.000000       0.000000
       25%    4.172614e+12   5.640286e+06      18.000000       0.000000
       50%    3.173184e+13   5.680573e+06      37.000000       0.000000
```

```
75%    9.439172e+13   5.725524e+06      55.000000       0.000000
max    9.999816e+14   5.790484e+06     115.000000       1.000000

        Hipertension       Diabetes     Alcoholism        Handcap  \
count  110527.000000  110527.000000  110527.000000  110527.000000
mean        0.197246       0.071865       0.030400       0.022248
std         0.397921       0.258265       0.171686       0.161543
min         0.000000       0.000000       0.000000       0.000000
25%         0.000000       0.000000       0.000000       0.000000
50%         0.000000       0.000000       0.000000       0.000000
75%         0.000000       0.000000       0.000000       0.000000
max         1.000000       1.000000       1.000000       4.000000

        SMS_received
count  110527.000000
mean        0.321026
std         0.466873
min         0.000000
25%         0.000000
50%         0.000000
75%         1.000000
max         1.000000
```

- as we can see min age value is -1 , so we will check age values under 0

```
In [6]: age_under_zero=df.query('Age < 0')
        age_under_zero
```

```
Out[6]:           PatientId  AppointmentID Gender          ScheduledDay  \
        99832  4.659432e+14        5775010      F  2016-06-06T08:58:13Z

                    AppointmentDay  Age Neighbourhood  Scholarship  Hipertension  \
        99832  2016-06-06T00:00:00Z   -1          ROMÃO            0             0

               Diabetes  Alcoholism  Handcap  SMS_received No-show
        99832         0           0        0             0      No
```

- check numerical columns for value counts:

```
In [7]: df['Scholarship'].value_counts()
```

```
Out[7]: 0    99666
        1    10861
        Name: Scholarship, dtype: int64
```

```
In [8]: df['Hipertension'].value_counts()
```

```
Out[8]: 0    88726
        1    21801
        Name: Hipertension, dtype: int64
```

```
In [9]: df['Diabetes'].value_counts()

Out[9]: 0    102584
        1      7943
        Name: Diabetes, dtype: int64

In [10]: df['Alcoholism'].value_counts()

Out[10]: 0    107167
         1      3360
         Name: Alcoholism, dtype: int64

In [11]: df['Handcap'].value_counts()

Out[11]: 0    108286
         1      2042
         2       183
         3        13
         4         3
         Name: Handcap, dtype: int64

In [12]: df['SMS_received'].value_counts()

Out[12]: 0    75045
         1    35482
         Name: SMS_received, dtype: int64
```

- check for duplicated data and nan values

```
In [13]: df.duplicated().sum()

Out[13]: 0

In [14]: df.isna().any(axis=1).sum()

Out[14]: 0
```

- check males and females count

```
In [15]: df['Gender'].value_counts()

Out[15]: F    71840
         M    38687
         Name: Gender, dtype: int64
```

- this data set is unbalanced because number of females greater thane males
- assess conclusion:
  - Drop rows with age value under 0
  - Change datatype of ScheduledDay and AppointmentDay to datetime
  - Drop unuseful columns for analysis (PatientId and AppointmentID columns).
  - Check and Delete the rows which appointment day is berfor Scheduled Day
  - Rename columns to start with lower case and describtive names
  - change column no-show to show and map values to 0 for not showing up and 1 for showing up

3.0.3 Data Cleaning

- Change datatype of ScheduledDay and AppointmentDay to datetime

```
In [16]: df['ScheduledDay']=pd.to_datetime(df['ScheduledDay'])
         df['ScheduledDay'].dtype

Out[16]: dtype('<M8[ns]')

In [17]: df['AppointmentDay']=pd.to_datetime(df['AppointmentDay'])
         df['AppointmentDay'].dtype

Out[17]: dtype('<M8[ns]')
```

- Drop rows with age value under 0

```
In [18]: df.drop(index=age_under_zero.index, axis=0, inplace=True)
         df.query('Age < 0')

Out[18]: Empty DataFrame
         Columns: [PatientId, AppointmentID, Gender, ScheduledDay, AppointmentDay, Age, Neighbou
         Index: []
```

- Drop unuseful columns for analysis (PatientId and AppointmentID columns).

```
In [19]: df.drop(['PatientId','AppointmentID'],axis=1,inplace=True)
         df.head()

Out[19]:   Gender        ScheduledDay AppointmentDay  Age      Neighbourhood  \
         0      F 2016-04-29 18:38:08     2016-04-29   62    JARDIM DA PENHA
         1      M 2016-04-29 16:08:27     2016-04-29   56    JARDIM DA PENHA
         2      F 2016-04-29 16:19:04     2016-04-29   62      MATA DA PRAIA
         3      F 2016-04-29 17:29:31     2016-04-29    8  PONTAL DE CAMBURI
         4      F 2016-04-29 16:07:23     2016-04-29   56    JARDIM DA PENHA

            Scholarship  Hipertension  Diabetes  Alcoholism  Handcap  SMS_received  \
         0            0             1         0           0        0             0
         1            0             0         0           0        0             0
         2            0             0         0           0        0             0
         3            0             0         0           0        0             0
         4            0             1         1           0        0             0

           No-show
         0      No
         1      No
         2      No
         3      No
         4      No
```

- check if Appointment day after Scheduled Day

```
In [20]: df.query('AppointmentDay.dt.date < ScheduledDay.dt.date')
```

Out[20]:

	Gender	ScheduledDay	AppointmentDay	Age	Neighbourhood	Scholarship	Hipertension	Diabetes	Alcoholism	Handcap	SMS_received	No-show
27033	M	2016-05-10 10:51:53	2016-05-09	38	RESISTÊNCIA	0	0	0	0	1	0	Yes
55226	F	2016-05-18 14:50:41	2016-05-17	19	SANTO ANTÔNIO	0	0	0	0	1	0	Yes
64175	F	2016-05-05 13:43:58	2016-05-04	22	CONSOLAÇÃO	0	0	0	0	0	0	Yes
71533	F	2016-05-11 13:49:20	2016-05-05	81	SANTO ANTÔNIO	0	0	0	0	0	0	Yes
72362	M	2016-05-04 06:50:57	2016-05-03	7	TABUAZEIRO	0	0	0	0	0	0	Yes

- delete the rows which appointment day is berfor Scheduled Day , and chech if it is deleted

```
In [21]: wrong_dates = df.query('AppointmentDay.dt.date < ScheduledDay.dt.date')
         wrong_dates
```

Out[21]:

	Gender	ScheduledDay	AppointmentDay	Age	Neighbourhood	Scholarship	Hipertension	Diabetes	Alcoholism	Handcap	SMS_received	No-show
27033	M	2016-05-10 10:51:53	2016-05-09	38	RESISTÊNCIA	0	0	0	0	1	0	Yes
55226	F	2016-05-18 14:50:41	2016-05-17	19	SANTO ANTÔNIO	0	0	0	0	1	0	Yes
64175	F	2016-05-05 13:43:58	2016-05-04	22	CONSOLAÇÃO	0	0	0	0	0	0	Yes
71533	F	2016-05-11 13:49:20	2016-05-05	81	SANTO ANTÔNIO	0	0	0	0	0	0	Yes
72362	M	2016-05-04 06:50:57	2016-05-03	7	TABUAZEIRO	0	0	0	0	0	0	Yes

```
In [22]: df.drop(wrong_dates.index , axis=0 , inplace=True)
         df.query('AppointmentDay.dt.date < ScheduledDay.dt.date')
```

```
Out[22]: Empty DataFrame
         Columns: [Gender, ScheduledDay, AppointmentDay, Age, Neighbourhood, Scholarship, Hipert
         Index: []
```

- rename columns to start with lower case and describtive names

```
In [23]: clean_columns_name(df)
         df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 110521 entries, 0 to 110526
Data columns (total 12 columns):
gender            110521 non-null object
scheduledday      110521 non-null datetime64[ns]
appointmentday    110521 non-null datetime64[ns]
age               110521 non-null int64
neighbourhood     110521 non-null object
scholarship       110521 non-null int64
hipertension      110521 non-null int64
diabetes          110521 non-null int64
alcoholism        110521 non-null int64
handcap           110521 non-null int64
sms_received      110521 non-null int64
no_show           110521 non-null object
dtypes: datetime64[ns](2), int64(7), object(3)
memory usage: 11.0+ MB
```

```
In [24]: df.rename(columns={"scheduledday":"scheduled_day","appointmentday":"appointment_day","n
         df.head()
```

```
Out[24]:   gender       scheduled_day appointment_day  age      neighbourhood  \
         0      F 2016-04-29 18:38:08      2016-04-29   62    JARDIM DA PENHA
         1      M 2016-04-29 16:08:27      2016-04-29   56    JARDIM DA PENHA
         2      F 2016-04-29 16:19:04      2016-04-29   62      MATA DA PRAIA
         3      F 2016-04-29 17:29:31      2016-04-29    8  PONTAL DE CAMBURI
         4      F 2016-04-29 16:07:23      2016-04-29   56    JARDIM DA PENHA

            scholarship  hipertension  diabetes  alcoholism  handcap  sms_received show
         0            0             1         0           0        0             0   No
         1            0             0         0           0        0             0   No
         2            0             0         0           0        0             0   No
         3            0             0         0           0        0             0   No
         4            0             1         1           0        0             0   No
```

- change column no-show to show and map values to 0 for not showing up and 1 for showing up

```
In [25]: df['show'].value_counts()

Out[25]: No     88207
         Yes    22314
         Name: show, dtype: int64

In [26]: df['show']=df['show'].map({"No":1,"Yes":0})
         df['show'].value_counts()

Out[26]: 1    88207
         0    22314
         Name: show, dtype: int64
```

- change show column datatype to int64

```
In [27]: df['show'].astype('int')

Out[27]: 0         1
         1         1
         2         1
         3         1
         4         1
         5         1
         6         0
         7         0
         8         1
         9         1
         10        1
         11        0
         12        1
         13        1
         14        1
         15        1
         16        1
         17        0
         18        1
         19        1
         20        0
         21        0
         22        0
         23        1
         24        1
         25        1
         26        1
         27        1
         28        1
         29        1
                  ..
         110497    1
```

```
110498    1
110499    1
110500    1
110501    1
110502    1
110503    1
110504    1
110505    1
110506    1
110507    1
110508    1
110509    1
110510    1
110511    1
110512    1
110513    1
110514    1
110515    0
110516    0
110517    1
110518    1
110519    1
110520    1
110521    1
110522    1
110523    1
110524    1
110525    1
110526    1
Name: show, Length: 110521, dtype: int64
```

```
In [28]: df.info()
```

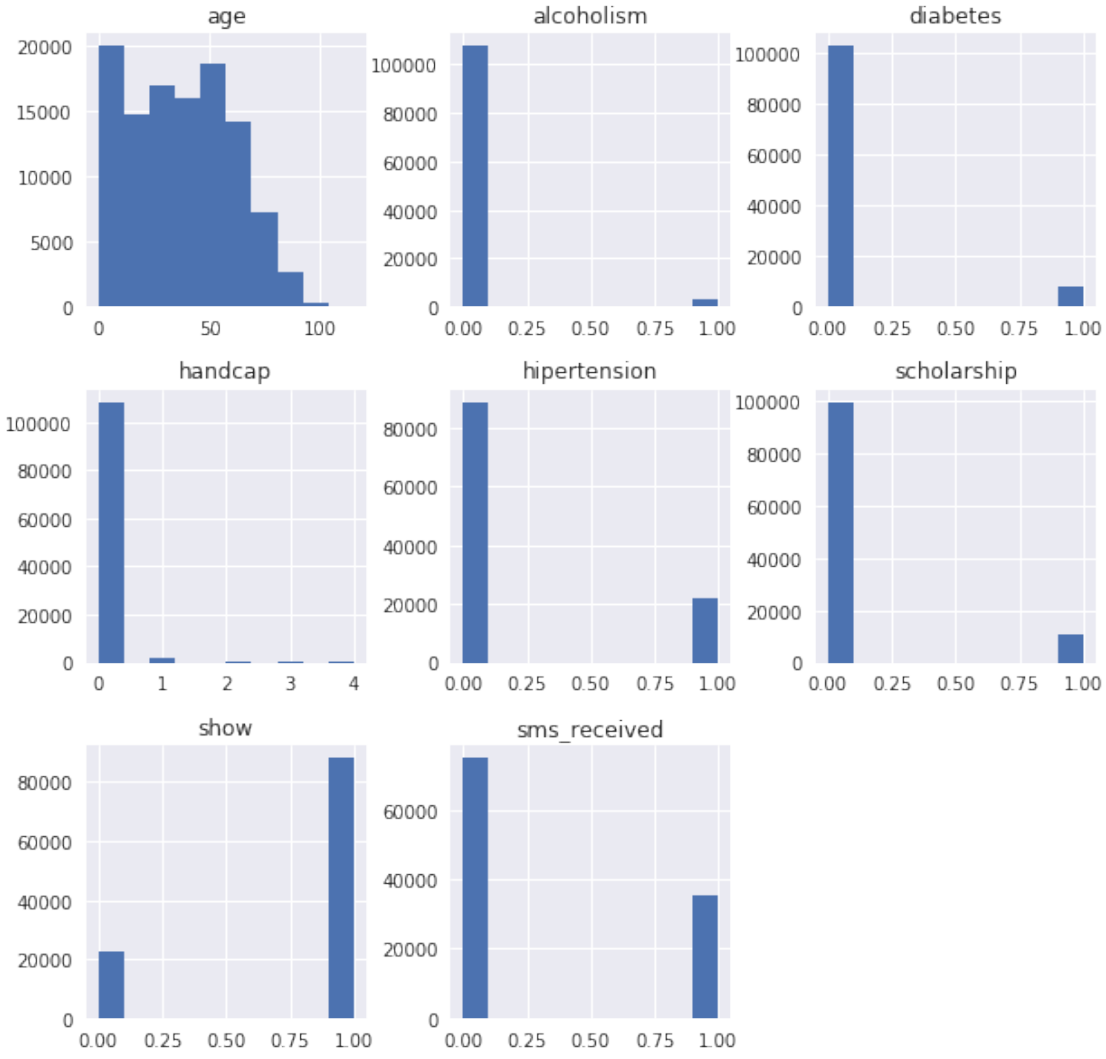
```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 110521 entries, 0 to 110526
Data columns (total 12 columns):
gender             110521 non-null object
scheduled_day      110521 non-null datetime64[ns]
appointment_day    110521 non-null datetime64[ns]
age                110521 non-null int64
neighbourhood      110521 non-null object
scholarship        110521 non-null int64
hipertension       110521 non-null int64
diabetes           110521 non-null int64
alcoholism         110521 non-null int64
handcap            110521 non-null int64
sms_received       110521 non-null int64
show               110521 non-null int64
```

```
dtypes: datetime64[ns](2), int64(8), object(2)
memory usage: 11.0+ MB
```

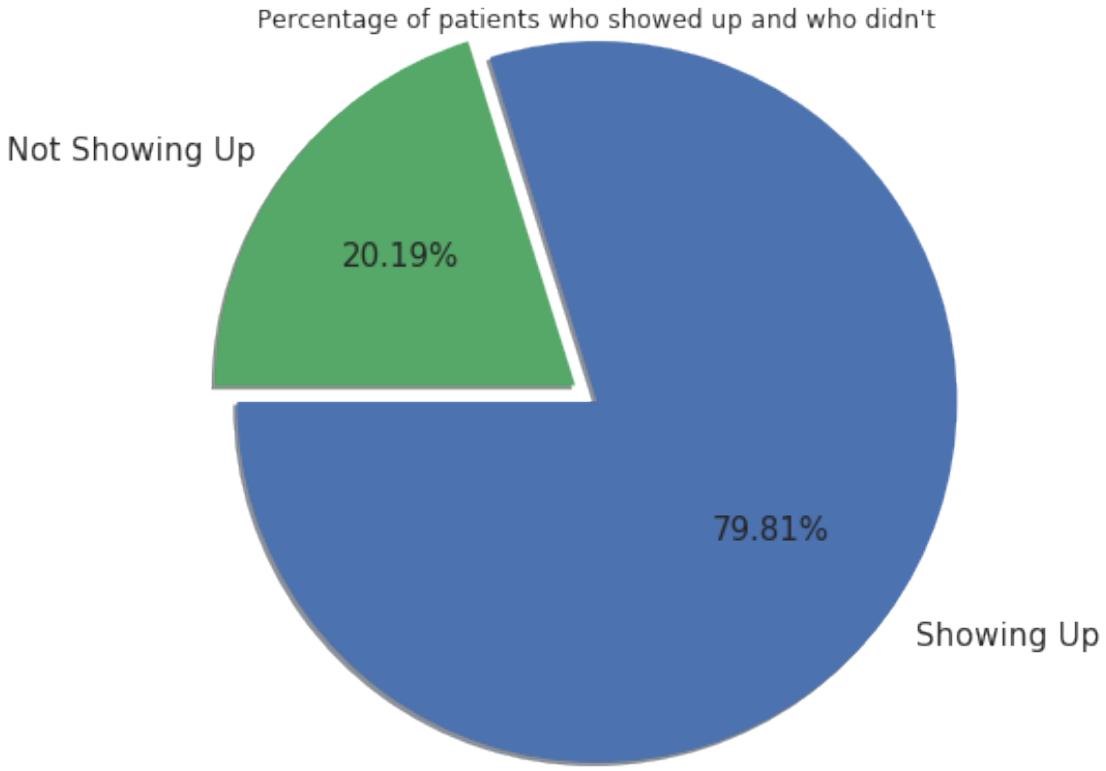
```
In [29]: df.reset_index(drop=True, inplace=True)
```

Exploratory Data Analysis

```
In [30]: df.hist(figsize=(10,10));
```

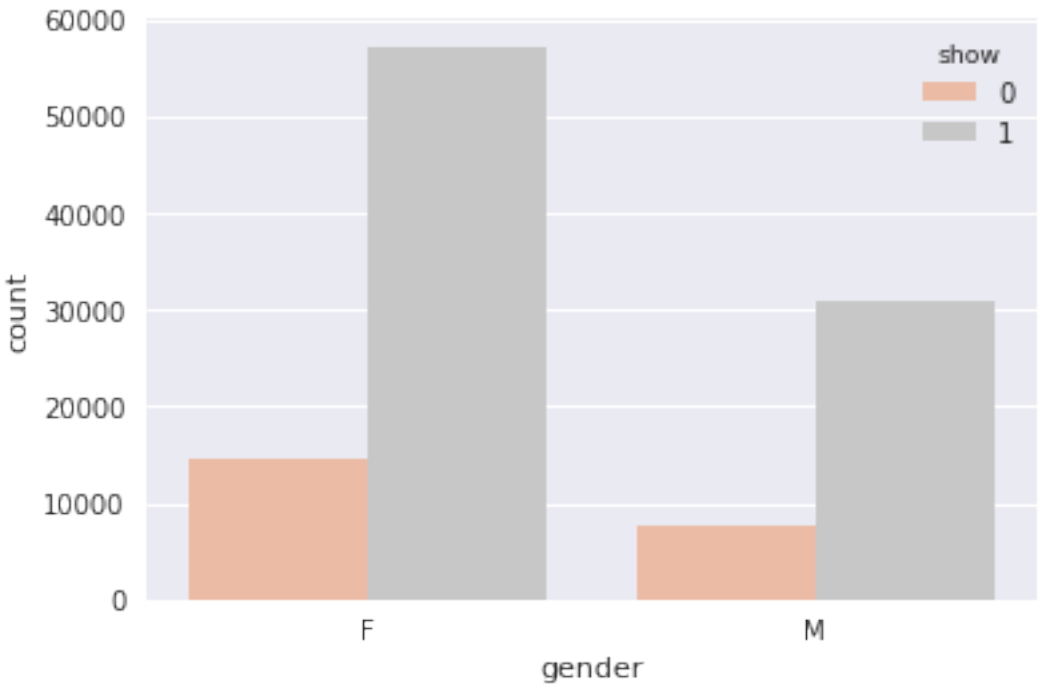



```
In [31]: label_Names = ["Showing Up", "Not Showing Up"]
         data = [df.query('show == 1').count()[0], df.query('show == 0').count()[0]]
         explode = (0, 0.15)
         plt.axis('equal');
         plt.pie(data,radius=2,shadow=True ,labels = label_Names,explode=explode, startangle=180
         plt.title("Percentage of patients who showed up and who didn't",y=1.3);
```



3.0.4 Research Question 1 (which gender shows up for thier appointment?)

```
In [32]: fig=sns.countplot(x='gender', data=df, hue='show', palette='RdGy')
```




```
In [33]: male_total= df.query('gender == "M" ')['gender'].count()
         male_total
```

```
Out[33]: 38685
```

```
In [34]: male_miss=df.query('gender == "M" and show ==0 ')['gender'].count()
         male_miss
```

```
Out[34]: 7723
```

```
In [35]: male_absent_ratio=(male_miss/male_total) *100
         male_absent_ratio
```

```
Out[35]: 19.963810262375599
```

```
In [36]: female_total= df.query('gender == "F" ')['gender'].count()
         female_miss=df.query('gender == "F" and show ==0 ')['gender'].count()
         female_absent_ratio=(female_miss/female_total) *100
         female_absent_ratio
```

```
Out[36]: 20.311542958962082
```

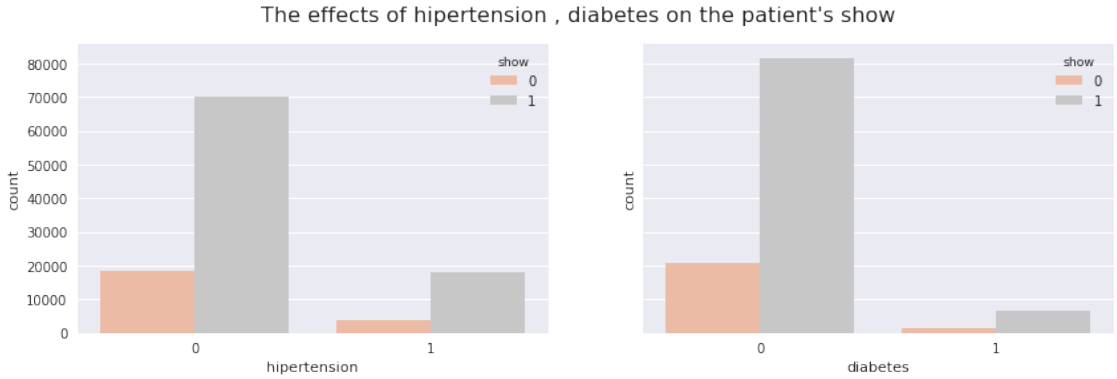
```
In [37]: male_to_all_ratio=male_total/df['gender'].count()
         male_to_all_ratio
```

```
Out[37]: 0.35002397734367224
```

- the precentage of male and female whose missed show up almost are the same.

3.0.5 Research Question 2 (Is any disease affect showing up for thier appointment?)

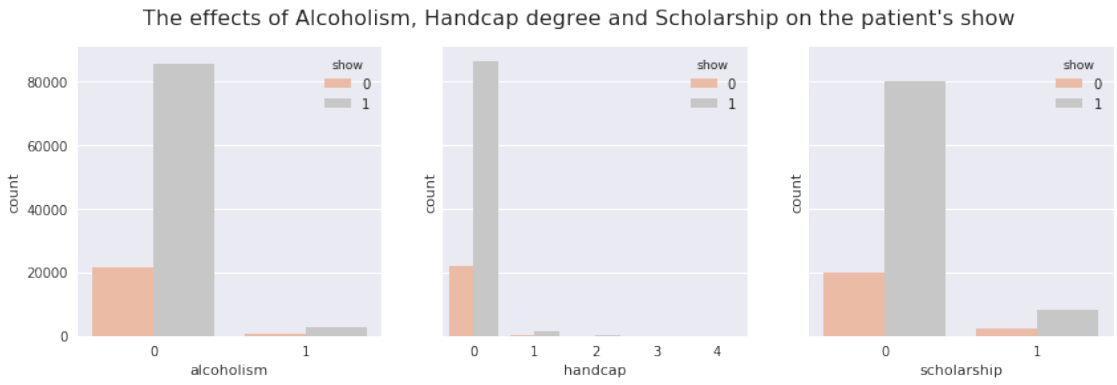
```
In [38]: fig, (ax1, ax2 )= plt.subplots(ncols=2, sharey=True)
         sns.countplot(x='hipertension', data=df, hue='show', ax=ax1, palette='RdGy')
         sns.countplot(x='diabetes', data=df, hue='show', ax=ax2, palette='RdGy')
         fig.set_figwidth(14)
         fig.set_figheight(4)
         fig.suptitle("The effects of hipertension , diabetes on the patient's show", fontsize=1
```



- hipertension , diabetes do not affect paitents show up.

3.0.6 Research Question 3 (Is Alcoholism, Handcap degree and Scholarship affect showing up for thier appointment?)

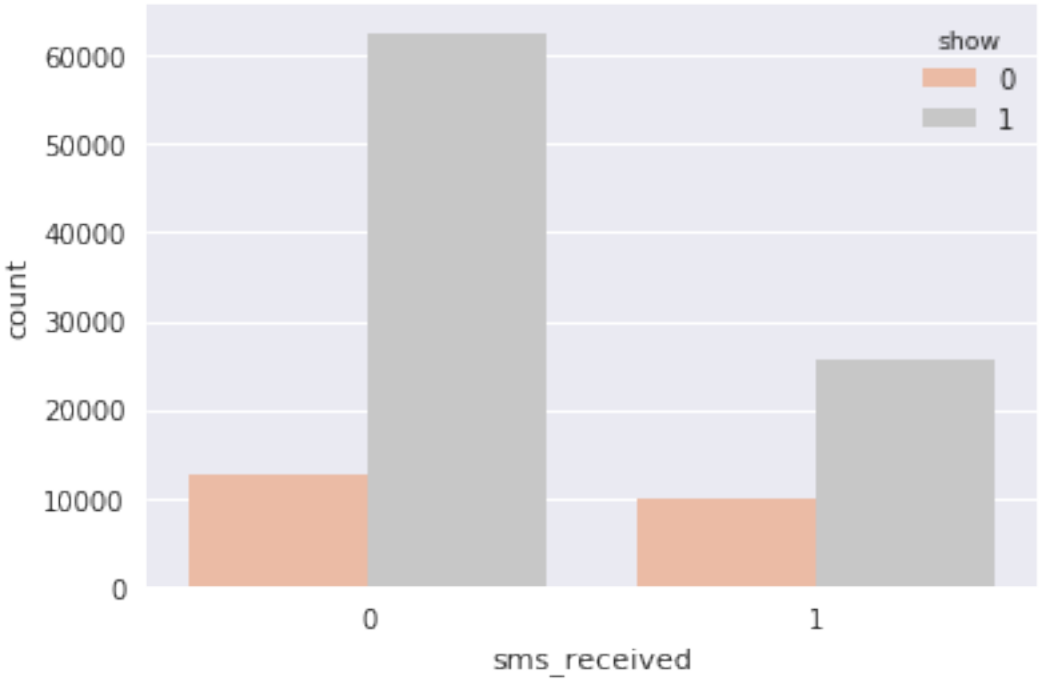
```
In [39]: fig, (ax1, ax2 ,ax3)= plt.subplots(ncols=3, sharey=True)
         sns.countplot(x='alcoholism', data=df, hue='show', ax=ax1, palette='RdGy')
         sns.countplot(x='handcap', data=df, hue='show', ax=ax2, palette='RdGy')
         sns.countplot(x='scholarship', data=df, hue='show', ax=ax3, palette='RdGy')
         fig.set_figwidth(14)
         fig.set_figheight(4)
         fig.suptitle("The effects of Alcoholism, Handcap degree and Scholarship on the patient'
```



- Alcoholism, Handcap degree and Scholarship do not affect paitents show up.

3.0.7 Research Question 4 (Is reciving SMS- message affect showing up for thier appointment?)

```
In [40]: fig=sns.countplot(x='sms_received', data=df, hue='show', palette='RdGy')
```



- reciving SMS- message does not affect paitents show up.

3.0.8 Research Question 5 (Is appointment month/day/hour affect showing up for thier appointment?)

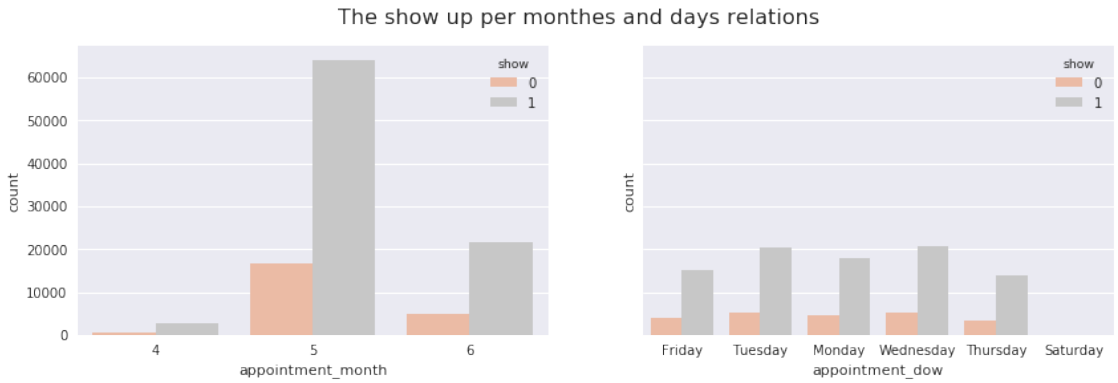
```
In [41]: df['appointment_day'].dt.hour

Out[41]: 0         0
         1         0
         2         0
         3         0
         4         0
         5         0
         6         0
         7         0
```

```
8         0
9         0
10        0
11        0
12        0
13        0
14        0
15        0
16        0
17        0
18        0
19        0
20        0
21        0
22        0
23        0
24        0
25        0
26        0
27        0
28        0
29        0
          ..
110491    0
110492    0
110493    0
110494    0
110495    0
110496    0
110497    0
110498    0
110499    0
110500    0
110501    0
110502    0
110503    0
110504    0
110505    0
110506    0
110507    0
110508    0
110509    0
110510    0
110511    0
110512    0
110513    0
110514    0
110515    0
```

```
110516    0
110517    0
110518    0
110519    0
110520    0
Name: appointment_day, Length: 110521, dtype: int64
```

- No hours in appointment date

```
In [42]: df['appointment_dow']=df['appointment_day'].dt.day_name()
         df['appointment_dow'].head()

Out[42]: 0    Friday
         1    Friday
         2    Friday
         3    Friday
         4    Friday
         Name: appointment_dow, dtype: object

In [43]: df['appointment_month']=df['appointment_day'].dt.month
         df['appointment_month'].head()

Out[43]: 0    4
         1    4
         2    4
         3    4
         4    4
         Name: appointment_month, dtype: int64

In [44]: fig, (ax1, ax2) = plt.subplots(ncols=2, sharey=True)
         sns.countplot(x='appointment_month', data=df, hue='show', ax=ax1, palette='RdGy')
         sns.countplot(x='appointment_dow', data=df, hue='show', ax=ax2, palette='RdGy')
         fig.set_figwidth(14)
         fig.set_figheight(4)
         fig.suptitle("The show up per monthes and days relations", fontsize=16);
```



```
In [45]: df['appointment_day'].min()

Out[45]: Timestamp('2016-04-29 00:00:00')

In [46]: df['appointment_day'].max()

Out[46]: Timestamp('2016-06-08 00:00:00')
```

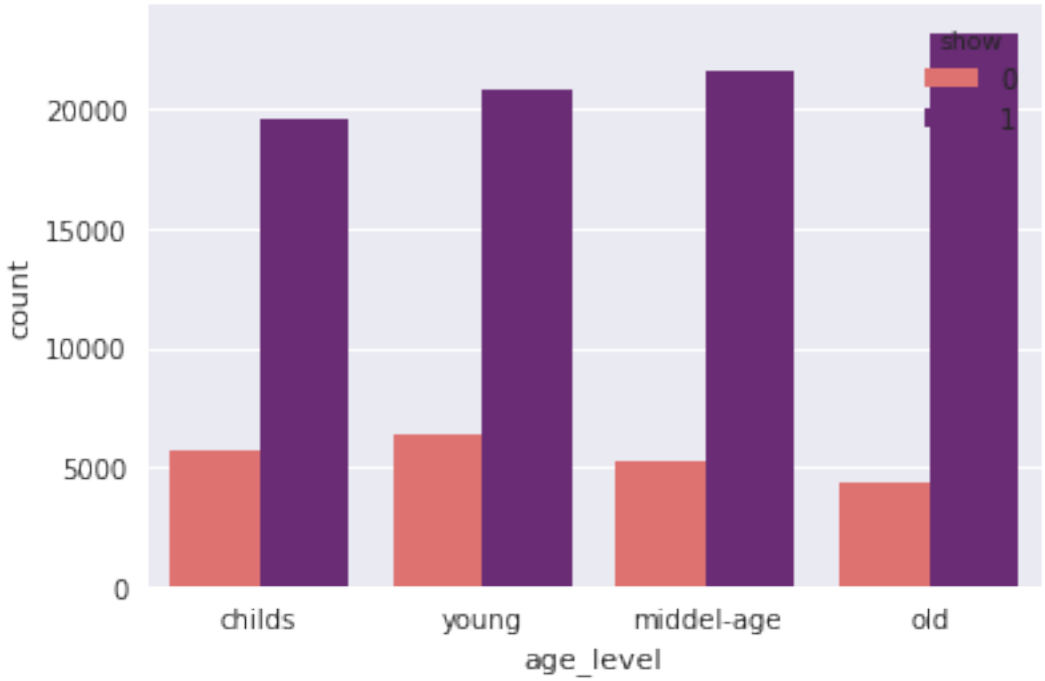
- May the highest month when patients make appointment , but data already collected from 2016/04/29 to 2016/06/08 so this chart does not give information in terms of the difference between the months
- Tuesday,Wednesday highest days when patients make appointment.
- Saturday the lowest ptients appoinmentday and no data on Sunday
- No hours in appointment date

3.0.9 Research Question 6 (what age range was most showing up for thier appointment?)

```
In [47]: df.describe()['age']

Out[47]: count    110521.000000
         mean         37.089386
         std          23.109885
         min           0.000000
         25%          18.000000
         50%          37.000000
         75%          55.000000
         max         115.000000
         Name: age, dtype: float64

In [48]: bins=[df.describe()['age']['min'],df.describe()['age']['25%'],df.describe()['age']['50%
              df.describe()['age']['max']]
         bins_labels=['childs','young','middel-age','old']
         age=pd.cut(df['age'],bins,labels=bins_labels)
         age.name='age_level'
         df_age=df.copy()
         df_age['age_level']=age
         df_age.head()

Out[48]:   gender       scheduled_day appointment_day  age      neighbourhood  \
         0      F 2016-04-29 18:38:08      2016-04-29   62    JARDIM DA PENHA
         1      M 2016-04-29 16:08:27      2016-04-29   56    JARDIM DA PENHA
         2      F 2016-04-29 16:19:04      2016-04-29   62      MATA DA PRAIA
         3      F 2016-04-29 17:29:31      2016-04-29    8  PONTAL DE CAMBURI
         4      F 2016-04-29 16:07:23      2016-04-29   56    JARDIM DA PENHA

            scholarship  hipertension  diabetes  alcoholism  handcap  sms_received  \
         0            0             1         0           0        0             0
         1            0             0         0           0        0             0
         2            0             0         0           0        0             0
```

```
3            0             0          0           0         0             0
4            0             1          1           0         0             0

   show appointment_dow  appointment_month age_level
0     1          Friday                  4       old
1     1          Friday                  4       old
2     1          Friday                  4       old
3     1          Friday                  4    childs
4     1          Friday                  4       old
```

```
In [49]: sns.countplot(x='age_level', data=df_age, hue='show', palette='magma_r');
         fig.set_figwidth(25);
         fig.set_figheight(10);
```



- young (18 to 37) years old are the highest missed showing up, and old (55 to 115) years old are the highest showing up

3.0.10 Research Question 7 (Is waiting days affect the patient's show?)

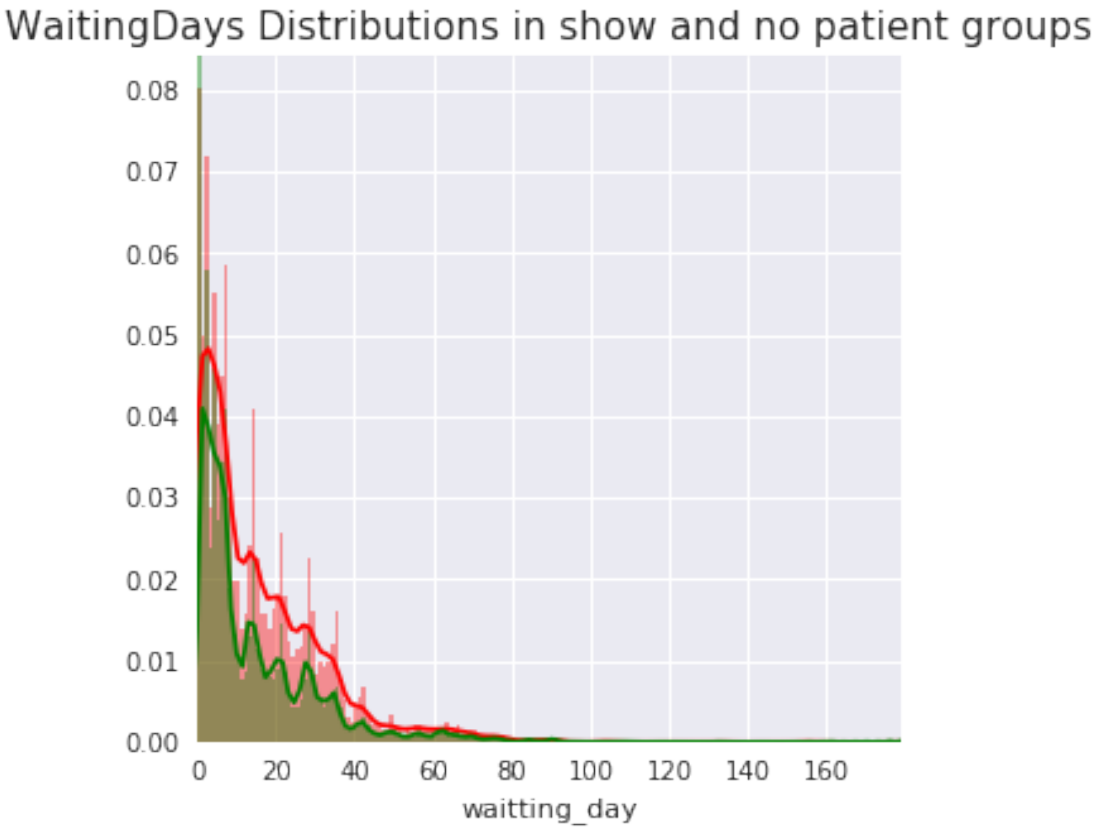
```
In [50]: df['waitting_day']=df['appointment_day'].dt.date-df['scheduled_day'].dt.date
         df['waitting_day'].describe()
```

```
Out[50]: count                      110521
         mean      10 days 04:25:27.412889
         std       15 days 06:07:25.262183
```

```
min              0 days 00:00:00
25%              0 days 00:00:00
50%              4 days 00:00:00
75%             15 days 00:00:00
max            179 days 00:00:00
Name: waitting_day, dtype: object
```

In [51]:
```
df['waitting_day']=df['waitting_day'].dt.days
```

In [52]:
```
plt.figure(figsize=(5,5))

sns.distplot(df[df['show'] == 0]["waitting_day"], bins=df['waitting_day'].max(),color='
sns.distplot(df[df['show'] == 1]["waitting_day"], bins=df['waitting_day'].max(), color=

plt.title('WaitingDays Distributions in show and no patient groups', fontsize=15)
plt.xlim(df['waitting_day'].min(),df['waitting_day'].max())
plt.show();
```



- waiting days until 7 days patient show up is higher ratio after 7 days missed show up is higher ratio

Conclusions

- Percentage of patients who show up on their appointments represents 70.81% and who Don't show up on their appointments represents 20.19%
- Both genders have same commitment to medical schedules. (near to 80 %)
- Sms doesn't affect on patient's show up.
- young from 18 to 39 years old are the highest missed show up
- Patients Who didn't show up have more than 7 days of waiting.
- Relation between wating days and show up is negative.
- The important factors affect patient show up are: hipertension and Age

3.0.11 limitations:

- Data is imbalanced because males represent 35% of observations.
- Data collected from 2016/04/29 to 2016/06/08 .
- some patients who marked as no show up, in real they may show up but on another day.
- Data must include time of sending sms to detect if sms send before appointment day with enough time or send after appointment day.

```
In [53]: from subprocess import call
         call(['python', '-m', 'nbconvert', 'Investigate_a_Dataset.ipynb'])
```

```
Out[53]: 0
```