In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import matplotlib.ticker as tcr
%matplotlib inline
import seaborn as sns
```

In [2]:

```
#reading data as excel as csv file is too big
dating = pd.read_excel('/home/amybirdee/hobby_projects/dating_site/profiles.xlsx')
```

In [3]:

```
dating.head(3)
```

Out[3]:

	age	body_type	diet	drinks	drugs	education	essay0	
0	22	a little extra	strictly anything	socially	never	working on college/university	removed_for_privacy	remove
1	35	average	mostly other	often	sometimes	working on space camp	removed_for_privacy	remove
2	38	thin	anything	socially	NaN	graduated from masters program	removed_for_privacy	remove

3 rows × 31 columns

In [4]:

```
#checking number of rows and columns
dating.shape
```

Out[4]:

```
(59946, 31)
```

In [5]:

```
#checking datatypes
dating.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 59946 entries, 0 to 59945
Data columns (total 31 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   age          59946 non-null  int64  
 1   body_type    54650 non-null  object 
 2   diet         35551 non-null  object 
 3   drinks       56961 non-null  object 
 4   drugs        45866 non-null  object 
 5   education    53318 non-null  object 
 6   essay0       59946 non-null  object 
 7   essay1       59946 non-null  object 
 8   essay2       59946 non-null  object 
 9   essay3       59946 non-null  object 
 10  essay4       59946 non-null  object 
 11  essay5       59946 non-null  object 
 12  essay6       59946 non-null  object 
 13  essay7       59946 non-null  object 
 14  essay8       59946 non-null  object 
 15  essay9       59946 non-null  object 
 16  ethnicity    54263 non-null  object 
 17  height       59940 non-null  float64
 18  income       59943 non-null  float64
 19  job          51745 non-null  object 
 20  last_online  59943 non-null  object 
 21  location     59943 non-null  object 
 22  offspring    24383 non-null  object 
 23  orientation  59943 non-null  object 
 24  pets         40023 non-null  object 
 25  religion     39717 non-null  object 
 26  sex          59943 non-null  object 
 27  sign         48887 non-null  object 
 28  smokes       54431 non-null  object 
 29  speaks       59893 non-null  object 
 30  status       59943 non-null  object 
dtypes: float64(2), int64(1), object(28)
memory usage: 14.2+ MB
```

In [6]:

```
#descibing the data
dating.describe(include = 'all')
```

Out[6]:

	age	body_type	diet	drinks	drugs	education	essa
count	59946.000000	54650	35551	56961	45866	53318	599
unique	NaN	12	18	6	3	32	
top	NaN	average	mostly anything	socially	never	graduated from college/university	removed_for_priva
freq	NaN	14652	16585	41780	37724	23959	599
mean	32.340290	NaN	NaN	NaN	NaN	NaN	Na
std	9.452779	NaN	NaN	NaN	NaN	NaN	Na
min	18.000000	NaN	NaN	NaN	NaN	NaN	Na
25%	26.000000	NaN	NaN	NaN	NaN	NaN	Na
50%	30.000000	NaN	NaN	NaN	NaN	NaN	Na
75%	37.000000	NaN	NaN	NaN	NaN	NaN	Na
max	110.000000	NaN	NaN	NaN	NaN	NaN	Na

11 rows × 31 columns

In [7]:

```
#checking column names
dating.columns
```

Out[7]:

```
Index(['age', 'body_type', 'diet', 'drinks', 'drugs', 'education', 'essay
0',
       'essay1', 'essay2', 'essay3', 'essay4', 'essay5', 'essay6', 'essay
7',
       'essay8', 'essay9', 'ethnicity', 'height', 'income', 'job',
       'last_online', 'location', 'offspring', 'orientation', 'pets',
       'religion', 'sex', 'sign', 'smokes', 'speaks', 'status'],
      dtype='object')
```

In [8]:

```
#dropping the essay columns and last_online as not needed for analysis
dating = dating.drop(['essay0', 'essay1', 'essay2', 'essay3', 'essay4', 'essay5', 'essay6', 'essay7', 'essay8', 'essay9', \
                     'last_online'], axis = 1)
```

In [9]:

```
dating.head()
```

Out[9]:

	age	body_type	diet	drinks	drugs	education	ethnicity	height	income
0	22	a little extra	strictly anything	socially	never	working on college/university	asian, white	75.0	-1.0
1	35	average	mostly other	often	sometimes	working on space camp	white	70.0	80000.0
2	38	thin	anything	socially	NaN	graduated from masters program	NaN	68.0	-1.0
3	23	thin	vegetarian	socially	NaN	working on college/university	white	71.0	20000.0
4	29	athletic	NaN	socially	never	graduated from college/university	asian, black, other	66.0	-1.0

In [10]:

```
#filling in nan values - using median for age since dataset is right skewed and average
s for rest of numeric values.
#Using most common values for some non-numeric variables where there are only a few mis
sing values.
#Otherwise filling with 'no response given'
dating['age'] = dating.age.fillna(dating['age'].median())
dating['body_type'] = dating.body_type.fillna('average')
dating['diet'] = dating.diet.fillna('no response given')
dating['drinks'] = dating.drinks.fillna('no response given')
dating['drugs'] = dating.drugs.fillna('no response given')
dating['education'] = dating.education.fillna('no response given')
dating['ethnicity'] = dating.ethnicity.fillna('no response given')
dating['height'] = dating.height.fillna(dating['height'].mean())
dating['income'] = dating.income.fillna(dating['income'].mean())
dating['job'] = dating.job.fillna('no response given')
dating['location'] = dating.location.fillna('no response given')
dating['offspring'] = dating.offspring.fillna('no response given')
dating['orientation'] = dating.orientation.fillna('no response given')
dating['pets'] = dating.pets.fillna('no response given')
dating['religion'] = dating.religion.fillna('no response given')
dating['sex'] = dating.sex.fillna('no response given')
dating['sign'] = dating.sign.fillna('no response given')
dating['smokes'] = dating.smokes.fillna('no response given')
dating['speaks'] = dating.speaks.fillna('no response given')
dating['status'] = dating.status.fillna('no response given')
```

In [11]:

```
#apostrophes are being replaces with '&rsquo;' - fixing this
dating['offspring'] = dating['offspring'].str.replace('doesn&rsquo;t', "doesn't")
dating['sign'] = dating['sign'].str.replace('doesn&rsquo;t', "doesn't")
```

In [12]:

```
#converting numeric fields to integers rather than floats
dating['age'] = dating.age.astype(int)
dating['height'] = dating.height.astype(int)
dating['income'] = dating.income.astype(int)
```

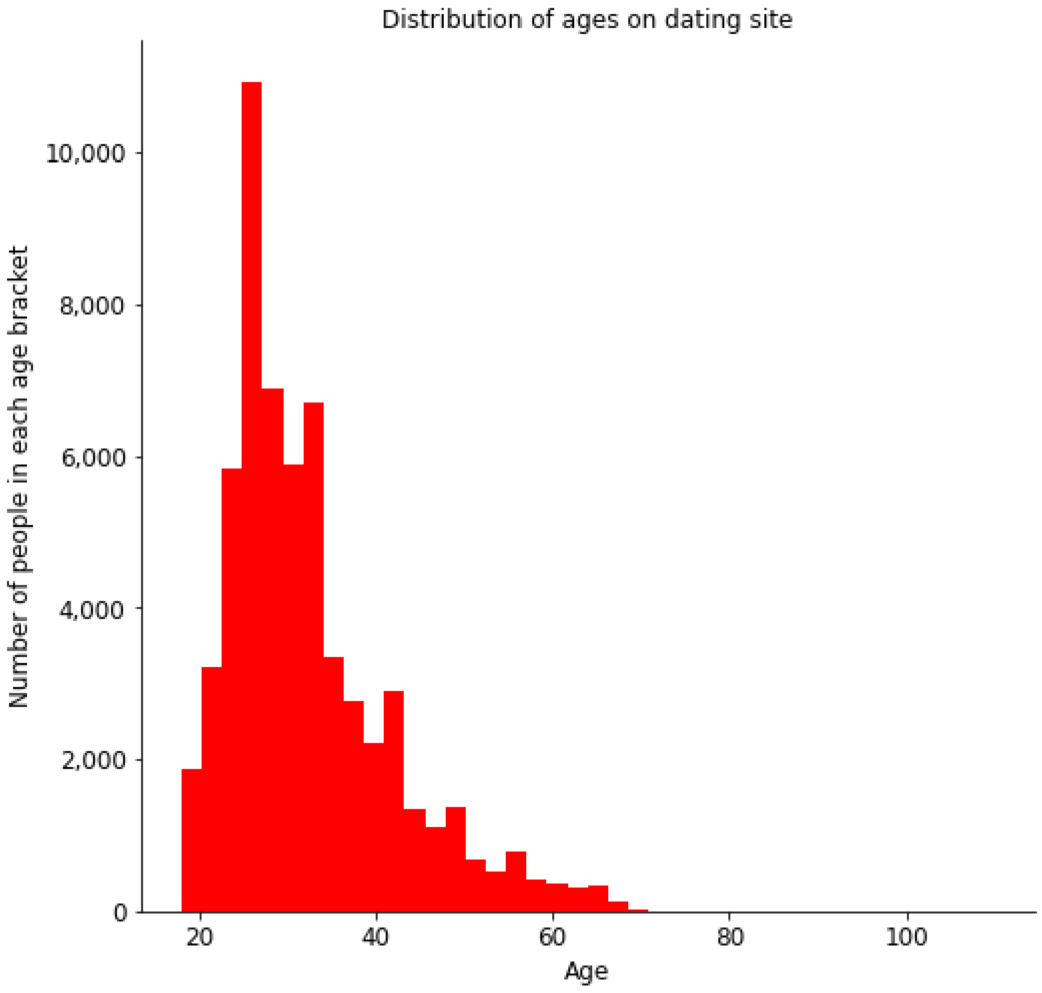
In [13]:

```
#all records now filled in
dating.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 59946 entries, 0 to 59945
Data columns (total 20 columns):
 #   Column       Non-Null Count  Dtype 
---  ------       --------------  ----- 
 0   age          59946 non-null  int64 
 1   body_type    59946 non-null  object
 2   diet         59946 non-null  object
 3   drinks       59946 non-null  object
 4   drugs        59946 non-null  object
 5   education    59946 non-null  object
 6   ethnicity    59946 non-null  object
 7   height       59946 non-null  int64 
 8   income       59946 non-null  int64 
 9   job          59946 non-null  object
 10  location     59946 non-null  object
 11  offspring    59946 non-null  object
 12  orientation  59946 non-null  object
 13  pets         59946 non-null  object
 14  religion     59946 non-null  object
 15  sex          59946 non-null  object
 16  sign         59946 non-null  object
 17  smokes       59946 non-null  object
 18  speaks       59946 non-null  object
 19  status       59946 non-null  object
dtypes: int64(3), object(17)
memory usage: 9.1+ MB
```

In [14]:

```
#checking age distribution - shows a right skew
plt.figure(figsize = (8,8))
ax = plt.subplot()

dating['age'].hist(bins = 40, color = 'red')

#removing chart borders
ax.spines['top'].set_visible(False)
ax.spines['right'].set_visible(False)

#function to add comma separator to labels. Function takes tick label and tick position
def comma(x, pos):
    return format(x, ",.0f")

#this code adds a comma separater to the y tick marks
ax.yaxis.set_major_formatter(tcr.FuncFormatter(comma))

plt.xlabel('Age', fontsize = 12)
plt.ylabel('Number of people in each age bracket', fontsize = 12)
plt.tick_params(axis = 'x', labelsize = 12)
plt.tick_params(axis = 'y', labelsize = 12)

plt.title('Distribution of ages on dating site', fontsize = 12)
plt.grid(None)
plt.savefig('Age - histogram', bbox_inches = 'tight')
```



In [15]:

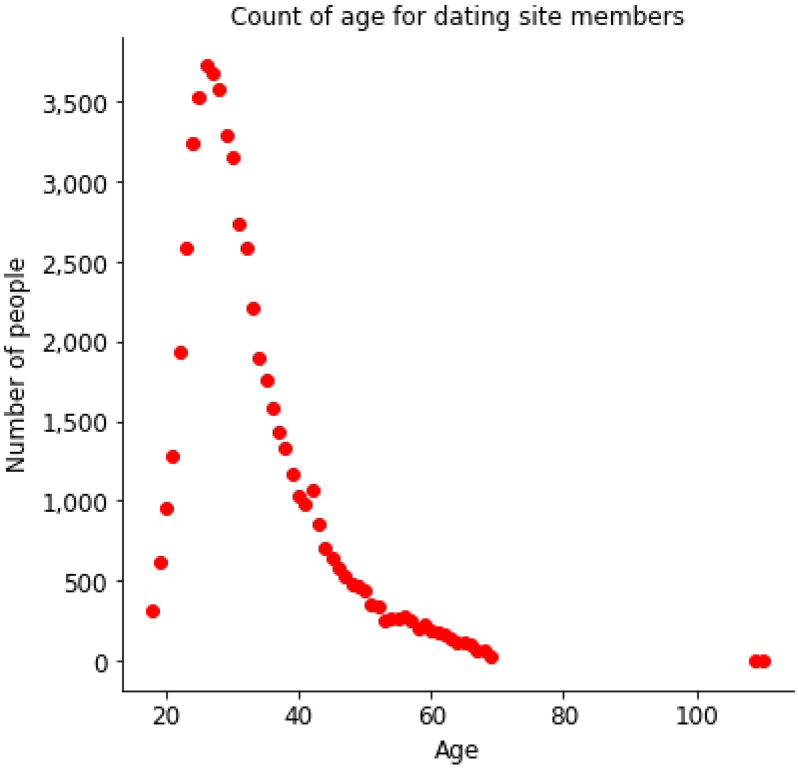
```
#grouping by age to see the data - a couple of ages over 100 - anomalies or might be false data
Age = dating.groupby('age').size().reset_index().rename(columns = {0: 'count_of_age'})
Age.head()
```

Out[15]:

	age	count_of_age
0	18	309
1	19	611
2	20	953
3	21	1282
4	22	1934

In [16]:

```
#plotting a scatter plot of ages - most people are mid 20s-30
plt.figure(figsize = (6,6))
ax = plt.subplot()

plt.scatter(Age['age'], Age['count_of_age'], color = 'red')

#removing chart borders
ax.spines['top'].set_visible(False)
ax.spines['right'].set_visible(False)

#this code adds a comma separater to the y tick marks
ax.yaxis.set_major_formatter(tcr.FuncFormatter(comma))

plt.xlabel('Age', fontsize = 12)
plt.ylabel('Number of people', fontsize = 12)
plt.tick_params(axis = 'x', labelsize = 12)
plt.tick_params(axis = 'y', labelsize = 12)

plt.title('Count of age for dating site members', fontsize = 12)
plt.savefig('Age - scatter plot')
```


Count of age for dating site members
Number of people
3,500
3,000
2,500
2,000
1,500
1,000
500
0
20
40
60
80
100
Age

In [17]:

```
#grouping ages into 7 groups for barplot using pd.cut to cut the age column
bins = [17, 19, 29, 39, 49, 59, 69, np.inf]
labels = ['<20', '20-29', '30-39', '40-49', '50-59', '60-69', '70+']
Age['age_range'] = pd.cut(Age['age'], bins = bins, labels = labels)
Age.head()
```

Out[17]:

	age	count_of_age	age_range
0	18	309	<20
1	19	611	<20
2	20	953	20-29
3	21	1282	20-29
4	22	1934	20-29

In [18]:

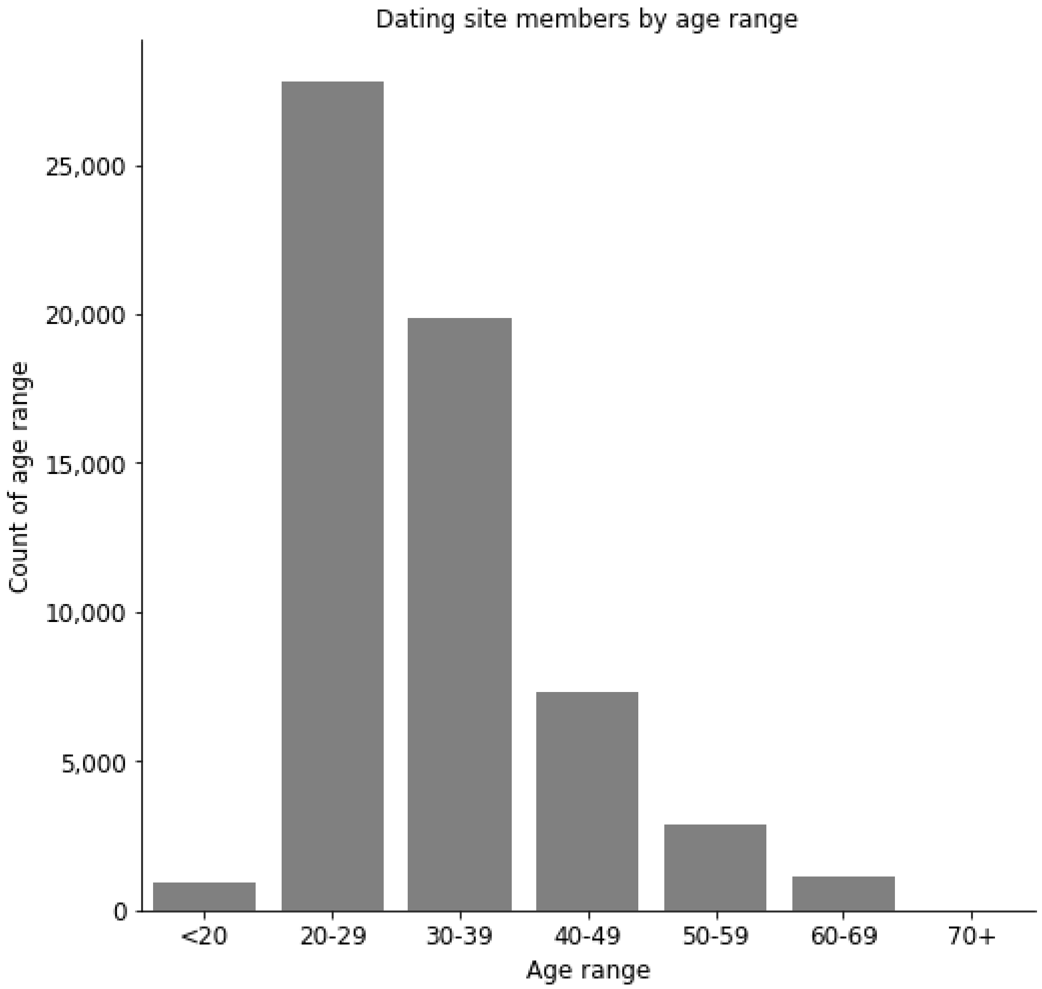
```
#grouping age ranges
age_range = Age.groupby('age_range').count_of_age.sum().to_frame().reset_index()
age_range
```

Out[18]:

	age_range	count_of_age
0	<20	920
1	20-29	27821
2	30-39	19846
3	40-49	7338
4	50-59	2860
5	60-69	1159
6	70+	2

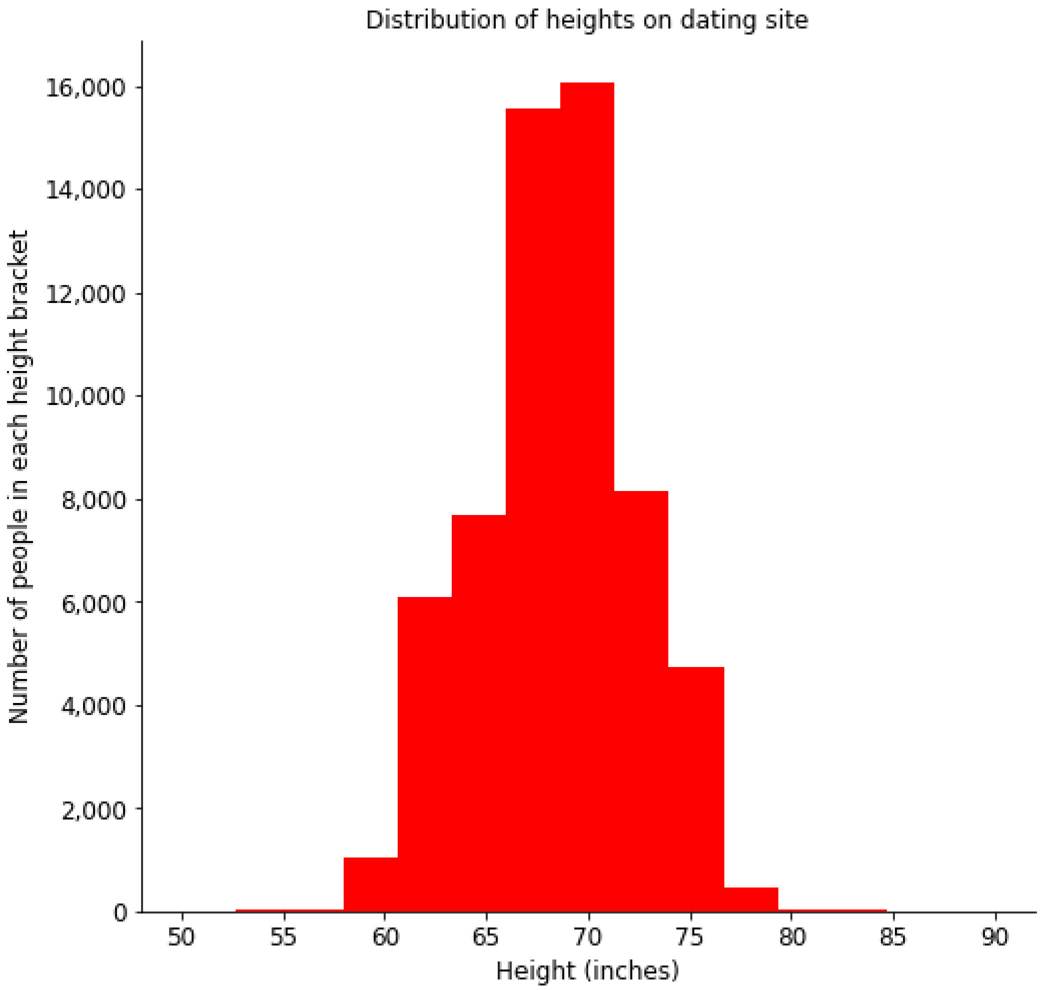
In [19]:

```
#barplot of ages - ci = None removes the confidence intervals
plt.figure(figsize = (8,8))
ax = sns.barplot(x = age_range['age_range'], y = age_range['count_of_age'], color = 'grey', ci = None)

#removing chart borders
ax.spines['top'].set_visible(False)
ax.spines['right'].set_visible(False)

ax.yaxis.set_major_formatter(tcr.FuncFormatter(comma))

plt.xlabel('Age range', fontsize = 12)
plt.ylabel('Count of age range', fontsize = 12)
plt.tick_params(axis = 'x', labelsize = 12)
plt.tick_params(axis = 'y', labelsize = 12)

plt.title('Dating site members by age range', fontsize = 12)
plt.savefig('Age - barplot', bbox_inches = 'tight')
```



In [20]:

```
#checking height distribution - shows a relatively normal distribution
plt.figure(figsize = (8,8))
ax = plt.subplot()
dating['height'].hist(bins = 15, range = [50, 90], color = 'red')

#removing chart borders
ax.spines['top'].set_visible(False)
ax.spines['right'].set_visible(False)

ax.yaxis.set_major_formatter(tcr.FuncFormatter(comma))

plt.xlabel('Height (inches)', fontsize = 12)
plt.ylabel('Number of people in each height bracket', fontsize = 12)
plt.tick_params(axis = 'x', labelsize = 12)
plt.tick_params(axis = 'y', labelsize = 12)

plt.title('Distribution of heights on dating site', fontsize = 12)
plt.grid(None)
plt.savefig('Height - histogram', bbox_inches = 'tight')
```



In [21]:

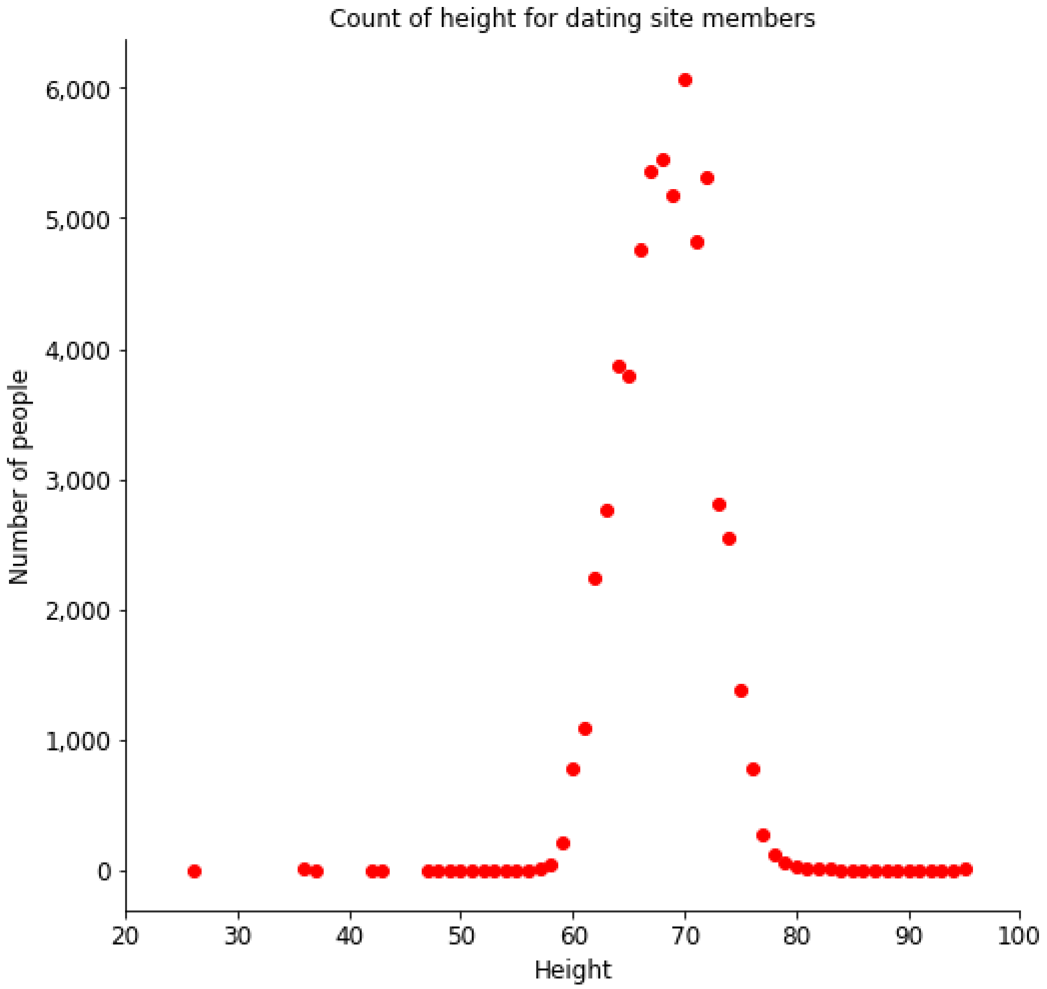
```
#grouping by height to see the data - most people are 60-70 inches but 20 are 95 inches. A few people in the 1-9 inch
#category - these are likely incorrect datapoints which haven't been filled in properly
height = dating.groupby('height').size().reset_index().rename(columns = {0: 'count_of_height'})
height.head()
```

Out[21]:

	height	count_of_height
0	1	1
1	3	1
2	4	1
3	6	1
4	8	1

In [22]:

```
#plotting a scatter plot of heights - have excluded the very low heights that were clearly wrong
plt.figure(figsize = (8,8))
ax = plt.subplot()
plt.scatter(height['height'], height['count_of_height'], color = 'red')

#removing chart borders
ax.spines['top'].set_visible(False)
ax.spines['right'].set_visible(False)

ax.yaxis.set_major_formatter(tcr.FuncFormatter(comma))

ax.set_xlim(20, 100)
plt.xlabel('Height', fontsize = 12)
plt.ylabel('Number of people', fontsize = 12)
plt.tick_params(axis = 'x', labelsize = 12)
plt.tick_params(axis = 'y', labelsize = 12)

plt.title('Count of height for dating site members', fontsize = 12)
plt.savefig('Height - scatter plot')
```


Count of height for dating site members
Number of people
0
1,000
2,000
3,000
4,000
5,000
6,000
Height
20
30
40
50
60
70
80
90
100

In [23]:

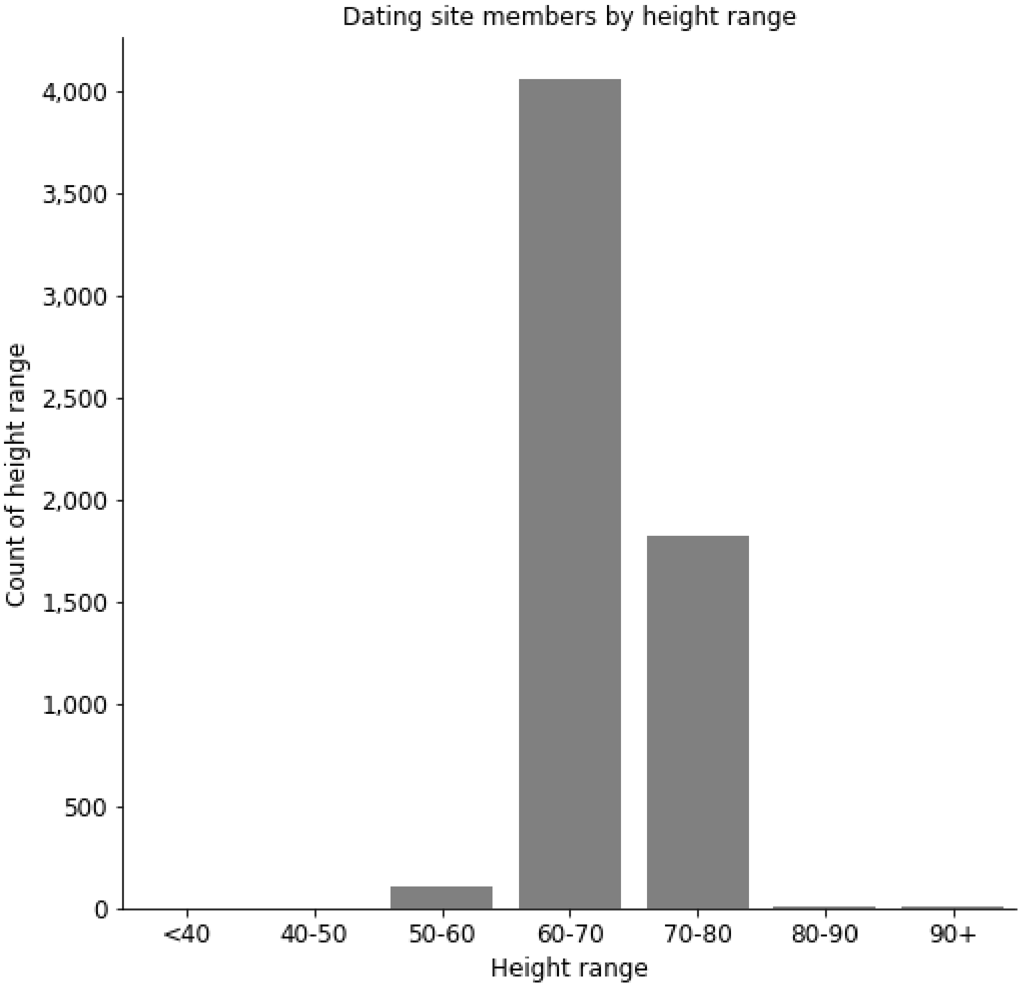
```
#grouping heights into groups for barplot using pd.cut to cut the height column
bins = [0, 40, 50, 60, 70, 80, 90, np.inf]
labels = ['<40', '40-50', '50-60', '60-70', '70-80', '80-90', '90+']
height['height_range'] = pd.cut(height['height'], bins = bins, labels = labels)
height.head()
```

Out[23]:

	height	count_of_height	height_range
0	1	1	<40
1	3	1	<40
2	4	1	<40
3	6	1	<40
4	8	1	<40

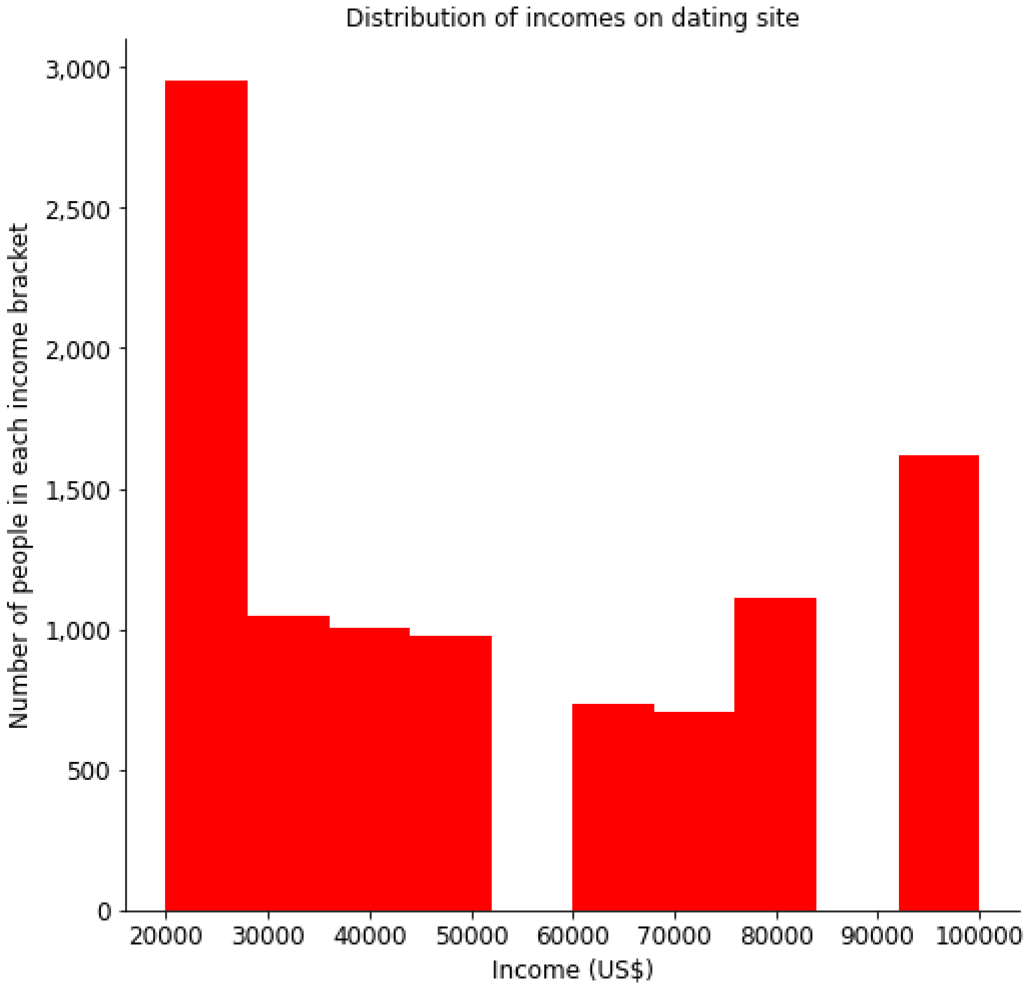
In [24]:

```
#barplot of heights
plt.figure(figsize = (8,8))
ax = sns.barplot(x = height['height_range'], y = height['count_of_height'], color = 'grey', ci = None)

#removing chart borders
ax.spines['top'].set_visible(False)
ax.spines['right'].set_visible(False)

ax.yaxis.set_major_formatter(tcr.FuncFormatter(comma))

plt.xlabel('Height range', fontsize = 12)
plt.ylabel('Count of height range', fontsize = 12)
plt.tick_params(axis = 'x', labelsize = 12)
plt.tick_params(axis = 'y', labelsize = 12)
plt.title('Dating site members by height range', fontsize = 12)
plt.savefig('Height - barplot')
```


Dating site members by height range
Count of height range
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
<40
40-50
50-60
60-70
70-80
80-90
90+
Height range

In [25]:

```
#checking income distribution - most people are on lower incomes but many did not fill
 this fields in. A few people also
#said their income was $1,000,000 which propbably isn't true - have excluded from chart
plt.figure(figsize = (8,8))
ax = plt.subplot()
dating['income'].hist(bins = 10, range = [20000, 100000], color = 'red')

#removing chart borders
ax.spines['top'].set_visible(False)
ax.spines['right'].set_visible(False)

ax.yaxis.set_major_formatter(tcr.FuncFormatter(comma))

plt.xlabel('Income (US$)', fontsize = 12)
plt.ylabel('Number of people in each income bracket', fontsize = 12)
plt.tick_params(axis = 'x', labelsize = 12)
plt.tick_params(axis = 'y', labelsize = 12)

plt.title('Distribution of incomes on dating site', fontsize = 12)
plt.grid(None)
plt.savefig('Income - histogram')
```



In [26]:

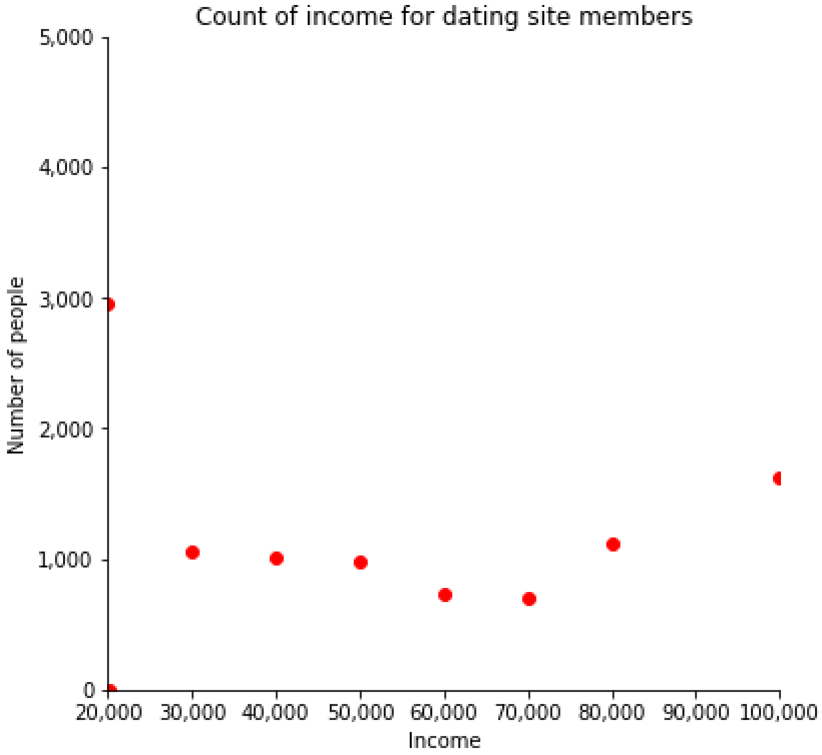
```
#grouping by income to see the data - 81% of people put -1 for this which likely means
 they didn't answer the question
income = dating.groupby('income').size().reset_index().rename(columns = {0: 'count_of_i
ncome'})
income.head()
```

Out[26]:

	income	count_of_income
0	-1	48440
1	20000	2952
2	20033	3
3	30000	1048
4	40000	1004

In [27]:

```
#plotting a scatter plot of income - have excluded the very low and high incomes that were clearly wrong or incomplete
plt.figure(figsize = (6,6))
ax = plt.subplot()
plt.scatter(income['income'], income['count_of_income'], color = 'red')

#removing chart borders
ax.spines['top'].set_visible(False)
ax.spines['right'].set_visible(False)

ax.yaxis.set_major_formatter(tcr.FuncFormatter(comma))
ax.xaxis.set_major_formatter(tcr.FuncFormatter(comma))

ax.set_xlim(20000, 100000)
ax.set_ylim(0, 5000)
plt.xlabel('Income')
plt.ylabel('Number of people')

plt.title('Count of income for dating site members')
plt.savefig('Income - scatter plot')
```


Count of income for dating site members
Number of people
0
1,000
2,000
3,000
4,000
5,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
Income

In [28]:

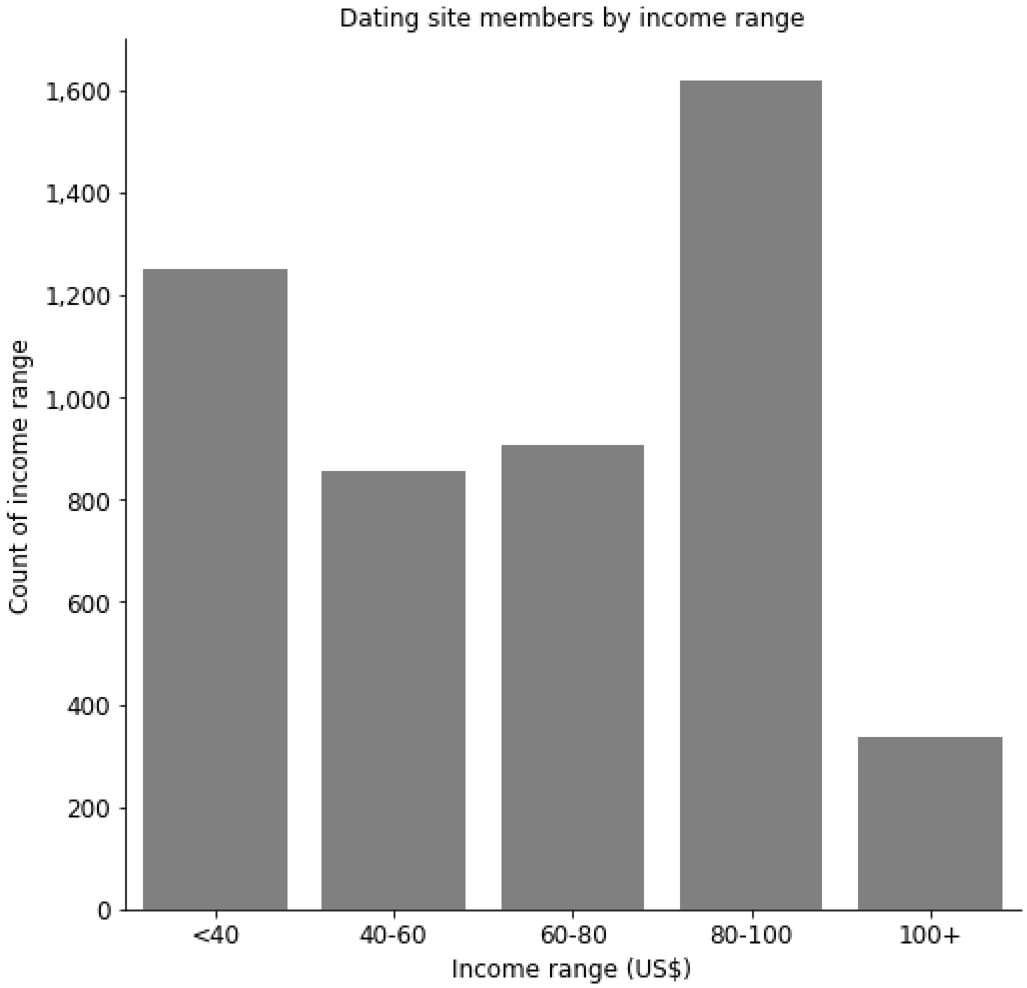
```
#grouping income into groups for barplot using pd.cut to cut the income column
bins = [0, 40000, 60000, 80000, 100000, np.inf]
labels = ['<40', '40-60', '60-80', '80-100', '100+']
income['income_range'] = pd.cut(income['income'], bins = bins, labels = labels)
income
```

Out[28]:

	income	count_of_income	income_range
0	-1	48440	NaN
1	20000	2952	<40
2	20033	3	<40
3	30000	1048	<40
4	40000	1004	<40
5	50000	975	40-60
6	60000	736	40-60
7	70000	707	60-80
8	80000	1111	60-80
9	100000	1621	80-100
10	150000	631	100+
11	250000	149	100+
12	500000	48	100+
13	1000000	521	100+

In [29]:

```
#barplot of income - have excluded those who didn't fill this in
plt.figure(figsize = (8,8))
ax = sns.barplot(x = income['income_range'], y = income['count_of_income'], color = 'gr
ey', ci = None)

#removing chart borders
ax.spines['top'].set_visible(False)
ax.spines['right'].set_visible(False)

ax.yaxis.set_major_formatter(tcr.FuncFormatter(comma))


plt.xlabel('Income range (US$)', fontsize = 12)
plt.ylabel('Count of income range', fontsize = 12)
plt.tick_params(axis = 'x', labelsize = 12)
plt.tick_params(axis = 'y', labelsize = 12)

plt.title('Dating site members by income range', fontsize = 12)
plt.savefig('Income - barplot')
```



In [30]:

```
#converting dating dataframe to csv as will continue analysising categorical values in a new notebook
dating = dating.to_csv('/home/amybirdee/hobby_projects/dating_site/dating_clean.csv', index = False)
```

In [ ]:

```

```