FAMILY EXPENDITURE

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```
# IMPORTING LIBRARIES
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

import warnings
warnings.filterwarnings('ignore')
```

```
filEx = pd.read_csv('datasets//FilipinoExpenditure.csv')
filEx
```

	Total Household Income	Region	Total Food Expenditure	Main Source of Income	Agricultural Household indicator	Bread and Cereals Expenditure	Total Rice Expenditure	Meat Expenditure	Total Fish and marine products Expenditure	Fruit Expenditure	...	Number of Refrigerator/ Freezer	Numbe of Washing Machine
0	480332	CAR	117848	Wage/Salaries	0	42140	38300	24676	16806	3325	...	1	1
1	198235	CAR	67766	Wage/Salaries	0	17329	13008	17434	11073	2035	...	0	1
2	82785	CAR	61609	Wage/Salaries	1	34182	32001	7783	2590	1730	...	0	0
3	107589	CAR	78189	Wage/Salaries	0	34030	28659	10914	10812	690	...	0	0
4	189322	CAR	94625	Wage/Salaries	0	34820	30167	18391	11309	1395	...	1	0
...	...	...	...	...	...	...	...	...	...	...	...	...	...
41539	119773	XII - SOCCSKSARGEN	44875	Enterpreneurial Activities	1	23675	21542	1476	6120	1632	...	0	0
41540	137320	XII - SOCCSKSARGEN	31157	Enterpreneurial Activities	1	2691	1273	1886	4386	1840	...	0	0
41541	133171	XII - SOCCSKSARGEN	45882	Enterpreneurial Activities	2	28646	27339	480	4796	1232	...	0	0
41542	129500	XII - SOCCSKSARGEN	81416	Enterpreneurial Activities	1	29996	26655	2359	17730	2923	...	0	0
41543	128598	XII - SOCCSKSARGEN	78195	Enterpreneurial Activities	1	43485	41205	1985	7735	2062	...	0	0

41544 rows × 60 columns

```
filEx.isnull().sum()
```

```
Total Household Income                                0
Region                                                0
Total Food Expenditure                                0
Main Source of Income                                 0
Agricultural Household indicator                      0
Bread and Cereals Expenditure                         0
Total Rice Expenditure                                0
Meat Expenditure                                      0
Total Fish and  marine products Expenditure           0
Fruit Expenditure                                     0
Vegetables Expenditure                                0
Restaurant and hotels Expenditure                     0
Alcoholic Beverages Expenditure                       0
Tobacco Expenditure                                   0
Clothing, Footwear and Other Wear Expenditure         0
Housing and water Expenditure                         0
Imputed House Rental Value                            0
Medical Care Expenditure                              0
Transportation Expenditure                            0
Communication Expenditure                             0
Education Expenditure                                 0
Miscellaneous Goods and Services Expenditure          0
Special Occasions Expenditure                         0
Crop Farming and Gardening expenses                   0
Total Income from Entrepreneurial Acitivites          0
Household Head Sex                                    0
Household Head Age                                    0
Household Head Marital Status                         0
Household Head Highest Grade Completed                0
Household Head Job or Business Indicator              0
Household Head Occupation                          7536
Household Head Class of Worker                     7536
Type of Household                                     0
Type of Household                                     0
Total Number of Family members                        0
Members with age less than 5 year old                 0
Members with age 5 - 17 years old                     0
Total number of family members employed               0
Type of Building/House                                0
Type of Roof                                          0
Type of Walls                                         0
House Floor Area                                      0
House Age                                             0
Number of bedrooms                                    0
Tenure Status                                         0
Toilet Facilities                                  1580
Electricity                                           0
Main Source of Water Supply                           0
Number of Television                                  0
Number of CD/VCD/DVD                                  0
Number of Component/Stereo set                        0
Number of Refrigerator/Freezer                        0
Number of Washing Machine                             0
Number of Airconditioner                              0
Number of Car, Jeep, Van                              0
Number of Landline/wireless telephones                0
Number of Cellular phone                              0
Number of Personal Computer                           0
Number of Stove with Oven/Gas Range                   0
Number of Motorized Banca                             0
Number of Motorcycle/Tricycle                         0
dtype: int64
```

```
filEx['Household Head Occupation'] = filEx['Household Head Occupation'].fillna(filEx['Household Head Occupation'].mode()[0])
filEx['Household Head Class of Worker'] = filEx['Household Head Class of Worker'].fillna(filEx['Household Head Class of Worker'].mode()[0])
filEx['Toilet Facilities'] = filEx['Toilet Facilities'].fillna(filEx['Toilet Facilities'].mode()[0])

filEx.isnull().sum()
```

```
Total Household Income                          0
Region                                          0
Total Food Expenditure                          0
Main Source of Income                           0
Agricultural Household indicator                0
Bread and Cereals Expenditure                   0
Total Rice Expenditure                          0
Meat Expenditure                                0
Total Fish and  marine products Expenditure     0
Fruit Expenditure                               0
Vegetables Expenditure                          0
Restaurant and hotels Expenditure               0
Alcoholic Beverages Expenditure                 0
Tobacco Expenditure                             0
Clothing, Footwear and Other Wear Expenditure   0
Housing and water Expenditure                   0
Imputed House Rental Value                      0
Medical Care Expenditure                        0
Transportation Expenditure                      0
Communication Expenditure                       0
Education Expenditure                           0
Miscellaneous Goods and Services Expenditure    0
Special Occasions Expenditure                   0
Crop Farming and Gardening expenses             0
Total Income from Entrepreneurial Acitivites    0
Household Head Sex                              0
Household Head Age                              0
Household Head Marital Status                   0
Household Head Highest Grade Completed          0
Household Head Job or Business Indicator        0
Household Head Occupation                       0
Household Head Class of Worker                  0
```

```
Type of Household                               0
Total Number of Family members                  0
Members with age less than 5 year old           0
Members with age 5 - 17 years old               0
Total number of family members employed         0
Type of Building/House                          0
Type of Roof                                    0
Type of Walls                                   0
House Floor Area                                0
House Age                                       0
Number of bedrooms                              0
Tenure Status                                   0
Toilet Facilities                               0
Electricity                                     0
Main Source of Water Supply                     0
Number of Television                            0
Number of CD/VCD/DVD                            0
Number of Component/Stereo set                  0
Number of Refrigerator/Freezer                  0
Number of Washing Machine                       0
Number of Airconditioner                        0
Number of Car, Jeep, Van                        0
Number of Landline/wireless telephones          0
Number of Cellular phone                        0
Number of Personal Computer                     0
Number of Stove with Oven/Gas Range             0
Number of Motorized Banca                       0
Number of Motorcycle/Tricycle                   0
dtype: int64
```

```
filEx.dtypes
```

```
Total Household Income                                int64
Region                                               object
Total Food Expenditure                                int64
Main Source of Income                                object
Agricultural Household indicator                      int64
Bread and Cereals Expenditure                         int64
Total Rice Expenditure                                int64
Meat Expenditure                                      int64
Total Fish and  marine products Expenditure           int64
Fruit Expenditure                                     int64
Vegetables Expenditure                                int64
Restaurant and hotels Expenditure                     int64
Alcoholic Beverages Expenditure                       int64
Tobacco Expenditure                                   int64
Clothing, Footwear and Other Wear Expenditure         int64
Housing and water Expenditure                         int64
Imputed House Rental Value                            int64
Medical Care Expenditure                              int64
Transportation Expenditure                            int64
Communication Expenditure                             int64
Education Expenditure                                 int64
Miscellaneous Goods and Services Expenditure          int64
Special Occasions Expenditure                         int64
Crop Farming and Gardening expenses                   int64
Total Income from Entrepreneurial Acitivites          int64
Household Head Sex                                   object
Household Head Age                                    int64
Household Head Marital Status                        object
Household Head Highest Grade Completed               object
Household Head Job or Business Indicator             object
Household Head Occupation                            object
Household Head Class of Worker                       object
Type of Household                                    object
```

```
Total Number of Family members                        int64
Members with age less than 5 year old                 int64
Members with age 5 - 17 years old                     int64
Total number of family members employed               int64
Type of Building/House                               object
Type of Roof                                         object
Type of Walls                                        object
House Floor Area                                      int64
House Age                                             int64
Number of bedrooms                                    int64
Tenure Status                                        object
Toilet Facilities                                    object
Electricity                                           int64
Main Source of Water Supply                          object
Number of Television                                  int64
Number of CD/VCD/DVD                                  int64
Number of Component/Stereo set                        int64
Number of Refrigerator/Freezer                        int64
Number of Washing Machine                             int64
Number of Airconditioner                              int64
Number of Car, Jeep, Van                              int64
Number of Landline/wireless telephones                int64
Number of Cellular phone                              int64
Number of Personal Computer                           int64
Number of Stove with Oven/Gas Range                   int64
Number of Motorized Banca                             int64
Number of Motorcycle/Tricycle                         int64
dtype: object
```

```
filEx['Region'] = filEx['Region'].astype('category')
filEx['Main Source of Income'] = filEx['Main Source of Income'].astype('category')
filEx['Household Head Sex'] = filEx['Household Head Sex'].astype('category')
filEx['Household Head Marital Status'] = filEx['Household Head Marital Status'].astype('category')
filEx['Household Head Highest Grade Completed'] = filEx['Household Head Highest Grade Completed'].astype('category')
filEx['Household Head Job or Business Indicator'] = filEx['Household Head Job or Business Indicator'].astype('category')
filEx['Household Head Occupation'] = filEx['Household Head Occupation'].astype('category')
filEx['Household Head Class of Worker'] = filEx['Household Head Class of Worker'].astype('category')
filEx['Type of Household'] = filEx['Type of Household'].astype('category')
filEx['Type of Building/House'] = filEx['Type of Building/House'].astype('category')
filEx['Type of Roof'] = filEx['Type of Roof'].astype('category')
filEx['Type of Walls'] = filEx['Type of Walls'].astype('category')
filEx['Tenure Status'] = filEx['Tenure Status'].astype('category')
filEx['Toilet Facilities'] = filEx['Toilet Facilities'].astype('category')
filEx['Main Source of Water Supply'] = filEx['Main Source of Water Supply'].astype('category')

filEx.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 41544 entries, 0 to 41543
Data columns (total 60 columns):
 #   Column                                      Non-Null Count  Dtype
---  ------                                      --------------  -----
 0   Total Household Income                      41544 non-null  int64
 1   Region                                      41544 non-null  category
 2   Total Food Expenditure                      41544 non-null  int64
 3   Main Source of Income                       41544 non-null  category
 4   Agricultural Household indicator            41544 non-null  int64
 5   Bread and Cereals Expenditure               41544 non-null  int64
 6   Total Rice Expenditure                      41544 non-null  int64
 7   Meat Expenditure                            41544 non-null  int64
 8   Total Fish and  marine products Expenditure 41544 non-null  int64
 9   Fruit Expenditure                           41544 non-null  int64
 10  Vegetables Expenditure                      41544 non-null  int64
 11  Restaurant and hotels Expenditure           41544 non-null  int64
 12  Alcoholic Beverages Expenditure             41544 non-null  int64
 13  Tobacco Expenditure                         41544 non-null  int64
 14  Clothing, Footwear and Other Wear Expenditure 41544 non-null  int64
 15  Housing and water Expenditure               41544 non-null  int64
 16  Imputed House Rental Value                  41544 non-null  int64
 17  Medical Care Expenditure                    41544 non-null  int64
 18  Transportation Expenditure                  41544 non-null  int64
 19  Communication Expenditure                   41544 non-null  int64
 20  Education Expenditure                       41544 non-null  int64
 21  Miscellaneous Goods and Services Expenditure 41544 non-null  int64
 22  Special Occasions Expenditure               41544 non-null  int64
 23  Crop Farming and Gardening expenses         41544 non-null  int64
 24  Total Income from Entrepreneurial Acitivites 41544 non-null  int64
 25  Household Head Sex                          41544 non-null  category
 26  Household Head Age                          41544 non-null  int64
 27  Household Head Marital Status               41544 non-null  category
 28  Household Head Highest Grade Completed      41544 non-null  category
 29  Household Head Job or Business Indicator    41544 non-null  category
 30  Household Head Occupation                   41544 non-null  category
 31  Household Head Class of Worker              41544 non-null  category
 32  Type of Household                           41544 non-null  category
 33  Total Number of Family members              41544 non-null  int64
 34  Members with age less than 5 year old       41544 non-null  int64
 35  Members with age 5 - 17 years old           41544 non-null  int64
 36  Total number of family members employed     41544 non-null  int64
 37  Type of Building/House                      41544 non-null  category
 38  Type of Roof                                41544 non-null  category
 39  Type of Walls                               41544 non-null  category
 40  House Floor Area                            41544 non-null  int64
 41  House Age                                   41544 non-null  int64
 42  Number of bedrooms                          41544 non-null  int64
 43  Tenure Status                               41544 non-null  category
 44  Toilet Facilities                           41544 non-null  category
 45  Electricity                                 41544 non-null  int64
 46  Main Source of Water Supply                 41544 non-null  category
 47  Number of Television                        41544 non-null  int64
 48  Number of CD/VCD/DVD                        41544 non-null  int64
 49  Number of Component/Stereo set              41544 non-null  int64
 50  Number of Refrigerator/Freezer              41544 non-null  int64
 51  Number of Washing Machine                   41544 non-null  int64
 52  Number of Airconditioner                    41544 non-null  int64
 53  Number of Car, Jeep, Van                    41544 non-null  int64
 54  Number of Landline/wireless telephones      41544 non-null  int64
 55  Number of Cellular phone                    41544 non-null  int64
 56  Number of Personal Computer                 41544 non-null  int64
 57  Number of Stove with Oven/Gas Range         41544 non-null  int64
 58  Number of Motorized Banca                   41544 non-null  int64
 59  Number of Motorcycle/Tricycle               41544 non-null  int64
dtypes: category(15), int64(45)
memory usage: 14.9 MB
```

Q1. What is the average total income per Region?

```
np.round(filEx.groupby('Region')['Total Household Income'].mean().sort_values(ascending=False), 2)
```

```
Region
NCR                          420861.86
IVA - CALABARZON             303360.54
III - Central Luzon          292965.18
CAR                          269540.48
XI - Davao Region            238115.89
I - Ilocos Region            238110.08
II - Cagayan Valley          236778.22
VII - Central Visayas        234909.31
VI - Western Visayas         220481.26
IVB - MIMAROPA               216685.12
X - Northern Mindanao        214057.78
Caraga                       196907.38
VIII - Eastern Visayas       196736.58
IX - Zasmboanga Peninsula    191000.91
V - Bicol Region             186105.49
XII - SOCCSKSARGEN           182984.80
 ARMM                        134746.82
Name: Total Household Income, dtype: float64
```

Insight #1:

The **National Capital Region (NCR)** has the highest average household income at **₱420,861.86**, **followed by Calabarzon and Central Luzon**. These highly urbanized and industrialized Region.

In contrast, **ARMM** has the lowest average income at **₱134,746.82**, highlighting significant region income that could be due to limited access to economic opportunities and infrastructures.

Q2. Which Region spends the most on food?

```
np.round(filEx.groupby('Region')['Total Food Expenditure'].mean().sort_values(ascending=False), 2)
```

```
Region
NCR                          127080.46
IVA - CALABARZON             105333.95
III - Central Luzon           99726.70
VII - Central Visayas         84307.18
XI - Davao Region             81126.93
I - Ilocos Region             80649.94
CAR                           80352.78
VI - Western Visayas          79829.03
V - Bicol Region              76811.41
II - Cagayan Valley           75604.36
Caraga                        71912.66
XII - SOCCSKSARGEN            71738.09
IVB - MIMAROPA                70760.29
VIII - Eastern Visayas        69833.93
IX - Zasmboanga Peninsula     69645.32
 ARMM                         64931.27
X - Northern Mindanao         64112.59
Name: Total Food Expenditure, dtype: float64
```

Insight #2:

Metro Manila (NCR) households spend the most on food, with an average of **₱127.080.46.**

This may reflect both higher food prices in urban areas and greater income levels allowing for higher consumption.

In contrast, **Northern Mindanao and ARMM** have the lowest food spending, which may reflect income contrast or lower cost of living.

Q3. Is there a relationship between Total Household Income and Total Food Expenditure?

Insight #3:

There is a **Strong Positive Correlation between Total Household Income and Total Food Expenditure**. This means that household increases, food expenditure tends to increase as well. This suggests that income plays a significant role in determining how much households spend on food.

```
InEx = filEx['Total Household Income'].corr(filEx['Total Food Expenditure'])
InEx
```

```
0.663659951604057
```

Q4. What are the main sources of Income across Regions?

Insight #4:

The most common source of income across most regions is **‘Wage/Salaries’**, especially in regions like NCR and Calabarzon.

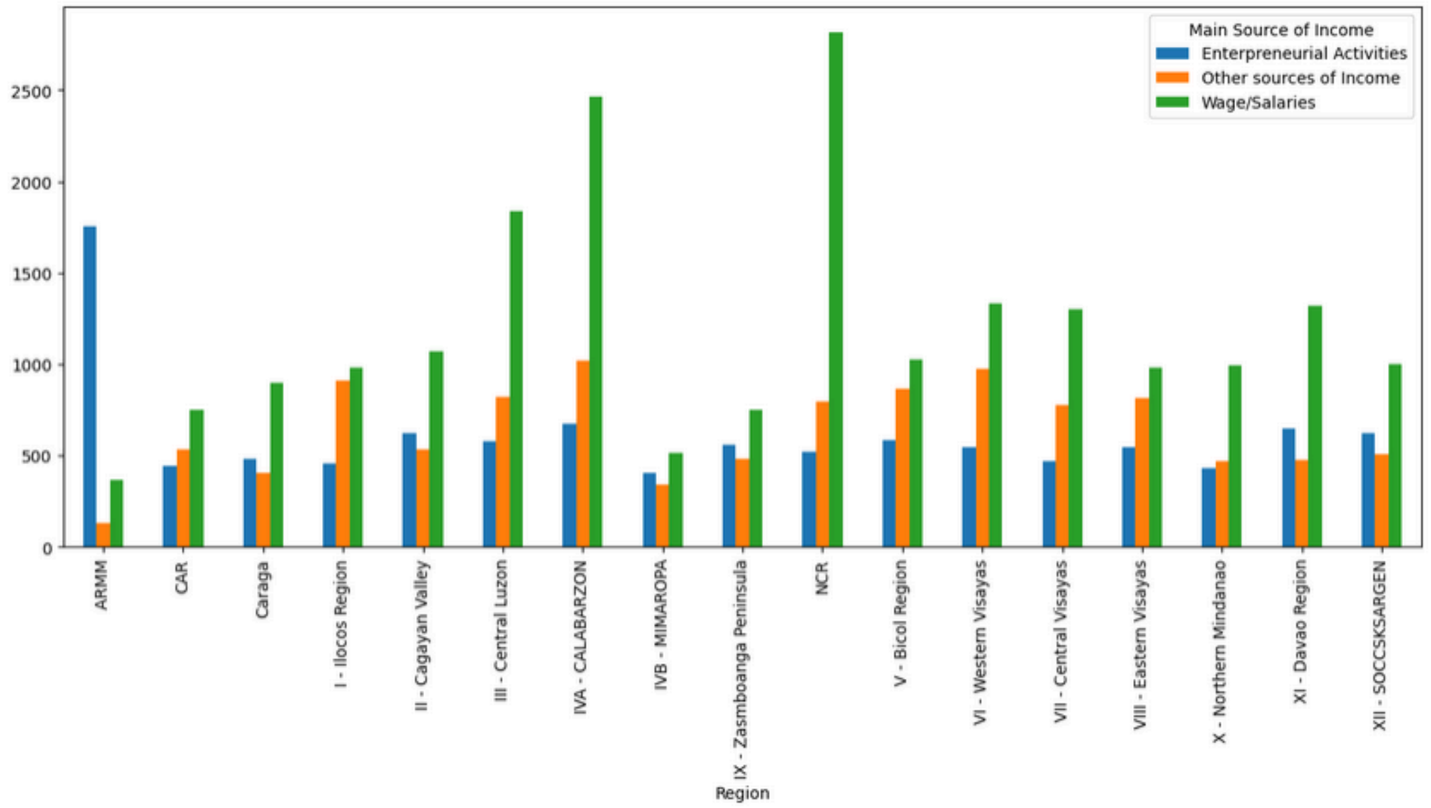
In some regions such as ARMM, Entrepreneurial Activities appear to be more widespread.

```
filEx['Main Source of Income'].unique()
```

```
['Wage/Salaries', 'Other sources of Income', 'Enterpreneurial Activities']
Categories (3, object): ['Enterpreneurial Activities', 'Other sources of Income', 'Wage/Salaries']
```

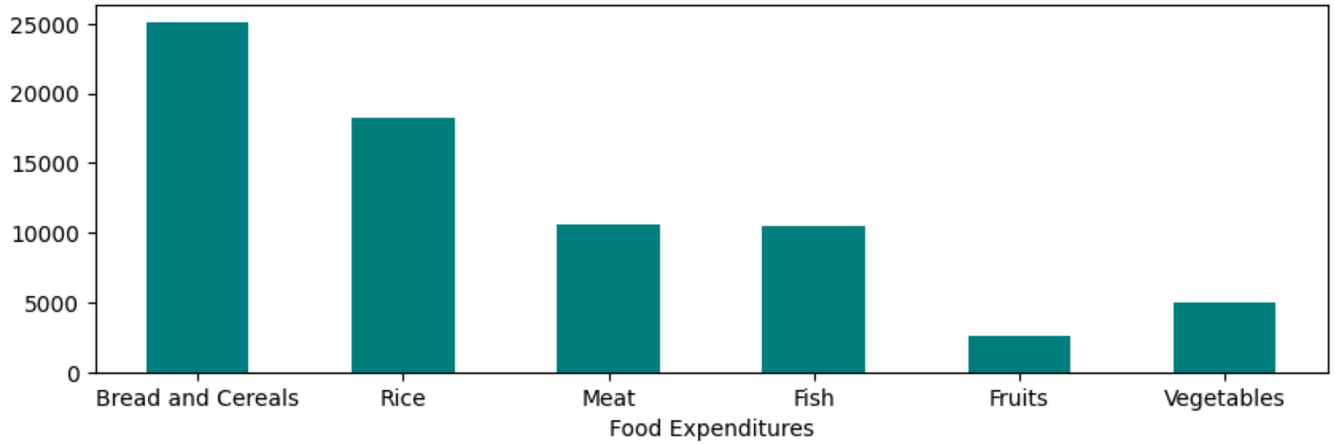
```
income_by_region = filEx.groupby(['Region', 'Main Source of Income']).size().unstack()
income_by_region.plot(kind='bar')
plt.gcf().set_size_inches(15,6)
plt.show
```

```
<function matplotlib.pyplot.show(close=None, block=None)>
```



Q5. Which Food Category do households spend the most on?

```
# LIST OF FOOD EXPENDITURES
food_ex = filEx[['Bread and Cereals Expenditure', 'Total Rice Expenditure', 'Meat Expenditure',
                 'Total Fish and  marine products Expenditure','Fruit Expenditure','Vegetables Expenditure']]

# RENAME COLUMUNS
food_ex.columns = ['Bread and Cereals', 'Rice', 'Meat', 'Fish', 'Fruits', 'Vegetables']

# COMPUTE AVERAGE SPENDING PER FOOD ITEM
avg_expense = food_ex.mean()

# CREATE BAR PLOT
avg_expense.plot(kind='bar', color='teal')
plt.xticks(rotation=0)
plt.xlabel('Food Expenditures')
plt.gcf().set_size_inches(10,3)
plt.show()
```



Insight #5:

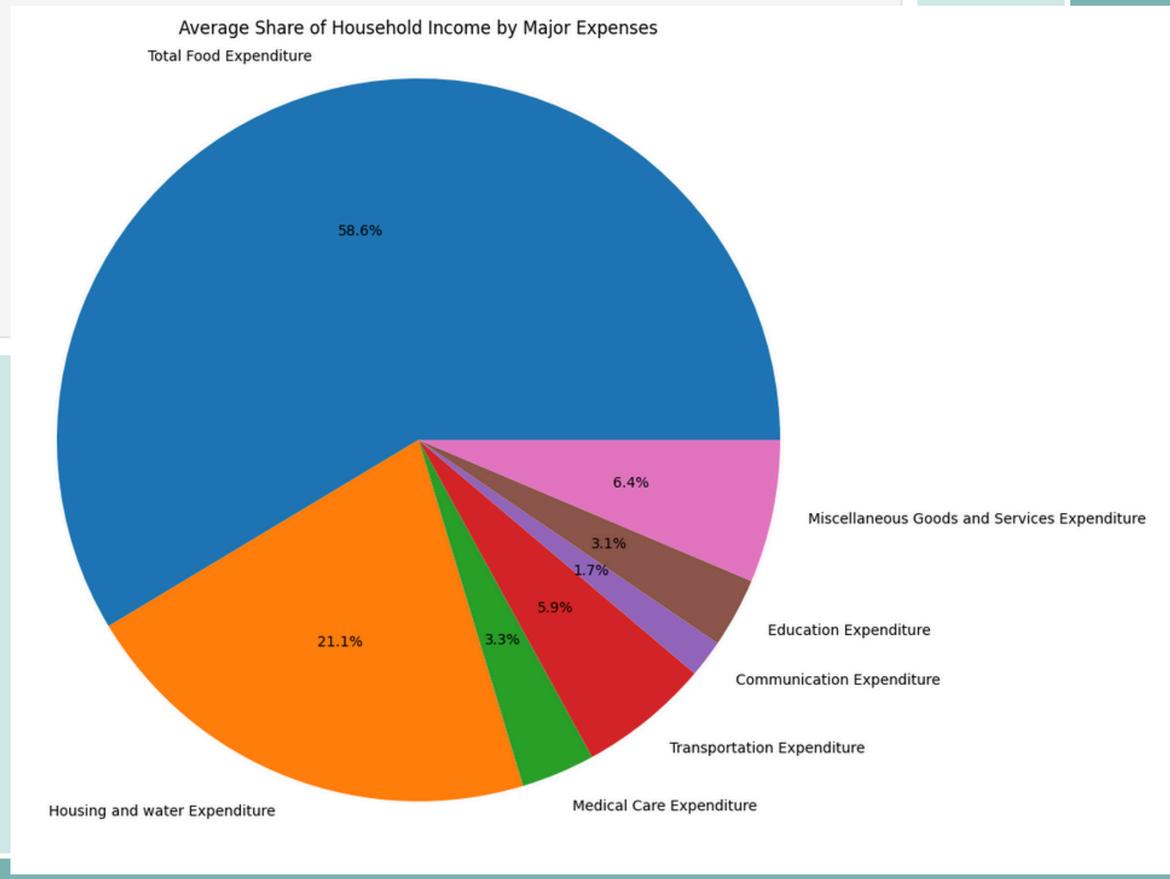
Households spend the most on **Bread and Cereals, followed by Rice,** making these two the top food expenditure categories.

Meat and Fish have similar average spending and **Fruits and Vegetable** receive the least household spending.

This indicates a prioritization of food items in household budgets.

Q6. Which Expenditure Categories take up the largest proportion of Household Income?

```python
# LIST OF MAJOR EXPENSES
expenses = ['Total Food Expenditure', 'Housing and water Expenditure', 'Medical Care Expenditure',
    'Transportation Expenditure', 'Communication Expenditure', 'Education Expenditure', 'Miscellaneous Goods and Services Expenditure']

# CALCULATE THE AVERAGE SHARE OF EACH EXPENSE
shares = (filEx[expenses].div(filEx['Total Household Income'], axis=0)).mean()

# CREATE PIE CHART
plt.figure(figsize=(20, 10))
plt.pie(shares, labels=shares.index, autopct='%1.1f%%')
plt.title("Average Share of Household Income by Major Expenses")
plt.axis('equal')
plt.show()
```



Insight #6:

Total Food Expenditure takes up the largest share of household income at **58.6%,** major portion of Filipino families earnings is spent on food.

Communication Expenditure is only **1.7%,** making it the smallest share among the major expense categories.

This indicates that basic needs like food remain the top priority.

Q7. How is the average household's Budget distributed across common expenditure types?

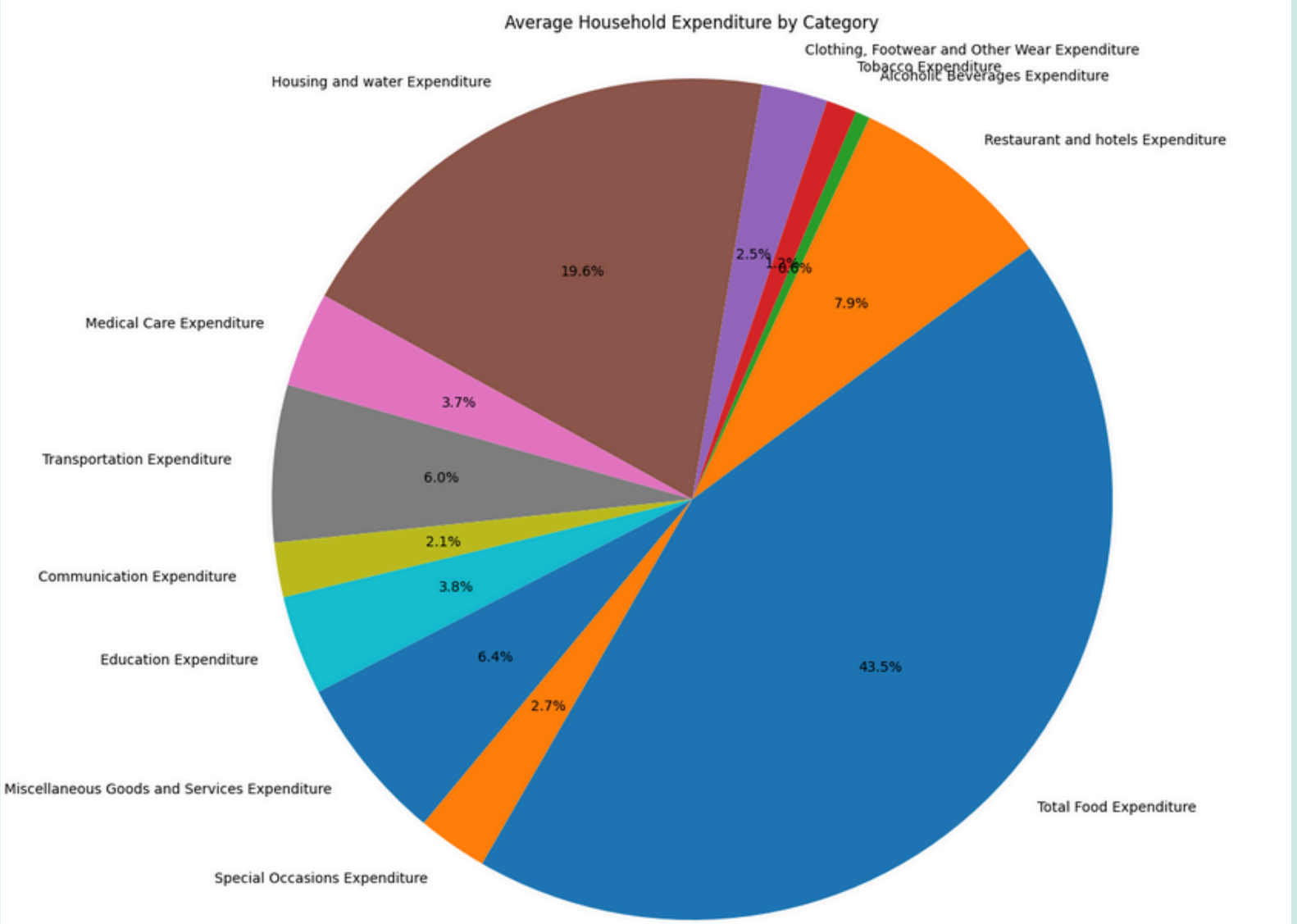
```
# LIST OF ALL EXPENDITURE
expenditure = ['Total Food Expenditure', 'Restaurant and hotels Expenditure', 'Alcoholic Beverages Expenditure',
               'Tobacco Expenditure', 'Clothing, Footwear and Other Wear Expenditure', 'Housing and water Expenditure',
               'Medical Care Expenditure', 'Transportation Expenditure', 'Communication Expenditure', 'Education Expenditure',
               'Miscellaneous Goods and Services Expenditure', 'Special Occasions Expenditure']

# CALCULATE THE AVERAGE
average_expenditures = filEx[expenditure].mean()

# CREATE PIE CHART
plt.figure(figsize=(15, 12))
plt.pie(average_expenditures, labels=average_expenditures.index, autopct='%1.1f%%', startangle=600)
plt.title('Average Household Expenditure by Category')
plt.axis('equal')
plt.show()
```

Insight #7:

Food Expenditure takes up the largest portion of the average of **43.5%,** followed by **Housing and Water Expenditure** at **19.6%.** This indicates that basic necessities like food and shelter are the top spending priorities for most households.

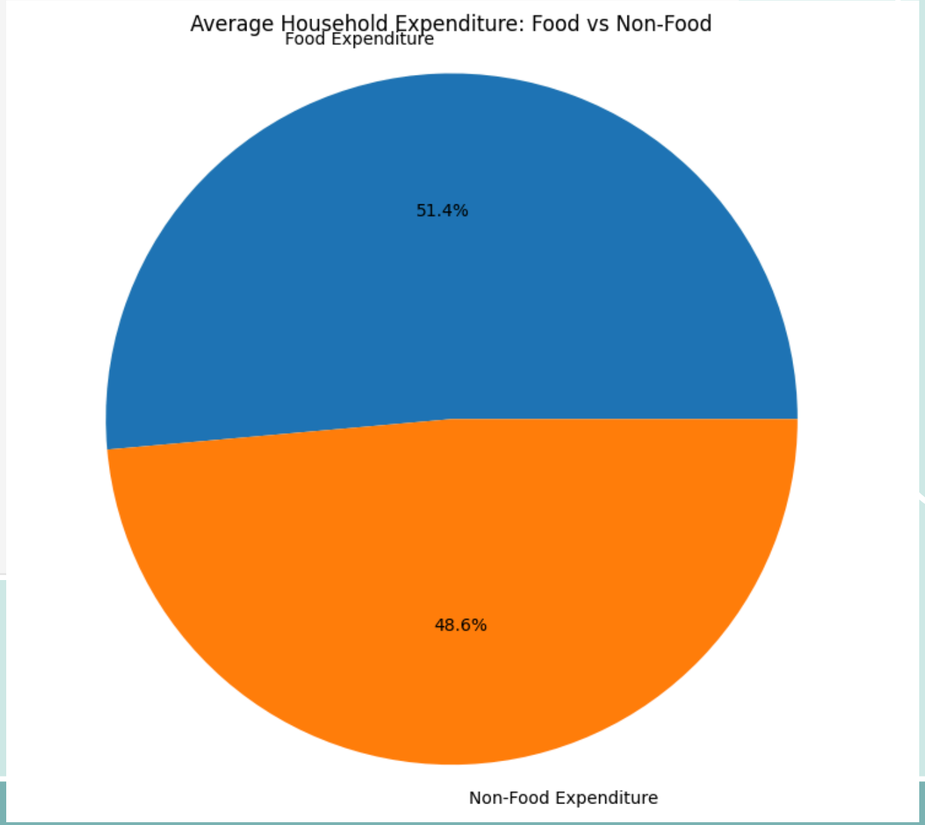
Tobacco (1.2%) and **Alcoholic Beverages (0.6%)** make up the smallest portions of the budget.

Q7. How is the average household's Budget distributed across common expenditure types?



Q8. Do Filipino households spend more on Food or Non-Food Items?

```python
# LIST OF FOOD ITEMS AND NON-FOOD ITEMS
food_expenditure_cols = ['Total Food Expenditure', 'Restaurant and hotels Expenditure']
non_food_expenditure_cols = ['Housing and water Expenditure', 'Medical Care Expenditure', 'Transportation Expenditure',
                             'Communication Expenditure', 'Education Expenditure', 'Miscellaneous Goods and Services Expenditure',
                             'Alcoholic Beverages Expenditure', 'Tobacco Expenditure', 'Clothing, Footwear and Other Wear Expenditure',
                             'Special Occasions Expenditure']

# CALCULATE TOTAL EXPENDITURE FOR FOOD AND NON-FOOD ITEMS
total_food_expenditure = filEx[food_expenditure_cols].sum(axis=1)
total_non_food_expenditure = filEx[non_food_expenditure_cols].sum(axis=1)

# CALCULATE AVERAGE EXPENDITURE
avg_food_expenditure = total_food_expenditure.mean()
avg_non_food_expenditure = total_non_food_expenditure.mean()

# CALL
labels = ['Food Expenditure', 'Non-Food Expenditure']
sizes = [avg_food_expenditure, avg_non_food_expenditure]

# CREATE PIE CHART
plt.figure(figsize=(8, 8))
plt.pie(sizes, labels=labels, autopct='%1.1f%%')
plt.title('Average Household Expenditure: Food vs Non-Food')
plt.axis('equal')
plt.show()
```



Insight 8:

Filipino households spend more on food than non -food items, with **51.4%** of their budget going to **Food related expenses** and **48.6%** of **non-food items.**

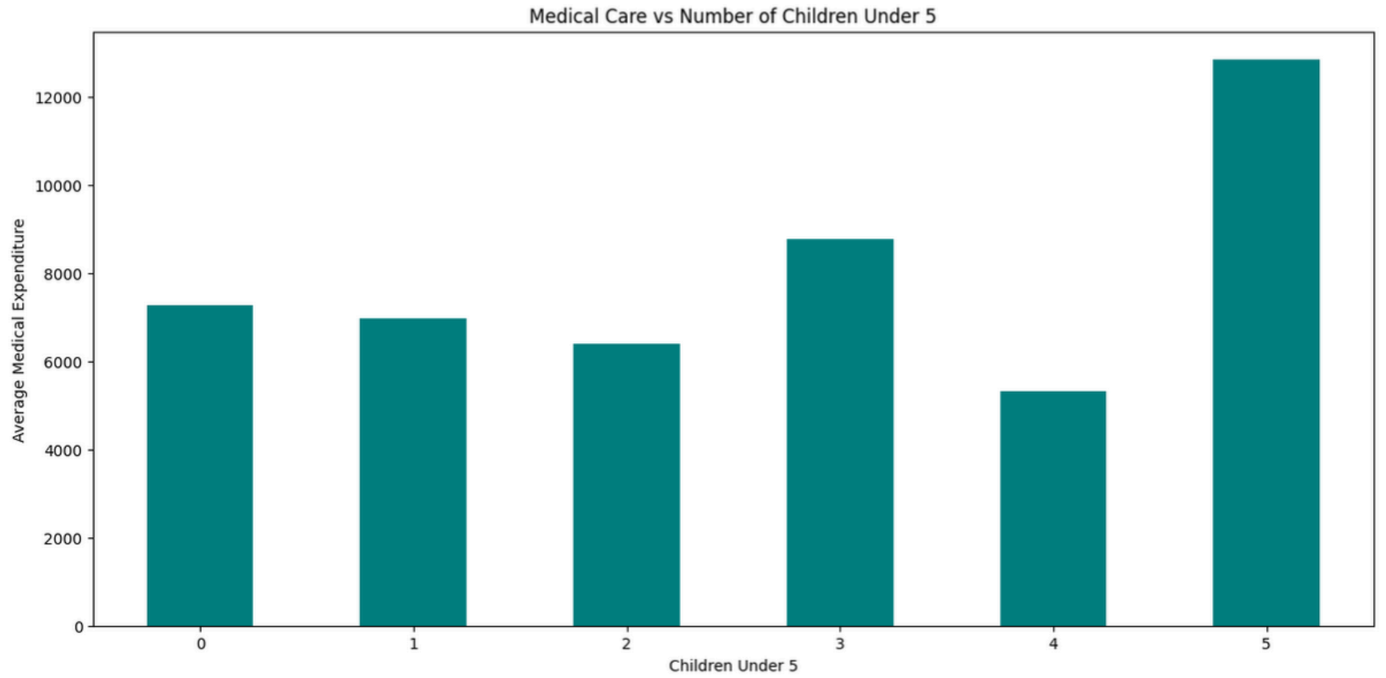
This indicates that food remains the top spending priority, but non-food essentials (house , transportation , education) also takes up significant portion of the household budget. It shows a balanced distribution between basic needs and other living costs.

Q9. Does having more children under 5 put a financial strain on households in terms of medical care?

Insight #9:

Household with with **5 children under 5 yrs old** have the highest average medical care expenditure significant financial as the number of young children increases. Medical expenses tend to rise with more children due to check ups, vaccinations, common childhood illnesses.

```
# GROUPBY THE AGE OF LESS THAN 5 YRS OLD AND MEDICAL CARE EXPENDITURE
under5_medical = filEx.groupby("Members with age less than 5 year old")["Medical Care Expenditure"].mean()

# CREATE BAR GRAPH
under5_medical.plot(kind='bar', color='teal')
plt.title("Medical Care vs Number of Children Under 5")
plt.ylabel("Average Medical Expenditure")
plt.xlabel("Children Under 5")
plt.xticks(rotation=0)
plt.gcf().set_size_inches(15,7)
plt.show()
```



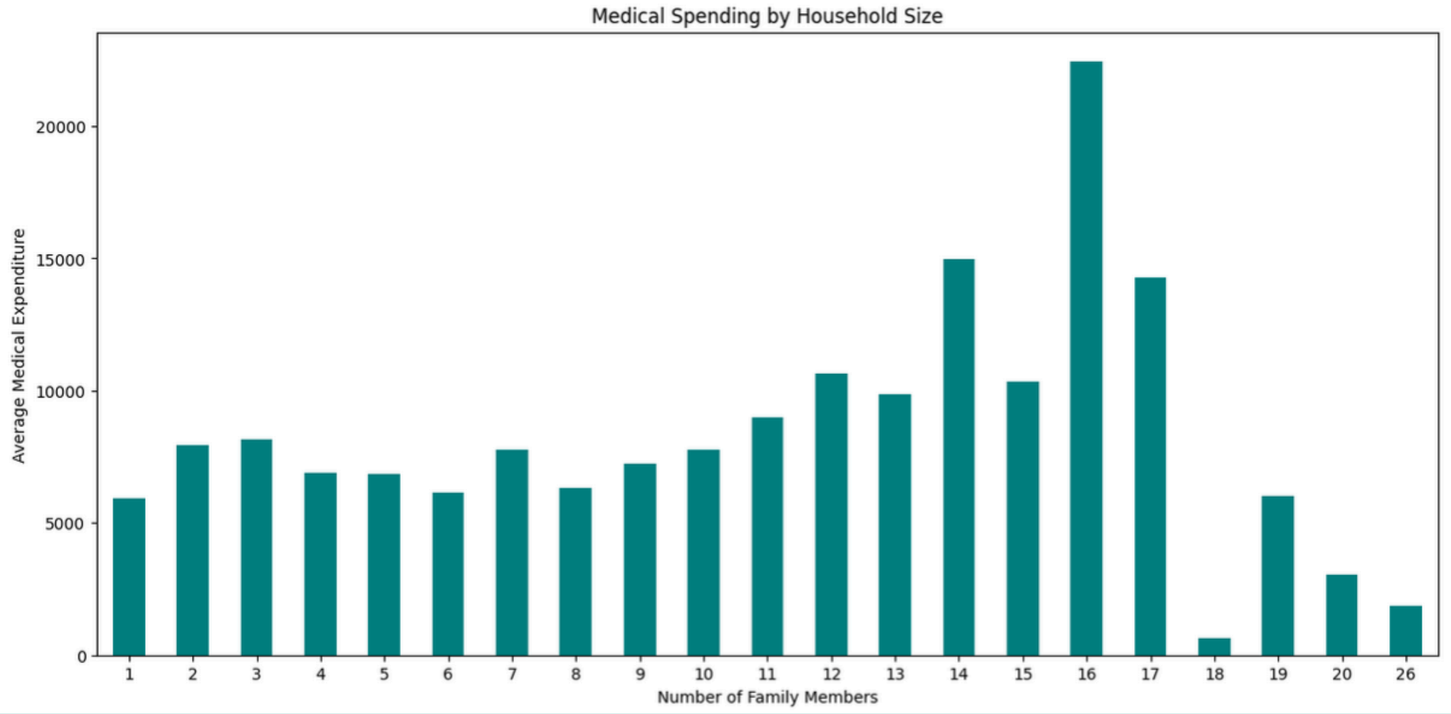
Q10. How does the total number of family members relate to medical care expenditure?

Insight #10:

Households with **16 family members** have the highest average medical care expenditure, while **18 members** have the lowest.

Larger households tend to spend more on medical care, as more family members increase the likelihood of health-related expenses (limited by budget constraints). This suggests that big families may face greater financial pressure in meeting healthcare needs.

```
# GROUPBY THE TOTAL NUMBER OF FAM MEMBERS AND MEDICAL CARE EXPENDITURE
med_by_size = filEx.groupby("Total Number of Family members")["Medical Care Expenditure"].mean()

# CREATE BAR PLOT
med_by_size.plot(kind='bar', color='teal')
plt.title("Medical Spending by Household Size")
plt.xlabel("Number of Family Members")
plt.ylabel("Average Medical Expenditure")
plt.xticks(rotation=0)
plt.gcf().set_size_inches(15,7)
plt.show()
```



Q11. How does the type of household affect medical care expenditure?

Insight #11:

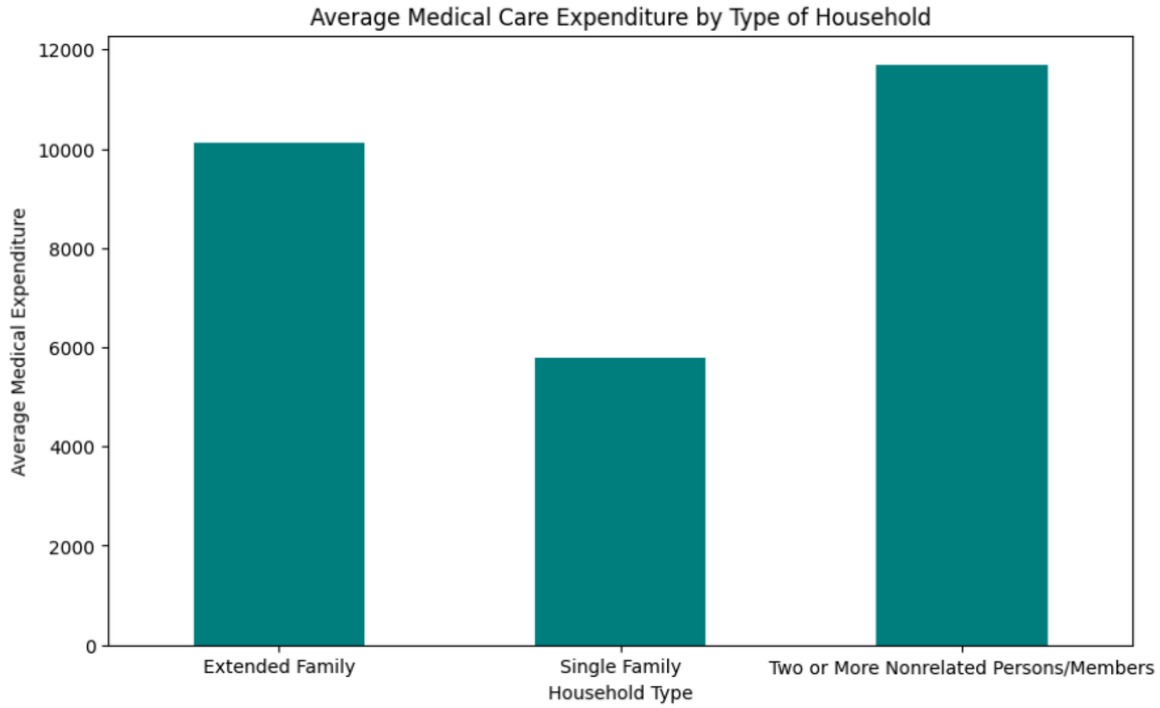
The households composed of **Two or More Nonrelated Persons/members** have the highest average medical care expenditure. Non family living may greater healthcare costs, due to limited shared support systems or individual health responsibilities.

Single Family households tend to have lower medical expenses, benefiting from shared caregiving and healthcare resources.

```
filEx["Type of Household"].unique()
```

```
['Extended Family', 'Single Family', 'Two or More Nonrelated Persons/Members']
Categories (3, object): ['Extended Family', 'Single Family', 'Two or More Nonrelated Persons/Members']
```

```
# GROUPBY THR TYPE OF HOUSEHOLD AND MEDICAL CARE EXPENDITURE
type_medical = filEx.groupby("Type of Household")["Medical Care Expenditure"].mean()

# CREATE BAR GRAPH
type_medical.plot(kind='bar', color='teal')
plt.title("Average Medical Care Expenditure by Type of Household")
plt.ylabel("Average Medical Expenditure")
plt.xlabel("Household Type")
plt.xticks(rotation=0)
plt.gcf().set_size_inches(10,6)
plt.show()
```



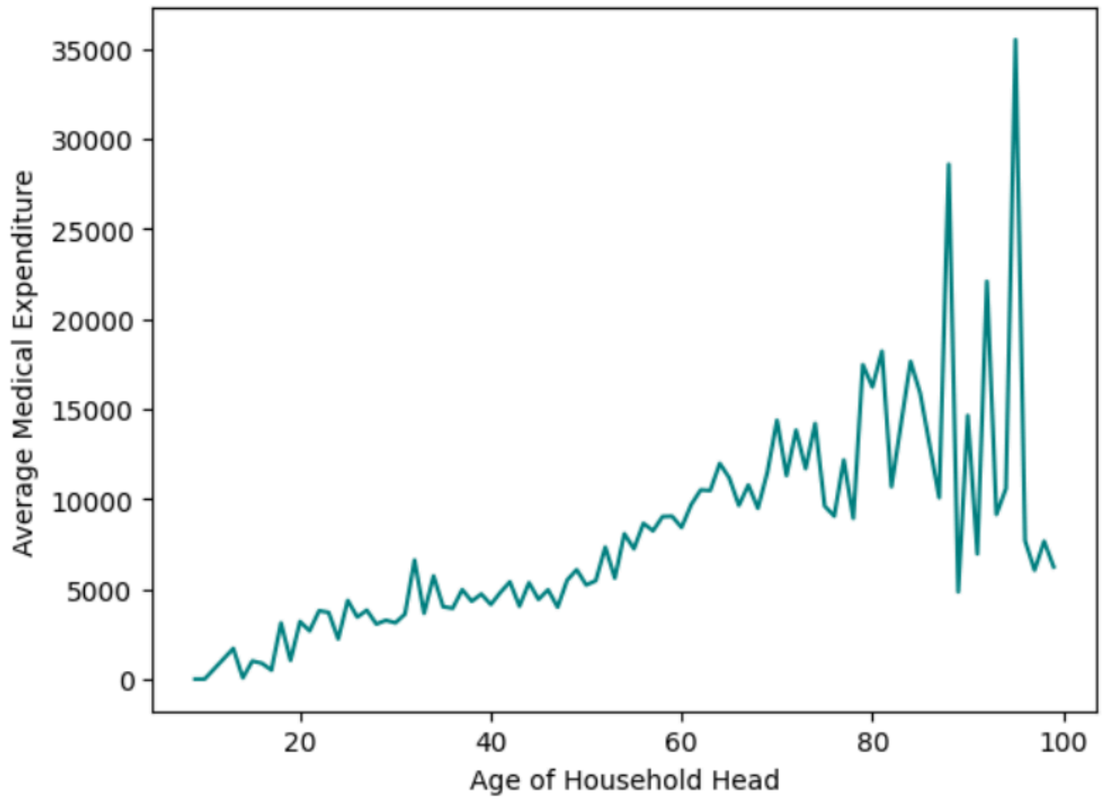
Q12. How does the age of the household head affect medical care spreading?

Insight #12:

There is a **Positive relationship** between the age of the household head and medical care expenditure.

As the age increases, medical spending also tends to rise, particularly in older age group (healthcare needs like medical check ups).

```
# GROUPBY THE HOUSEHOLD AGE AND MEDICAL CARE
age_medical = filEx.groupby("Household Head Age")["Medical Care Expenditure"].mean()

# CREATE LINE PLOT
age_medical.plot(kind='line', color="teal")
plt.ylabel("Average Medical Expenditure")
plt.xlabel("Age of Household Head")
plt.show()
```



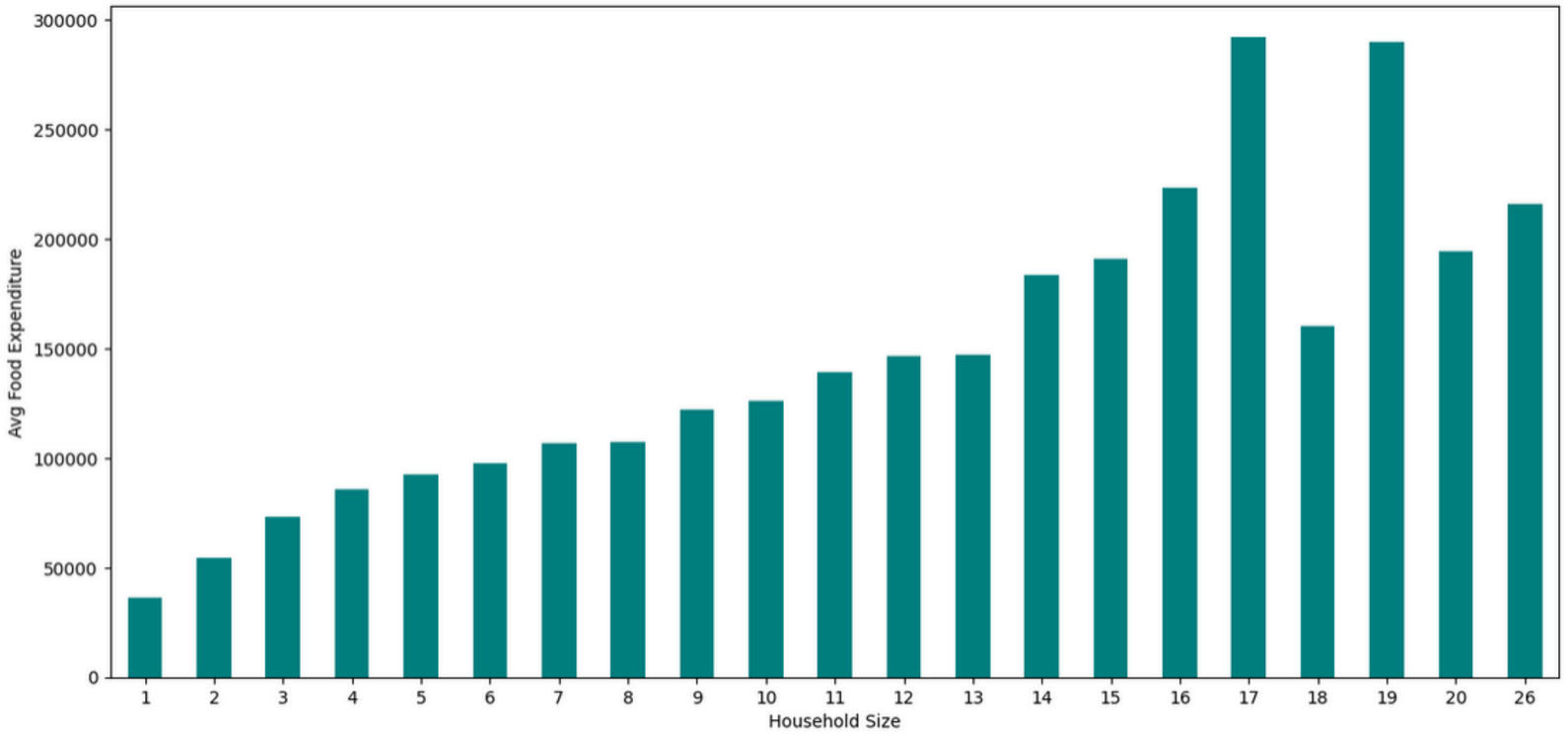
Q13. How does household sizes affect total food expenditure?

Insight #13:

Larger households, particularly those with **17 members,** have the highest average food expenditure, while **single member households** spend the least.

This indicates the positive relationship between household sizes and total food spending as the number of family increases.

```
# GROUPYBY THE TOTAL NUMBER OF FAMILY MEMBERS AND TOTAL FOOD EXPENDITURE
size_food = filEx.groupby("Total Number of Family members")["Total Food Expenditure"].mean()

# CREATE BAR GRAPH
size_food.plot(kind='bar', color='teal')
plt.xlabel("Household Size")
plt.ylabel("Avg Food Expenditure")
plt.xticks(rotation=0)
plt.gcf().set_size_inches(15,7)
plt.show()
```



```
filEx['Household Head Highest Grade Completed'].unique()
```

```
['Teacher Training and Education Sciences Progr..., 'Transport Services Programs', 'Grade 3', 'Elementary Graduate', 'Second Year High School', ..., 'Presc
hool', 'Physical Sciences Programs', 'Arts Programs', 'Veterinary Programs', 'Environmental Protection Programs']
Length: 46
Categories (46, object): ['Agriculture, Forestry, and Fishery Programs', 'Architecture and Building Programs', 'Arts Programs', 'Basic Programs', ..., 'Thi
rd Year College', 'Third Year High School', 'Transport Services Programs', 'Veterinary Programs']
```

```
# GROUPBY THE HOUSEHOLD HEAD HIGHEST GRADE AND MEDICAL CARE
edu_medical = filEx.groupby("Household Head Highest Grade Completed")["Medical Care Expenditure"].mean()

# CREATE BAR GRAPH
edu_medical.plot(kind='bar', color="teal")
plt.title("Avg Medical Care Spending by Education Level")
plt.ylabel("Average Medical Expenditure")
plt.xlabel("Education Level")
plt.gcf().set_size_inches(40,10)
plt.show()
```

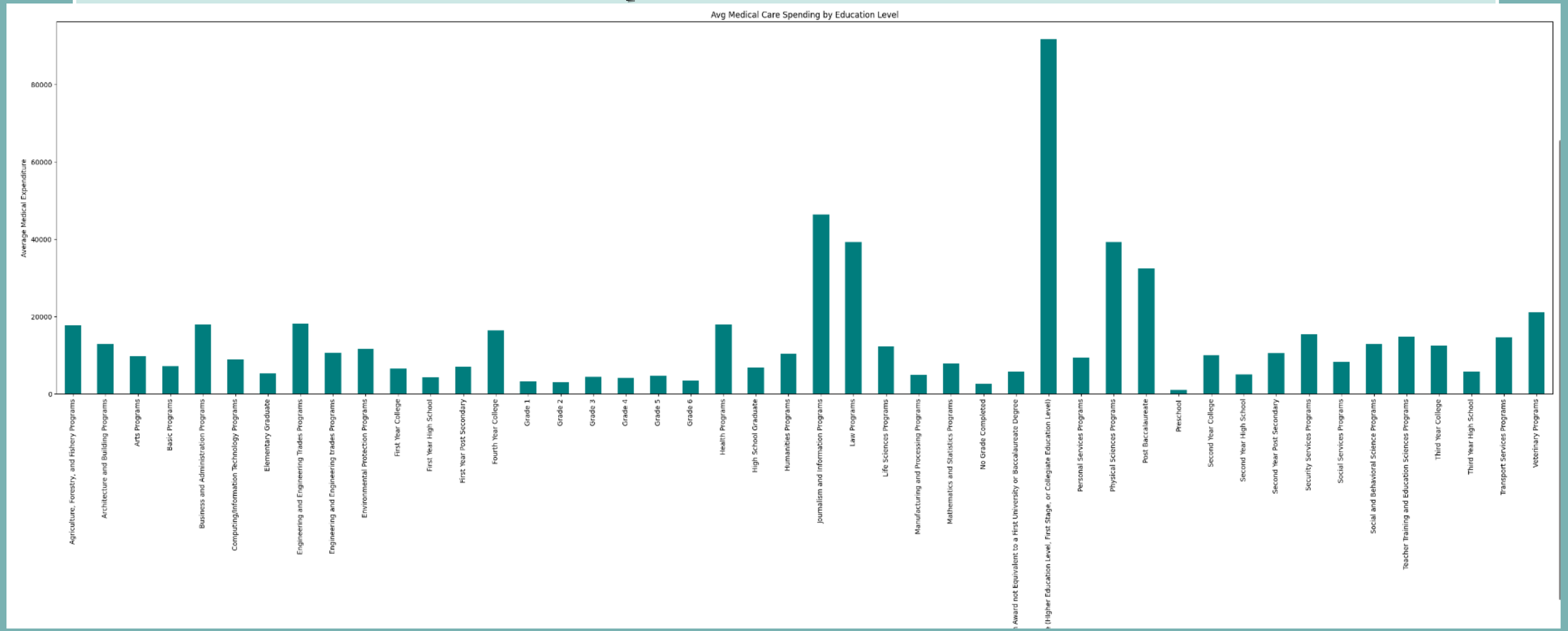
Q14. How does the education level of the household head influence medical care expenditure?

Insight #14:

Medical care expenditure increases with the educational level of the household head. Household led with **Higher Education Level, First Stage, or Collegiate Education Level** spend more on medical care.

Preschool education spend the least. This suggest that higher education may lead to greater health awareness.

Q14. How does the education level of the household head influence medical care expenditure?



Q15. How does the education level of the household head influence total household income?

Insight #15:

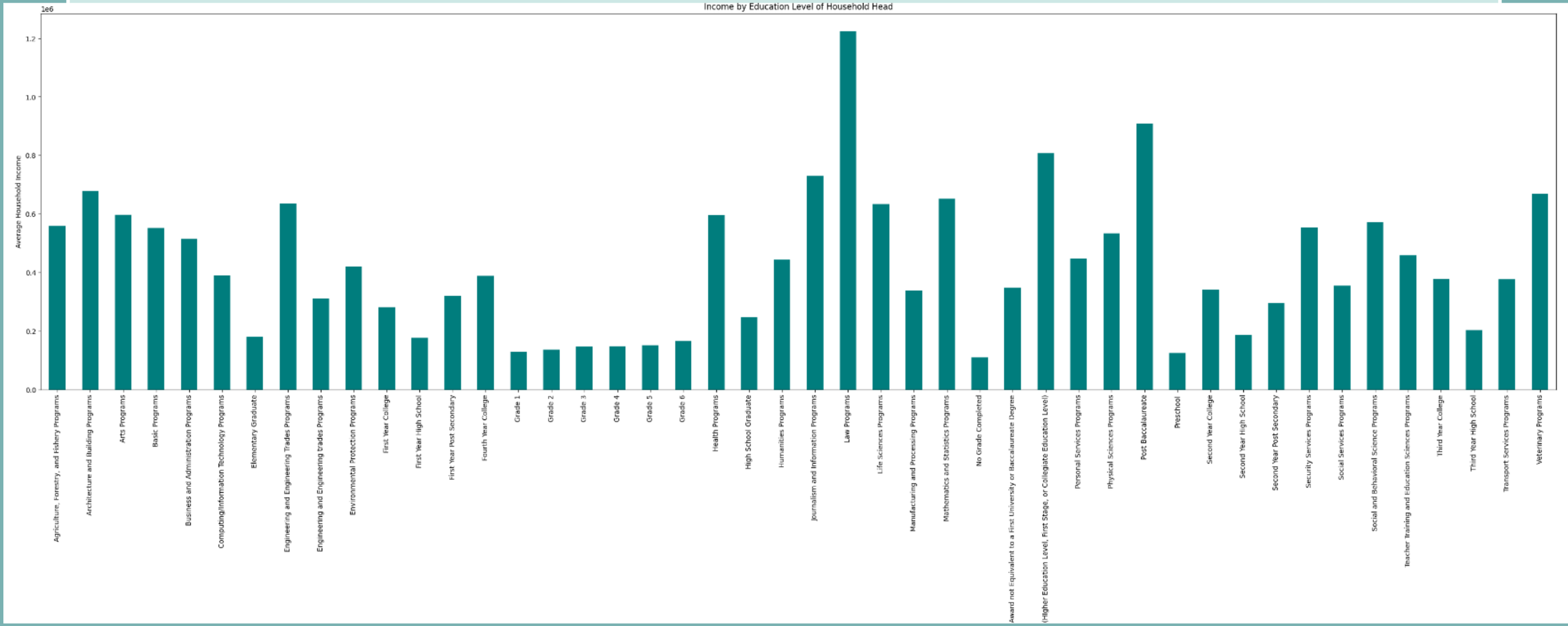
Who completed **Law Programs** have the highest average income, while those who **did not complete any grade level** have the lowest.

This indicates that have degrees, especially in professional fields like Law, typically lead to higher earning careers.

Limited education restrict access to well playing jobs, resulting in lower household income.

```
# GROUPBY THE HOUSEHOLD HEAD HIGHEST GRADE AND TOTAL HOUSEHOLD INCOME
edu_income = filEx.groupby("Household Head Highest Grade Completed")["Total Household Income"].mean()

# CREATE BAR GRAPH
edu_income.plot(kind='bar', color='teal', title="Income by Education Level of Household Head")
plt.xlabel("Education Level")
plt.ylabel("Average Household Income")
plt.gcf().set_size_inches(40,10)
plt.show()
```

Q15. How does the education level of the household head influence total household income?



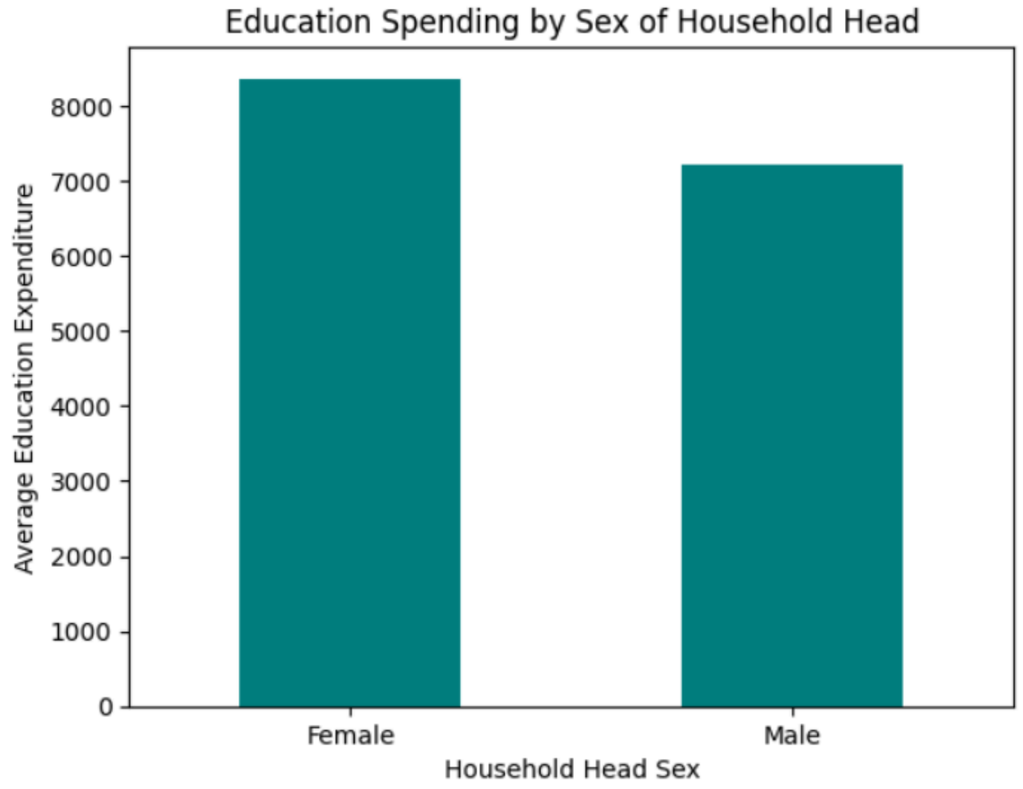
Q16. Which sex of household head spends more on education on average?

Insight #16:

Female households spend more on education on average of **8,000+** compared to **Male** households with the average of **7,000+.**

This indicates that female heads may prioritize educational expenses more.

```
# GROUPBY THE GENDER AND EDUCATION EXPENDITURE
gender_edu = filEx.groupby("Household Head Sex")["Education Expenditure"].mean()

# CREATE BAR GRAPH
gender_edu.plot(kind='bar', title="Education Spending by Sex of Household Head", color='teal')
plt.ylabel("Average Education Expenditure")
plt.xticks(rotation=0)
plt.show()
```



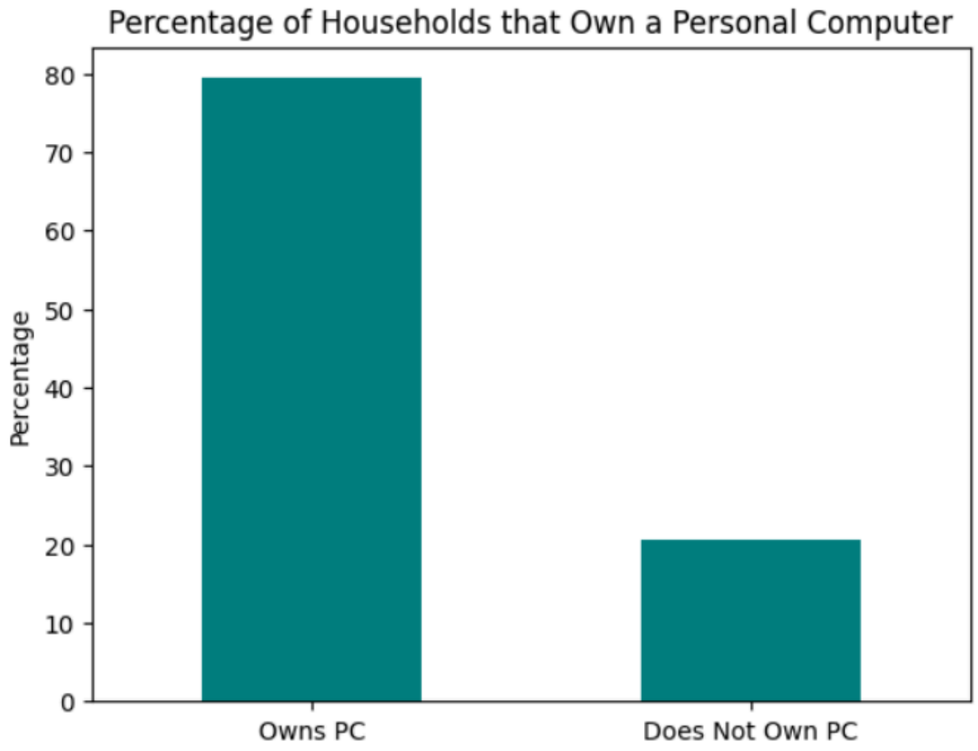
Q17. Do most Filipino Households own Personal Computers?

Insight #17:

The majority of Filipino households **owns at least one personal computer** that have **80%.** Suggests a growing access to digital technology, that reflect technological adoption, digital literacy, work and education purposes.

The remaining **20%** of households without PC, which highlights digital divide that may still exist, especially in lower income or rural areas.

```
# COUNT THE NUMBER OF PERSONAL COMPUTER
pc_ownership = (filEx["Number of Personal Computer"] > 0).value_counts(normalize=True) * 100
pc_ownership.index = ["Owns PC", "Does Not Own PC"]

# CREATE BAR GRAPH
pc_ownership.plot(kind="bar", color='teal')
plt.title("Percentage of Households that Own a Personal Computer")
plt.ylabel("Percentage")
plt.xticks(rotation=0)
plt.show()
```



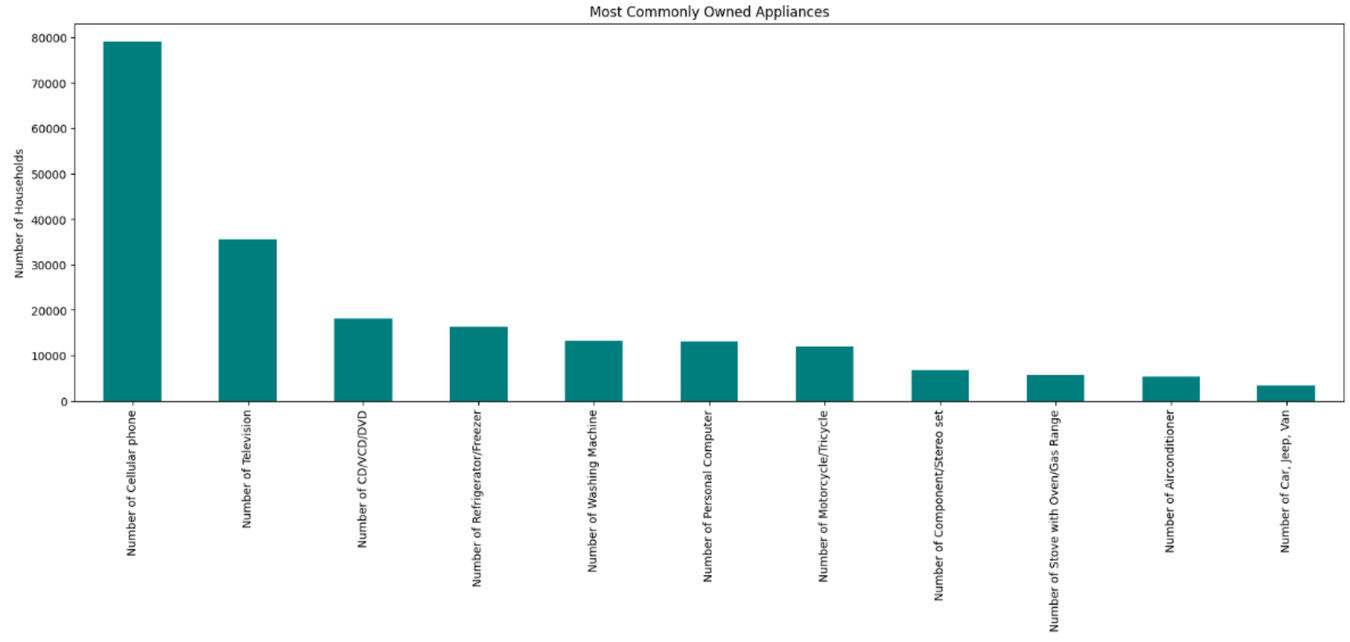
Q18. What appliances are most commonly owned by households?

Insight #18:

Cellular Phones are the most commonly owned appliances among Filipino households, followed by **Televisions.** This highlights the widespread of mobile technology for communication and entertainment.

Vehicle of Car, Jeep, and Van are the least commonly owned, which mean that not all families can afford private vehicles.

```
# LIST OF APPLIANCES
appliances = ["Number of Television", "Number of CD/VCD/DVD", "Number of Component/Stereo set",
              "Number of Refrigerator/Freezer", "Number of Washing Machine", "Number of Airconditioner",
              "Number of Personal Computer", "Number of Cellular phone", "Number of Stove with Oven/Gas Range",
              "Number of Car, Jeep, Van", "Number of Motorcycle/Tricycle"]

# SUM ALL THE APPLIANCES EACH
appliance_totals = filEx[appliances].sum().sort_values(ascending=False)

# CREATE BAR GRPAH
appliance_totals.plot(kind='bar', color='teal')
plt.title("Most Commonly Owned Appliances")
plt.ylabel("Number of Households")
plt.gcf().set_size_inches(20,6)
plt.show()
```



Q19. Is there a relationship between the number of bedrooms and Total Number of Family Members?

Insight #19:

The correlation is approximately **0.09,** which indicates a **Positive Relationship between the Number of Bedrooms and the Total Number of Family Members.** The more members the more bedrooms.

```
bedroom_members = filEx["Number of bedrooms"].corr(filEx["Total Number of Family members"])
bedroom_members
```

```
0.09114229012789835
```

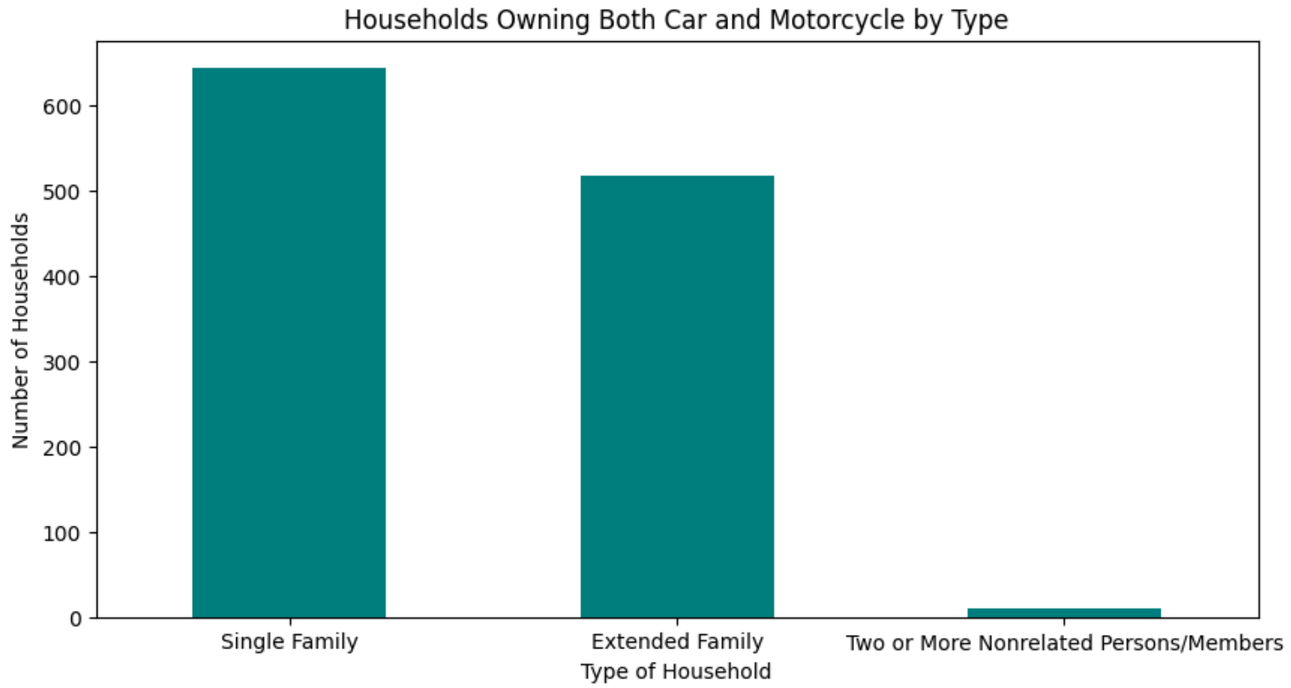
Q20. Which household Types own a Both Car and Motorcycle?

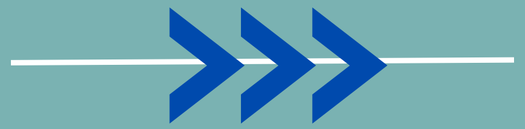
Insight #20:

Single Family households are the most likely to own both a car and a motorcycle. Single family may have financial stability or transportation needs.

While households with **Two or More Nonrelated Persons / Members** are the least likely.

```
# FILTERING HOUSEHOLDS THAT OWN BOTH A CAR AND MOTORCYCLE
car_and_motor = filEx[(filEx["Number of Car, Jeep, Van"] > 0) & (filEx["Number of Motorcycle/Tricycle"] > 0)]

# GROUP BY TPE OF HOUSEHOLD
car_motor_by_type = car_and_motor["Type of Household"].value_counts()

# CREATE BAR GRAPH
car_motor_by_type.plot(kind='bar', color='teal')
plt.title("Households Owning Both Car and Motorcycle by Type")
plt.xlabel("Type of Household")
plt.ylabel("Number of Households")
plt.xticks(rotation=0)
plt.gcf().set_size_inches(10,5)
plt.show()
```





THE END