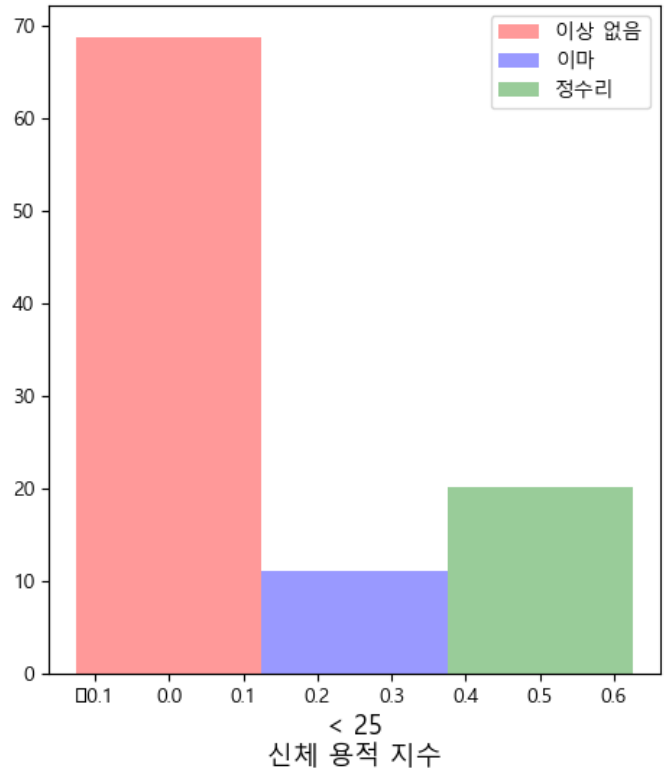
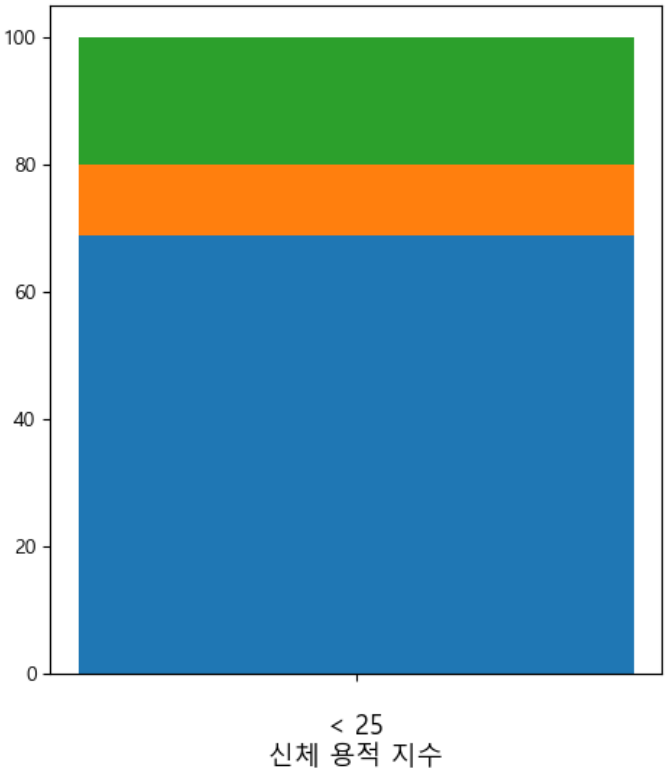
In [1]:

```
# 연습문제 2, p55
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd

# 폰트값 설정
plt.rc('font', family='Malgun Gothic')

# 데이터 입력
label = ['이상 없음', '이마', '정수리']
vunder_25 = [137, 22, 40]
v25_to_28 = [218, 34, 57]
vhigh_28  = [153, 30, 68]
values = []
colors = ['red', 'green', 'blue']
valve = ['vunder_25', 'v25_to_28', 'vhigh_28']

# under_25
total = sum(vunder_25)
for i in range(len(vunder_25)):
    data = round((vunder_25[i] / total * 100) ,1)
    values.append(data)

fig, ax = plt.subplots(figsize=(12,6))
bar_width = 0.25
index = np.arange(1)

plt.subplot(121)
b1 = plt.bar(index, values[0], bar_width, alpha=0.4, color='red', label=label[0])

b2 = plt.bar(index + bar_width, values[1], bar_width, alpha=0.4, color='blue', label=label[1])

b3 = plt.bar(index + 2 * bar_width, values[2], bar_width, alpha=0.4, color='green', label=label[2])

plt.xlabel('< 25\n신체 용적 지수', size = 13)
plt.legend()

plt.subplot(122)

plt.xlabel('< 25\n신체 용적 지수', size = 13)

quarters = [' ']
# 탑 형식의 데이터 지정
plt.bar(quarters, values[0])
plt.bar(quarters, values[1], bottom=values[0])
plt.bar(quarters, values[2], bottom=values[0]+values[1])

plt.show()
```

```
C:\Users\starl\AppData\Local\Temp\ipykernel_25368\2966323603.py:28: MatplotlibDeprecationWarning: Auto-removal of overlapping axes is deprecated since 3.6 and will be removed two minor releases later; explicitly call ax.remove() as needed.
  plt.subplot(121)
C:\Users\starl\AppData\Roaming\Python\Python311\site-packages\IPython\core\pylabtools.py:152: UserWarning: Glyph 8722 (\N{MINUS SIGN}) missing from current font.
  fig.canvas.print_figure(bytes_io, **kw)
```





In [127]:

```
# 연습문제 2.1, p55
import matplotlib.pyplot as plt
import numpy as np

bar_width = 0.25

plt.rc('font', family='Malgun Gothic')

label = ['이상 없음', '이마', '정수리']
vunder_25 = [137, 22, 40]
v25_to_28 = [218, 34, 67]
vhigh_28  = [153, 30, 68]
values, values2, values3 = [], [], []
colors = ['red', 'green', 'blue']
valve = ['vunder_25', 'v25_to_28', 'vhigh_28']
desc = ['< 25', '25 ~ 28', '> 28']
x_save, x_save1, x_save2 = [], [], []

# under_25
total = sum(vunder_25)
for i in range(len(vunder_25)):
    data = round((vunder_25[i] / total * 100) ,1)
    x_save.append(data)
    if i == 0:
        values.append(data)
    elif i == 1:
        values2.append(data)
    else:
        values3.append(data)

total = sum(v25_to_28)
for i in range(len(v25_to_28)):
    data = round((v25_to_28[i] / total * 100) ,1)
    x_save1.append(data)
```

```
    if i == 0:
        values.append(data)
    elif i == 1:
        values2.append(data)
    else:
        values3.append(data)

total = sum(vhigh_28)
for i in range(len(vhigh_28)):
    data = round((vhigh_28[i] / total * 100) ,1)
    x_save2.append(data)
    if i == 0:
        values.append(data)
    elif i == 1:
        values2.append(data)
    else:
        values3.append(data)

plt.subplot(121)
index = np.arange(3)
b1 = plt.bar(index, values, bar_width, alpha=0.4, color='red', label=label[0])
b2 = plt.bar(index + bar_width, values2, bar_width, alpha=0.4, color='blue', label=label[1])
b3 = plt.bar(index + 2 * bar_width, values3, bar_width, alpha=0.4, color='green', label=label[2])

plt.xticks(np.arange(bar_width, 3 + bar_width, 1), desc)
plt.xlabel('신체 용적 지수', size = 13)
plt.legend()

plt.subplot(122)

print(x_save, x_save1, x_save2)

print(values)
# plot2
plt.bar("< 25", x_save[0])
plt.bar("< 25", x_save[1], bottom=x_save[0])
plt.bar("< 25", x_save[2], bottom=x_save[0]+x_save[1])

# plot 2-1
plt.bar("25 ~ 28", x_save2[0])
plt.bar("25 ~ 28", x_save2[1], bottom=x_save2[0])
plt.bar("25 ~ 28", x_save2[2], bottom=x_save2[0]+x_save2[1])

# plot 2-2
plt.bar("> 28", x_save2[0])
plt.bar("> 28", x_save2[1], bottom=x_save2[0])
plt.bar("> 28", x_save2[2], bottom=x_save2[0]+x_save2[1])

plt.show()
```

[68.8, 11.1, 20.1] [68.3, 10.7, 21.0] [61.0, 12.0, 27.1]
[68.8, 68.3, 61.0]