In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib as mpl
import matplotlib.pyplot as plt
import statsmodels.api as sm
```

In [3]:
```
df= pd.read_csv('nhanes_2015_2016.csv')
df
```

Out[3]:

	SEQN	ALQ101	ALQ110	ALQ130	SMQ020	RIAGENDR	RIDAGEYR	RIDRETH1	DMDCITZN
0	83732	1.0	NaN	1.0	1	1	62	3	1.0
1	83733	1.0	NaN	6.0	1	1	53	3	2.0
2	83734	1.0	NaN	NaN	1	1	78	3	1.0
3	83735	2.0	1.0	1.0	2	2	56	3	1.0
4	83736	2.0	1.0	1.0	2	2	42	4	1.0
...	...	...	...	...	...	...	...	...	...
5730	93695	2.0	2.0	NaN	1	2	76	3	1.0
5731	93696	2.0	2.0	NaN	2	1	26	3	1.0
5732	93697	1.0	NaN	1.0	1	2	80	3	1.0
5733	93700	NaN	NaN	NaN	1	1	35	3	2.0
5734	93702	1.0	NaN	2.0	2	2	24	3	1.0

5735 rows × 28 columns

In [4]:
```
df.columns
```

Out[4]:
```
Index(['SEQN', 'ALQ101', 'ALQ110', 'ALQ130', 'SMQ020', 'RIAGENDR', 'RIDAGEYR',
       'RIDRETH1', 'DMDCITZN', 'DMDEDUC2', 'DMDMARTL', 'DMDHHSIZ', 'WTINT2YR',
       'SDMVPSU', 'SDMVSTRA', 'INDFMPIR', 'BPXSY1', 'BPXDI1', 'BPXSY2',
       'BPXDI2', 'BMXWT', 'BMXHT', 'BMXBMI', 'BMXLEG', 'BMXARML', 'BMXARMC',
       'BMXWAIST', 'HIQ210'],
      dtype='object')
```

In [5]:
```
vars = ['SMQ020', 'RIAGENDR', 'RIDAGEYR','BPXSY1','BMXBMI', 'BMXLEG']
df = df[vars].dropna()
df
```

Out[5]:

	SMQ020	RIAGENDR	RIDAGEYR	BPXSY1	BMXBMI	BMXLEG
0	1	1	62	128.0	27.8	43.3
1	1	1	53	146.0	30.8	38.0
2	1	1	78	138.0	28.8	35.6

	SMQ020	RIAGENDR	RIDAGEYR	BPXSY1	BMXBMI	BMXLEG
3	2	2	56	132.0	42.4	38.5
4	2	2	42	100.0	20.3	37.4
...	...	...	...	...	...	...
5730	1	2	76	112.0	21.5	38.2
5731	2	1	26	118.0	33.8	43.4
5732	1	2	80	154.0	31.0	31.3
5733	1	1	35	104.0	26.0	40.3
5734	2	2	24	118.0	21.4	38.2

5087 rows × 6 columns

In [6]:
```
df[vars].corr()
```

Out[6]:

	SMQ020	RIAGENDR	RIDAGEYR	BPXSY1	BMXBMI	BMXLEG
SMQ020	1.000000	0.180578	-0.147325	-0.093587	-0.027803	-0.080541
RIAGENDR	0.180578	1.000000	-0.017498	-0.104578	0.071564	-0.527342
RIDAGEYR	-0.147325	-0.017498	1.000000	0.466838	0.049514	-0.309734
BPXSY1	-0.093587	-0.104578	0.466838	1.000000	0.141162	-0.080850
BMXBMI	-0.027803	0.071564	0.049514	0.141162	1.000000	-0.062964
BMXLEG	-0.080541	-0.527342	-0.309734	-0.080850	-0.062964	1.000000

In [7]:
```
model = sm.OLS.from_formula ('BPXSY1 ~ RIDAGEYR',
                             data = df)
result = model.fit()
result.summary()
```

Out[7]:

OLS Regression Results

Dep. Variable:	BPXSY1	**R-squared:**	0.218
Model:	OLS	**Adj. R-squared:**	0.218
Method:	Least Squares	**F-statistic:**	1417.
Date:	Tue, 19 Oct 2021	**Prob (F-statistic):**	8.81e-274
Time:	04:26:50	**Log-Likelihood:**	-21375.
No. Observations:	5087	**AIC:**	4.275e+04
Df Residuals:	5085	**BIC:**	4.277e+04
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	102.5497	0.632	162.192	0.000	101.310	103.789

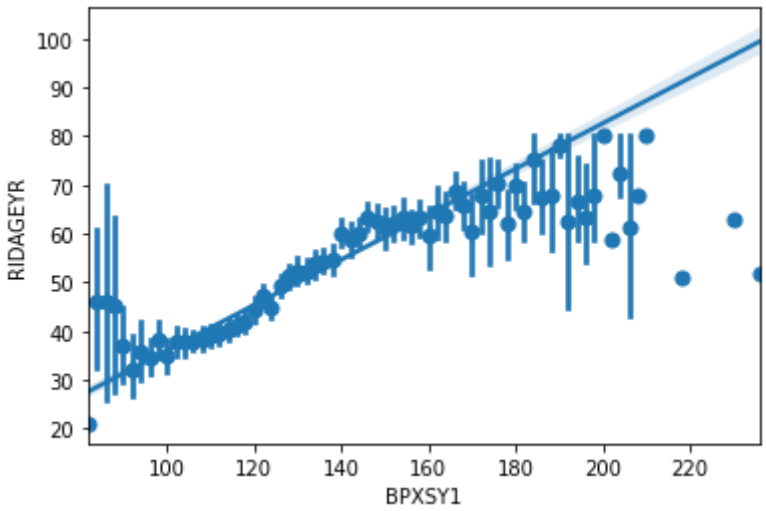
RIDAGEYR	0.4672	0.012	37.644	0.000	0.443	0.492

Omnibus:	717.009	**Durbin-Watson:**	2.034
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	1643.192
Skew:	0.823	**Prob(JB):**	0.00
Kurtosis:	5.246	**Cond. No.**	142.

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

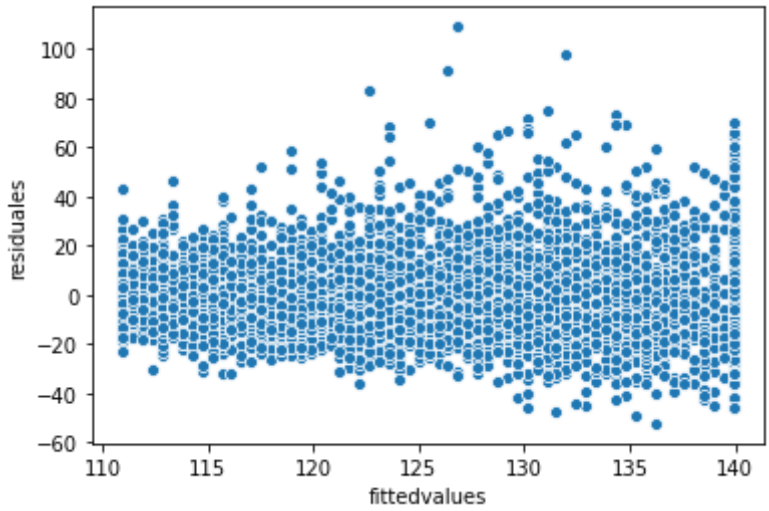
In [8]:
```
ax = sns.regplot (x = 'BPXSY1',
                  y = 'RIDAGEYR',
                  data = df,
                 x_estimator = np.mean,
                 )
```



In [9]:
```
x = result.fittedvalues
y = result.resid
```

In [10]:
```
fig = sns.scatterplot ( x = x,
                        y = y,
                       )
fig.set_xlabel ('fittedvalues')
fig.set_ylabel ('residuales')
```

Out[10]:
```
Text(0, 0.5, 'residuales')
```



In [12]:
```
model = sm.OLS.from_formula ('BPXSY1 ~ RIDAGEYR + RIAGENDR',
                             data = df)
result = model.fit()
result.summary()
```

Out[12]:

OLS Regression Results

Dep. Variable:	BPXSY1	**R-squared:**	0.227
Model:	OLS	**Adj. R-squared:**	0.227
Method:	Least Squares	**F-statistic:**	747.5
Date:	Tue, 19 Oct 2021	**Prob (F-statistic):**	2.60e-285
Time:	04:34:31	**Log-Likelihood:**	-21344.
No. Observations:	5087	**AIC:**	4.269e+04
Df Residuals:	5084	**BIC:**	4.271e+04
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	107.9643	0.935	115.459	0.000	106.131	109.797
RIDAGEYR	0.4656	0.012	37.723	0.000	0.441	0.490
RIAGENDR	-3.5269	0.451	-7.821	0.000	-4.411	-2.643

Omnibus:	742.153	**Durbin-Watson:**	2.030
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	1762.511
Skew:	0.837	**Prob(JB):**	0.00
Kurtosis:	5.349	**Cond. No.**	226.

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

In [ ]: