In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%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()
```

Out[3]:

	age	body_type	diet	drinks	drugs	education	essay0	essay1	
0	22.0	a little extra	strictly anything	socially	never	working on college/university	about me: \n \ni would love to think...	currently working as an international agent fo...	n
1	35.0	average	mostly other	often	sometimes	working on space camp	i am a chef: this is what that means. \n1...	dedicating everyday to being an unbelievable b...	
2	38.0	thin	anything	socially	NaN	graduated from masters program	i'm not ashamed of much, but writing public te...	i make nerdy software for musicians, artists, ...	
3	23.0	thin	vegetarian	socially	NaN	working on college/university	i work in a library and go to school. . .	reading things written by old dead people	a
4	29.0	athletic	NaN	socially	never	graduated from college/university	hey how's it going? currently vague on the pro...	work work work work + play	/>

5 rows × 31 columns

In [4]:

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

Out[4]:

```
(59949, 31)
```

In [5]:

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 59949 entries, 0 to 59948
Data columns (total 31 columns):
age             59946 non-null float64
body_type       54650 non-null object
diet            35551 non-null object
drinks          56961 non-null object
drugs           45866 non-null object
education       53318 non-null object
essay0          54456 non-null object
essay1          52361 non-null object
essay2          50287 non-null object
essay3          48457 non-null object
essay4          49405 non-null object
essay5          49087 non-null object
essay6          46154 non-null object
essay7          47488 non-null object
essay8          40709 non-null object
essay9          47328 non-null object
ethnicity       54263 non-null object
height          59940 non-null float64
income          59943 non-null float64
job             51745 non-null object
last_online     59943 non-null object
location        59943 non-null object
offspring       24383 non-null object
orientation     59943 non-null object
pets            40023 non-null object
religion        39717 non-null object
sex             59943 non-null object
sign            48887 non-null object
smokes          54431 non-null object
speaks          59893 non-null object
status          59943 non-null object
dtypes: float64(3), 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	essay0	essay1
count	59946.000000	54650	35551	56961	45866	53318	54456	52361
unique	NaN	12	18	6	3	32	54348	51503
top	NaN	average	mostly anything	socially	never	graduated from college/university	.	enjoying it.
freq	NaN	14652	16585	41780	37724	23959	12	61
mean	32.340290	NaN	NaN	NaN	NaN	NaN	NaN	NaN
std	9.452779	NaN	NaN	NaN	NaN	NaN	NaN	NaN
min	18.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
25%	26.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
50%	30.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
75%	37.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
max	110.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN

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 not needed for analysis
dating = dating.drop(['essay0', 'essay1', 'essay2', 'essay3', 'essay4', 'essay5', 'essa
y6', 'essay7', 'essay8', 'essay9'], axis = 1)
```

In [9]:

```
dating.head()
```

Out[9]:

	age	body_type	diet	drinks	drugs	education	ethnicity	height	income
0	22.0	a little extra	strictly anything	socially	never	working on college/university	asian, white	75.0	-1.(
1	35.0	average	mostly other	often	sometimes	working on space camp	white	70.0	80000.(
2	38.0	thin	anything	socially	NaN	graduated from masters program	NaN	68.0	-1.(
3	23.0	thin	vegetarian	socially	NaN	working on college/university	white	71.0	20000.(
4	29.0	athletic	NaN	socially	never	graduated from college/university	asian, black, other	66.0	-1.(

5 rows × 21 columns

In [10]:

```
#converting date column to date, it's currently object
dating['last_online'] = pd.to_datetime(dating.last_online)
```

In [11]:

```
dating.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 59949 entries, 0 to 59948
Data columns (total 21 columns):
age            59946 non-null float64
body_type      54650 non-null object
diet           35551 non-null object
drinks         56961 non-null object
drugs          45866 non-null object
education      53318 non-null object
ethnicity      54263 non-null object
height         59940 non-null float64
income         59943 non-null float64
job            51745 non-null object
last_online    59943 non-null datetime64[ns]
location       59943 non-null object
offspring      24383 non-null object
orientation    59943 non-null object
pets           40023 non-null object
religion       39717 non-null object
sex            59943 non-null object
sign           48887 non-null object
smokes         54431 non-null object
speaks         59893 non-null object
status         59943 non-null object
dtypes: datetime64[ns](1), float64(3), object(17)
memory usage: 9.6+ MB
```

In [12]:

```
#filling in nan values - using averages for numeric values and most common for some non
-numeric variables where there are
#only a few missing values. Otherwise filling with 'no response given'
dating['age'] = dating.age.fillna(dating['age'].mean())
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 [13]:

```
#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 [14]:

```
#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 [15]:

```
#there are 6 rows where last_online is blank - filtering for these so they can be delet
ed as most fields aren't filled in
last_online_blank = dating.loc[dating['last_online'].isnull()]
last_online_blank
```

Out[15]:

	age	body_type	diet	drinks	drugs	education	ethnicity	height	inc
18842	65	average	no response given	socially	no response given	graduated from ph.d program	no response given	68	2
18843	32	average	no response given	no response given	no response given	no response given	no response given	68	2
20594	26	skinny	strictly vegetarian	socially	never	graduated from college/university	no response given	68	2
20595	32	average	no response given	no response given	no response given	no response given	no response given	68	2
27530	36	athletic	mostly other	not at all	never	graduated from college/university	no response given	68	2
27531	32	average	no response given	no response given	no response given	no response given	no response given	68	2

6 rows × 21 columns

In [16]:

```
#deleting rows where last_online is blank by the index value
dating = dating.drop([18842, 18843, 20594, 20595, 27530, 27531]).reset_index(drop = Tru
e)
```

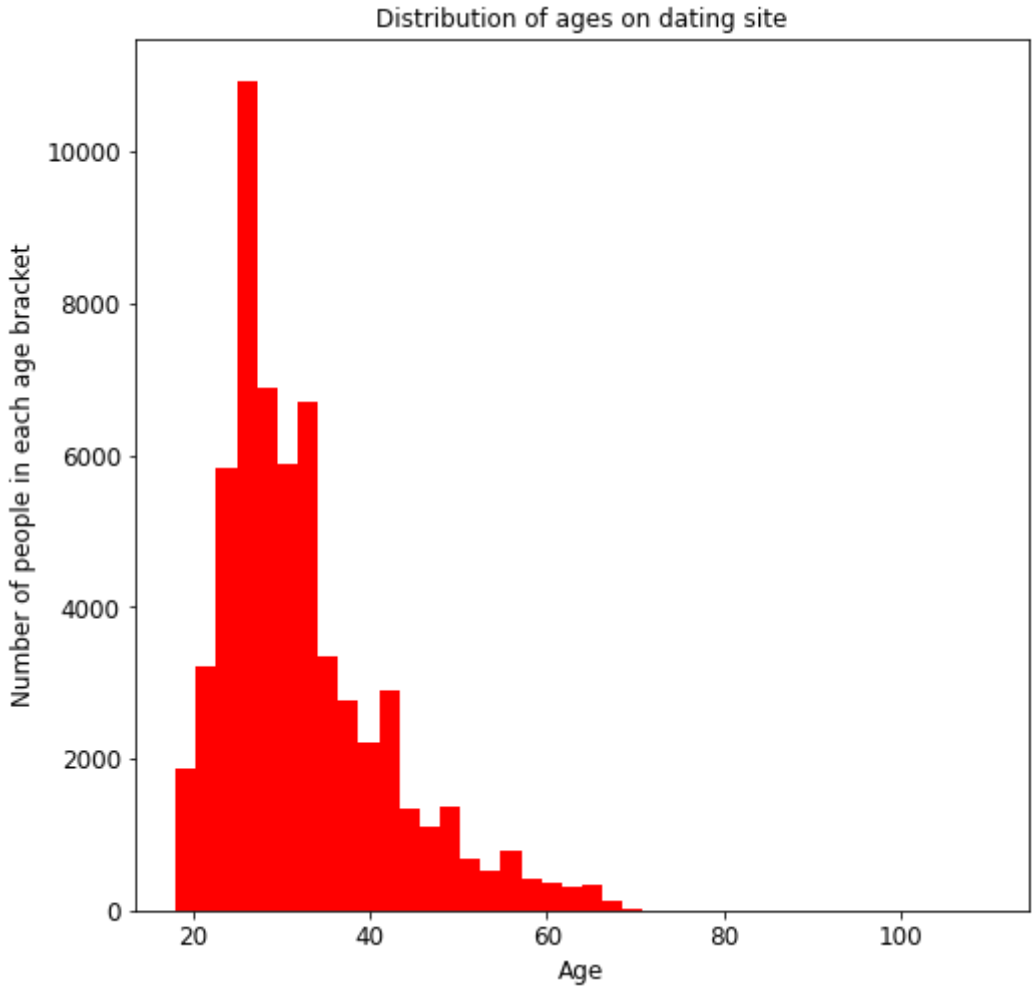
In [17]:

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 59943 entries, 0 to 59942
Data columns (total 21 columns):
age            59943 non-null int64
body_type      59943 non-null object
diet           59943 non-null object
drinks         59943 non-null object
drugs          59943 non-null object
education      59943 non-null object
ethnicity      59943 non-null object
height         59943 non-null int64
income         59943 non-null int64
job            59943 non-null object
last_online    59943 non-null datetime64[ns]
location       59943 non-null object
offspring      59943 non-null object
orientation    59943 non-null object
pets           59943 non-null object
religion       59943 non-null object
sex            59943 non-null object
sign           59943 non-null object
smokes         59943 non-null object
speaks         59943 non-null object
status         59943 non-null object
dtypes: datetime64[ns](1), int64(3), object(17)
memory usage: 9.6+ MB
```

In [18]:

```
#checking age distribution - shows a right skew
plt.figure(figsize = (8,8))
dating['age'].hist(bins = 40, color = 'red')
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 [19]:

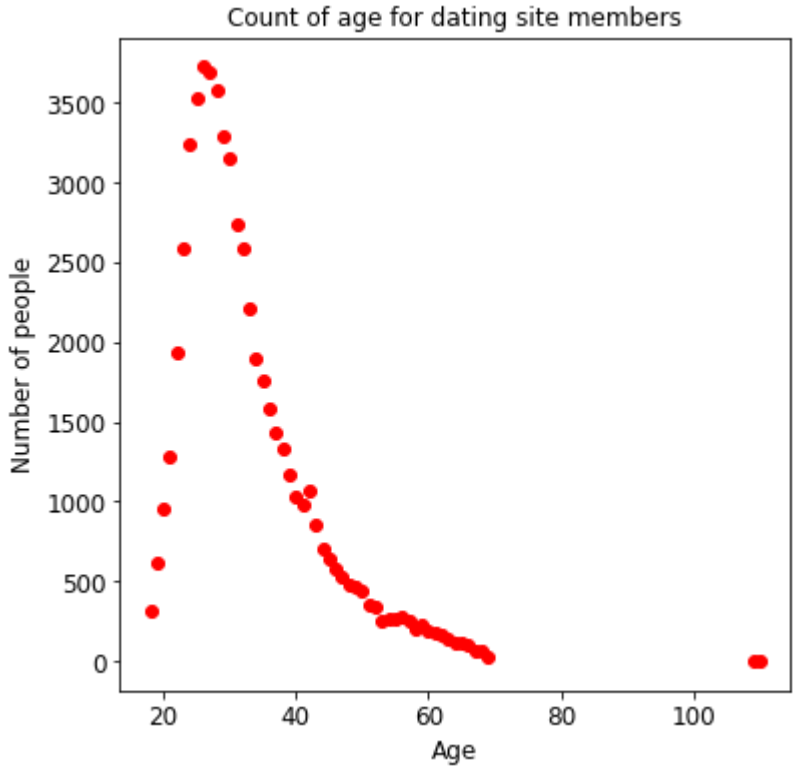
```
#grouping by age to see the data - a couple of ages over 100 - anomalies or might be fa
lse data
Age = dating.groupby('age').size().reset_index().rename(columns = {0: 'count_of_age'})
Age.head()
```

Out[19]:

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

In [20]:

```
#plotting a scatter plot of ages - most people are mid 20s-30
plt.figure(figsize = (6,6))
plt.scatter(Age['age'], Age['count_of_age'], color = 'red')
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')
```



In [21]:

```
#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[21]:

	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 [22]:

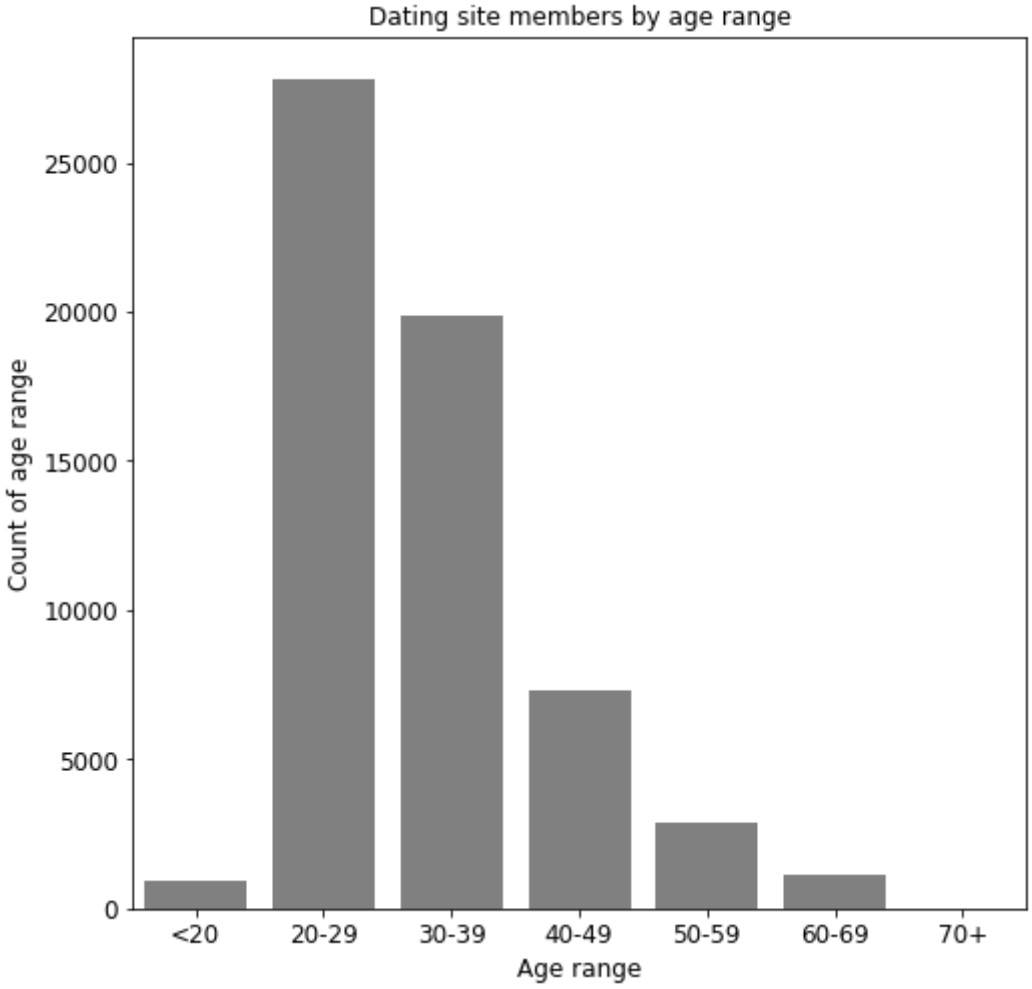
```
#grouping age ranges
age_range = Age.groupby('age_range').count_of_age.sum().to_frame().reset_index()
age_range
```

Out[22]:

	age_range	count_of_age
0	<20	920
1	20-29	27820
2	30-39	19845
3	40-49	7338
4	50-59	2860
5	60-69	1158
6	70+	2

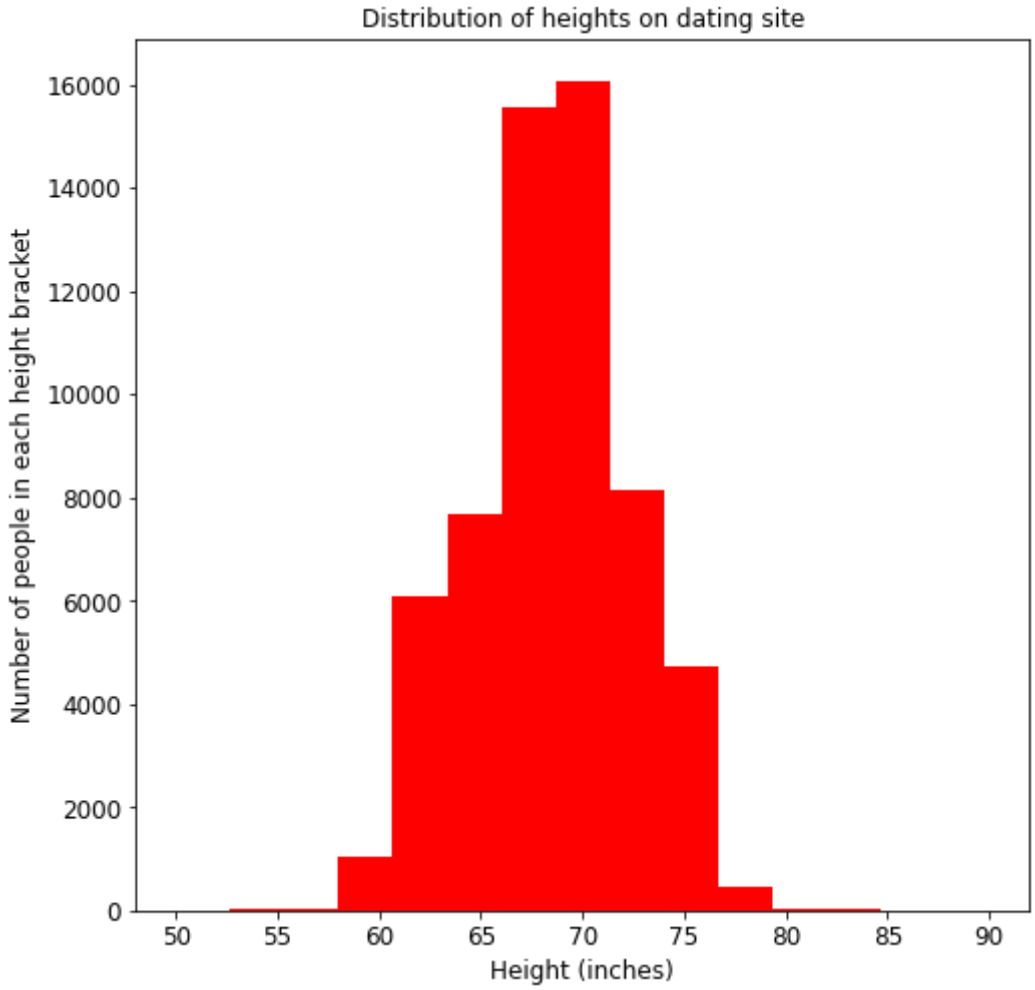
In [23]:

```
#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 = 'gr
ey', ci = None)
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 [24]:

```
#checking height distribution - shows a relatively normal distribution
plt.figure(figsize = (8,8))
dating['height'].hist(bins = 15, range = [50, 90], color = 'red')
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 [25]:

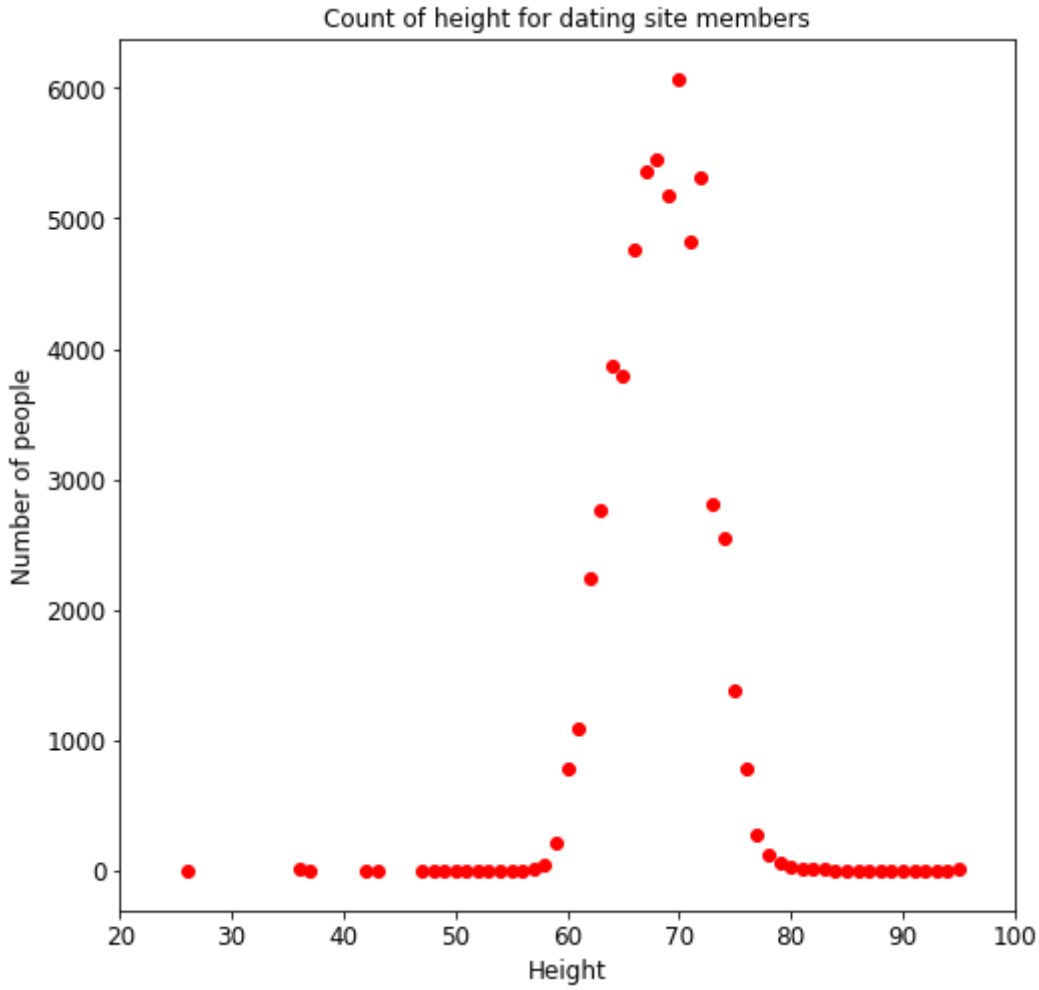
```
#grouping by height to see the data - most people are 60-70 inches but 20 are 95 inche
s. A few people in the 1-9 inch
#category - these are likely incorrect datapoints which haven't been filled in properly
height = dating.groupby('height').size().reset_index().rename(columns = {0: 'count_of_h
eight'})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

Out[25]:

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

In [26]:

```
#plotting a scatter plot of heights - have excluded the very low heights that were clea
rly wrong
plt.figure(figsize = (8,8))
ax = plt.subplot()
plt.scatter(height['height'], height['count_of_height'], color = 'red')
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
Height
0
1000
2000
3000
4000
5000
6000
20
30
40
50
60
70
80
90
100

In [27]:

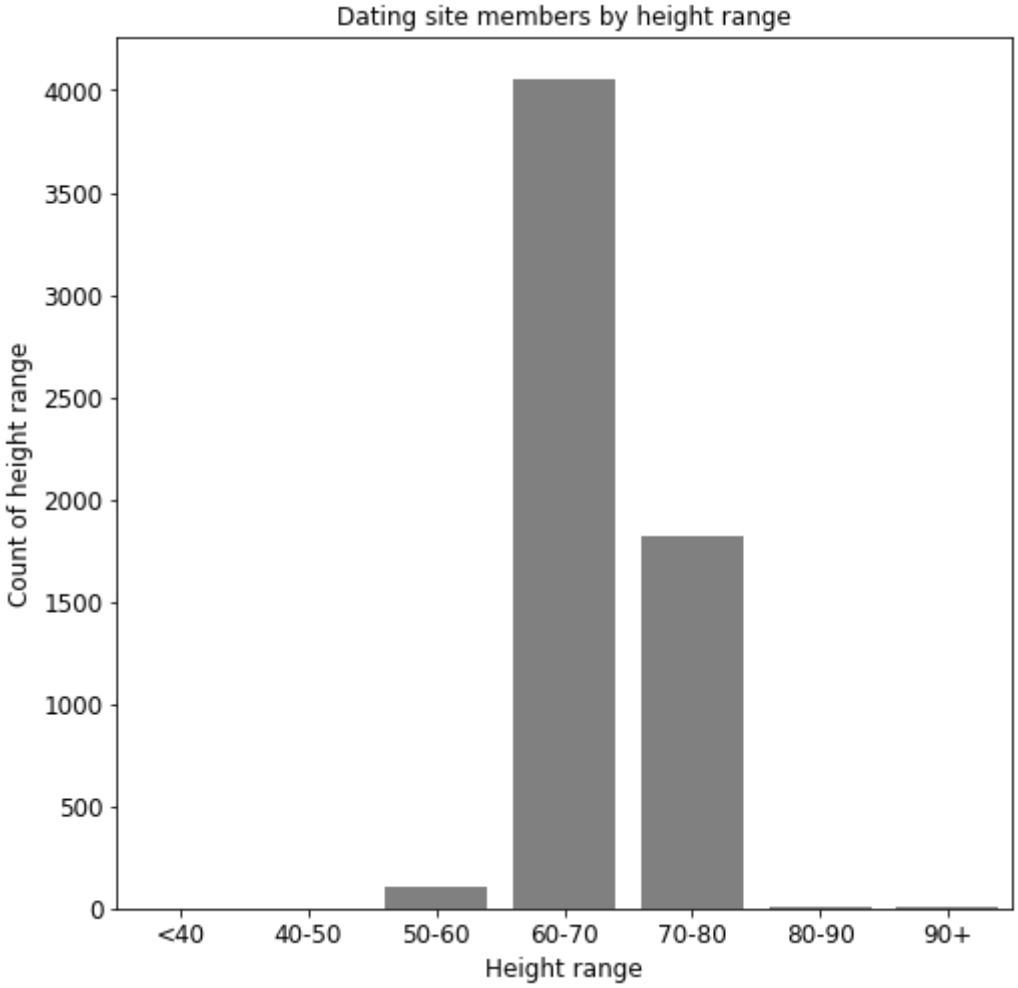
```
#grouping heights into groups for barplot using pd.cut to cut the height column
bins = [0, 40, 50, 60, 70, 80, 90, np.inf]
labels = ['<40', '40-50', '50-60', '60-70', '70-80', '80-90', '90+']
height['height_range'] = pd.cut(height['height'], bins = bins, labels = labels)
height.head()
```

Out[27]:

	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

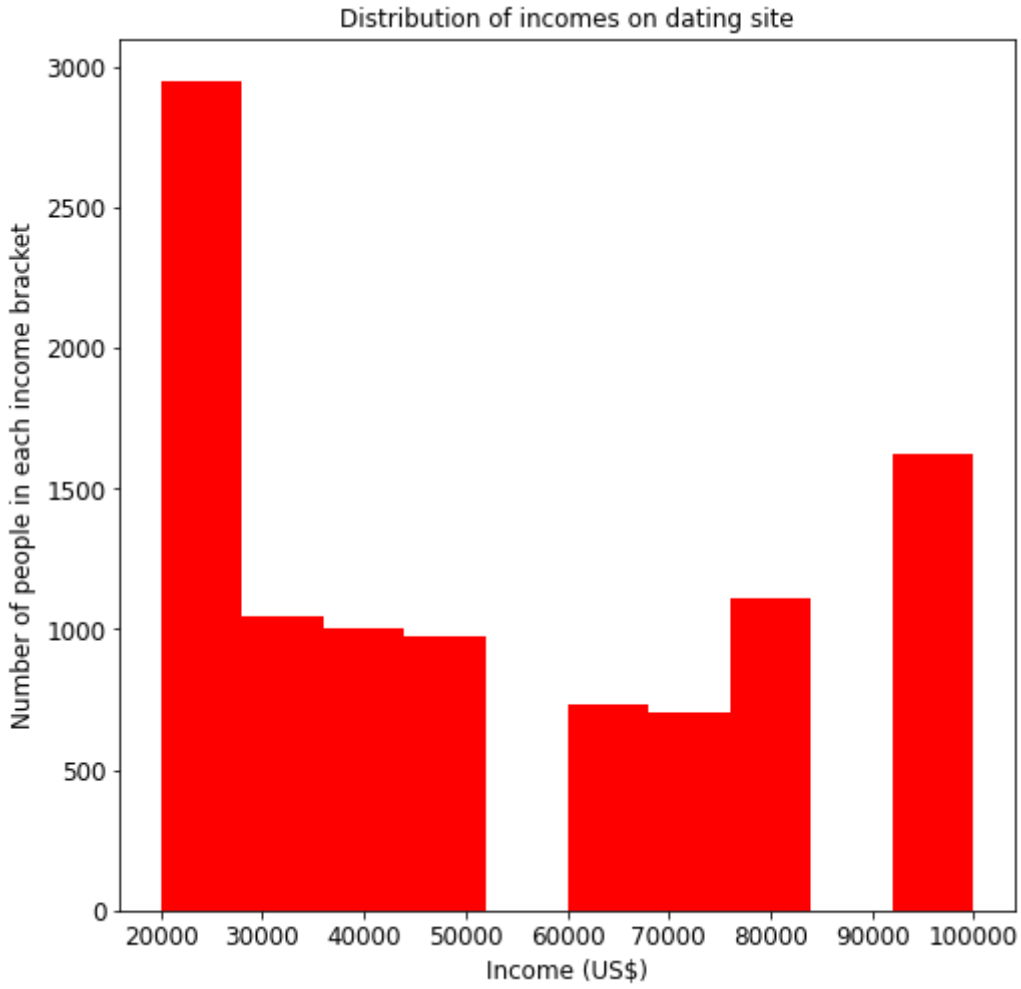
In [28]:

```
#barplot of heights
plt.figure(figsize = (8,8))
ax = sns.barplot(x = height['height_range'], y = height['count_of_height'], color = 'gr
ey', ci = None)
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
0
500
1000
1500
2000
2500
3000
3500
4000
<40
40-50
50-60
60-70
70-80
80-90
90+
Height range

In [29]:

```
#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 $1,000,000 which propbably isn't true - have excluded from chart
plt.figure(figsize = (8,8))
dating['income'].hist(bins = 10, range = [20000, 100000], color = 'red')
plt.xlabel('Income (US$)', 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 [30]:

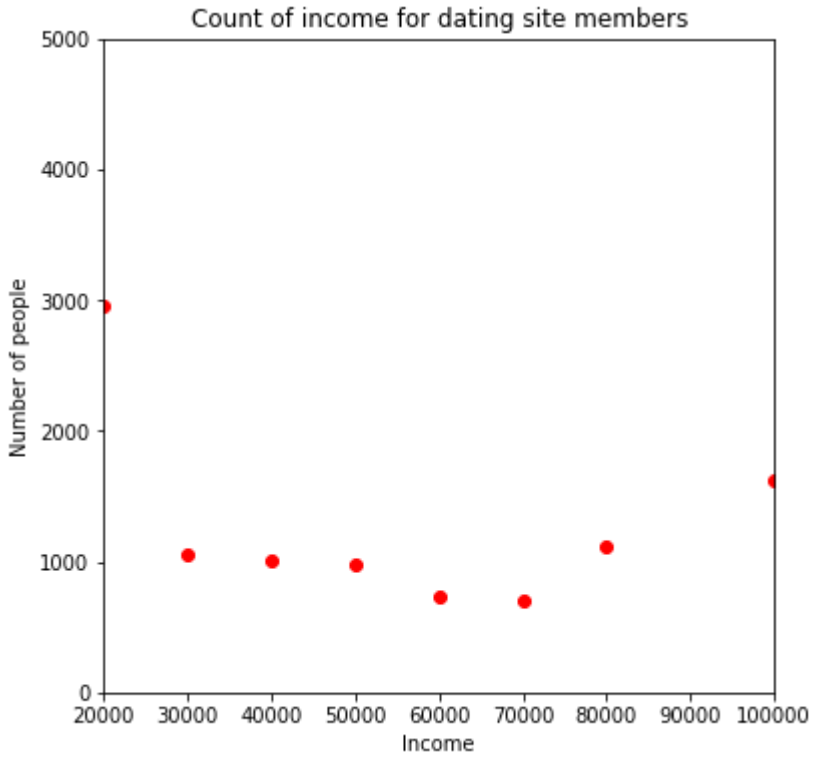
```
#grouping by income to see the data - 81% of people put -1 for this which likely means
 they didn't answer the question
income = dating.groupby('income').size().reset_index().rename(columns = {0: 'count_of_i
ncome'})
income.head()
```

Out[30]:

	income	count_of_income
0	-1	48440
1	20000	2952
2	30000	1048
3	40000	1004
4	50000	975

In [31]:

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



In [32]:

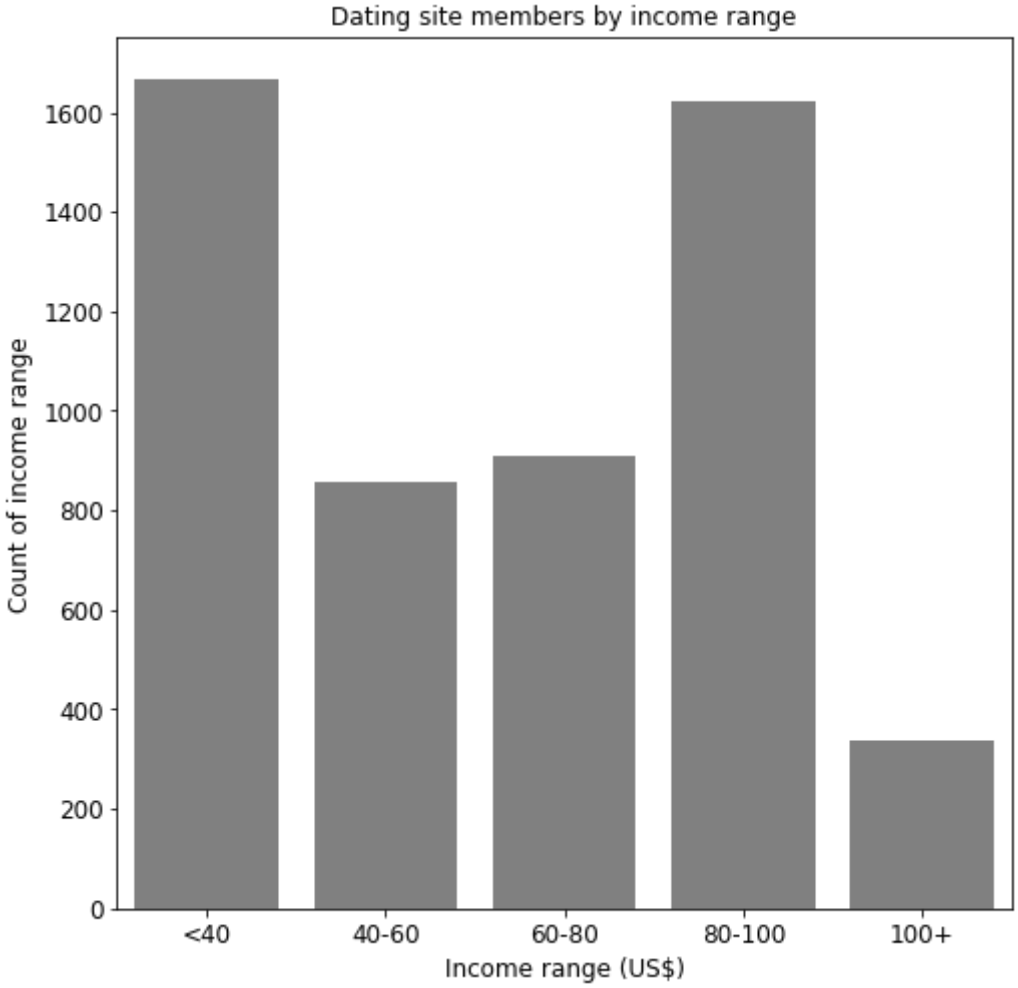
```
#grouping income into groups for barplot using pd.cut to cut the income column
bins = [0, 40000, 60000, 80000, 100000, np.inf]
labels = ['<40', '40-60', '60-80', '80-100', '100+']
income['income_range'] = pd.cut(income['income'], bins = bins, labels = labels)
income
```

Out[32]:

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

In [33]:

```
#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)
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 [34]:

```
#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', i
ndex = False)
```

In [ ]:

```

```