

《Original Article》

## Lifestyle habits and dietary habit differences according to living circumstances (living independently or living with others) among middle aged and elderly people

Shizuno Ishida\*, Hisashi Susaki\*, Kiwako Okada\* and Katsumi Yamanaka\*

### Preface.

In recent years, in our country Japan, the number of one person households has increased with the progression of the low birth rate and nuclear family. According to the National Institute of Population and Social Security Research the percentage of one person households amongst all households was 19.8% in 1980 which increased to 29.5% in 2005 and is estimated to reach 37.4% in 2030<sup>1)</sup>.

So far, there have been numerous studies<sup>2-8)</sup> concerned with the differences in dietary habits depending on whether the elderly live independently or with others. And all studies have shown that those living independently have a poor diet compared to those living with others. However, there are many cases where those elderly living independently, have lived on their own since middle age, and from that time, dietary habits and lifestyle habits have continued as they age, so it is crucial to look at both diet and lifestyle in middle aged people.

Hence, in this study our purpose is to grasp the accurate conditions of middle aged people's lifestyle habits and dietary habits, and in our investigation and analysis we reveal how it is influenced by the differences in how people live i.e. living independently or with others.

### Method.

From November to December 2002 the subjects

were National Insurance holders from N city in Aichi Prefecture. 1029 males and 1489 females aged 40-69. We defined the people who currently live on their own as living independently and people who live with relatives or others as living with others and divided them into two groups and we comparatively examined them. The method of investigation was a form given to the respondents (mail survey method) the items for the survey were gender, age, height, weight, alcohol consumption, the state of food intake etc. We used the questionnaire 'Lifestyle Habit Check' developed by Assist Corporation. The questionnaire items were life activities like exercise etc (11 items) sleep-stress (9 items), smoking (11 items), alcohol consumption (4 items), weight-dietary habit (14 items), nutritional intake (36 items) oral health (11 items) illnesses (5 items), fitness (7 items). As a method of analysis, we selected 8 items relating to lifestyle habits from the questionnaire items, and each item with a good response received one point and bad habit responses received zero points. In our study, 8 points was deemed as full marks and then we calculated the total score assigned for lifestyle habit- 8 points being the best habit and zero being the worst habit. Meanwhile, we showed in Table 1 the eight items questions as well as the allocation of marks. We used the statistical analysis software SPSS Ver.15.0 for Windows for all statistical analysis. Concerning age ranges with total score assigned for lifestyle habit we did a one way analysis variant and for examination we used Tukey's test. In order

\* School of Nutritional Sciences, Nagoya University of Arts and Sciences

Table 1 Allocation of Life-style Habit itemized scores

Items	Question	Good habit response (1point)	Bad habit response (0 point)
Exercise	Do you do exercise causing you to sweat more than twice a week?	Yes	No
Sleep	Do you sleep well?	Yes	No
Stress	Do you feel stress?	No	Yes
Interests	Do you have any hobbies?	Yes	No
Smoking	Do you smoke?	No	Yes
Alcohol consumption	Do you drink alcohol?	No	Yes
Meals	Do you eat three meals a day?	Yes	No
Dental care	Do you brush your teeth more than twice a day?	Yes	No

Table 2 The number of people either living independently or living with others according to age group  
(Unit : people)

Age group	Living independently	Living with others	Total	
M a l e	40-49yrs	15 (6.1%)	232 (93.9%)	247 (100.0%)
	50-59yrs	10 (2.5%)	391 (97.5%)	401 (100.0%)
	60-69yrs	16 (4.2%)	365 (95.8%)	381 (100.0%)
	Total	41 (4.0%)	988 (96.0%)	1029 (100.0%)
F e m a l e	40-49yrs	13 (3.6%)	345 (96.4%)	358 (100.0%)
	50-59yrs	23 (3.5%)	626 (96.5%)	649 (100.0%)
	60-69yrs	35 (7.3%)	447 (92.7%)	482 (100.0%)
	Total	71 (4.8%)	1418 (95.2%)	1489 (100.0%)

to examine the average value of the total score assigned for lifestyle habit, when living independently/ living together, we utilized the Mann-Whitney rank sum test and for cross table significant difference examination we used  $\chi^2$  evaluation and the significant level was  $p < 0.05$ . It should be noted that for total score calculation and cross table analysis we excluded non-respondents from the analysis.

## Results.

### 1. Living independently and living with others.

The number of males living with others was 988 (Average age  $55.3 \pm 7.4$  years old), living independently was 41 (Average age  $53.9 \pm 8.8$  years old). The number of females living with others was 1418

(Average age  $54.7 \pm 7.0$  years old), living independently was 71 (Average age  $57.2 \pm 7.4$  years old). The percentage of people living independently was 4.0% for males, and for females 4.8%.

In addition, the percentage of people living independently according to the age ranges was shown in table 2, males in the 40-49 years age range was 6.1%, 50-59 years was 2.5%, 60-69 years was 4.2%, females in the 40-49 age range was 3.6%, 50-59 years was 3.5%, 60-69 years was 7.3%.

### 2. The total score assigned for lifestyle habits.

We calculated the total score of the lifestyle habits 8 items according to gender and age range shown in table 3. For males in the 40-49 years age range the score was  $4.0 \pm 1.3$  points, for the 50-59 years age

Table 3 Average total score assigned for lifestyle habits according to gender and age group

(Unit : points)

Age group	Male		Female	
	Average total score	Standard deviation	Average total score	Standard deviation
40-49yrs	4.0	1.3	4.8	1.3
50-59yrs	4.1	1.4	5.3	1.3
60-69yrs	4.7	1.4	5.6	1.2
Total	4.3	1.4	5.3	1.3

\*\*\* : p<0.001

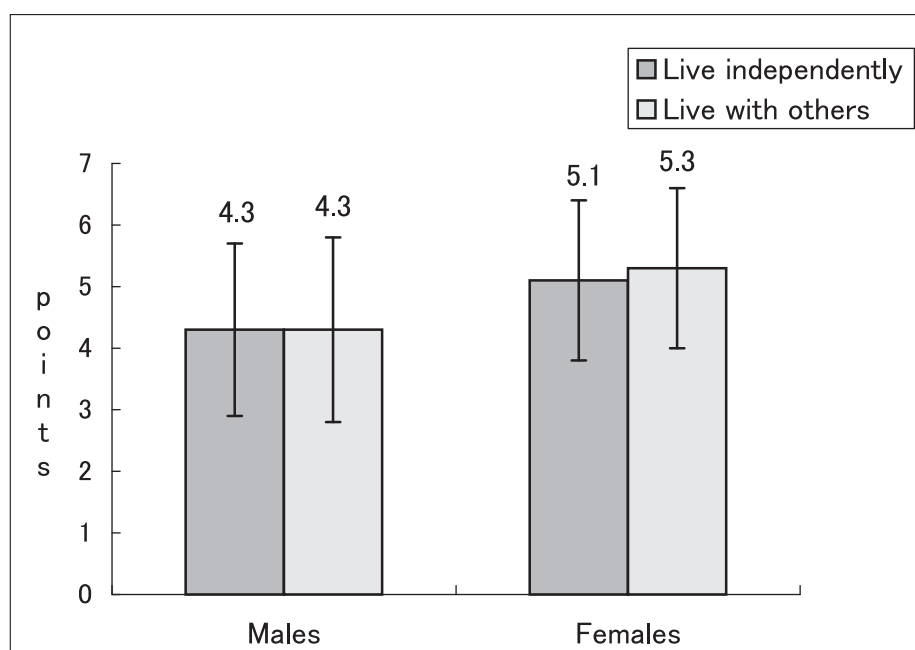


Figure 1 Average total score assigned for lifestyle habits- according to gender for those living independently and living with others

range it was 4.1±1.4points, for 60-69 years it was 4.7±1.4 points. For females in the 40-49 years age range the score was 4.8±1.3 points , for 50-59 years it was 5.3±1.3 points, for 60-69 years it was 5.6±1.2 points (all given as average ± standard deviation). There was a tendency for the total score assigned for lifestyle habits for both male and females, to be higher as they became older.

Secondly, the total score assigned for lifestyle habits according to gender, and either living independently or with others is shown in the figure 1; for the male group living independently the result was 4.3±1.5 points, for the male group living with others it was 4.3±1.4points. For the female group living

independently the results show as 5.1±1.3points, the female group living with others it was 5.3±1.3 points (all given as average ± standard deviation). There was a tendency for females living independently to be lower than those females living with others (p=0.231).

### 3. Life style habit items.

Next, we conducted a cross table analysis to investigate the relationship between those living independently and those living with others for each lifestyle habit item. Results are shown in table 4. For males, there was a tendency for the percentage to be lower in the independent living group for those

Table 4 The number of people living independently and living with others according to itemized lifestyle habits

			Live independently		Live with others		$\chi^2$	Significant probability
			No.of people	(%)	No.of people	(%)		
Do you do exercise causing you to sweat more than twice a week?	Male	Yes	12	29.3	211	21.6	1.345	0.250
		No	29	70.7	765	78.4		
	Female	Yes	12	17.1	323	23.1	1.332	0.307
		No	58	82.9	1077	76.9		
Do you sleep well?	Male	Yes	30	73.2	819	83.7	3.164	0.086
		No	11	26.8	159	16.3		
	Female	Yes	54	77.1	1107	78.9	0.124	0.764
		No	16	22.9	296	21.1		
Do you feel stress?	Male	Yes	29	70.7	698	71.2	0.005	1.000
		No	12	29.3	282	28.8		
	Female	Yes	55	78.6	1094	77.6	0.033	1.000
		No	15	21.4	315	22.4		
Do you have any hobbies?	Male	Yes	28	68.3	725	74.8	0.883	0.361
		No	13	31.7	244	25.2		
	Female	Yes	51	72.9	1056	76.2	0.420	0.565
		No	19	27.1	329	23.8		
Do you smoke?	Male	Yes	17	42.5	391	40.1	0.095	0.745
		No	23	57.5	585	59.9		
	Female	Yes	7	10.0	80	5.8	2.059	0.189
		No	63	90.0	1295	94.2		
Do you drink alcohol?	Male	Yes	27	67.5	756	77.9	2.360	0.126
		No	13	32.5	215	22.1		
	Female	Yes	22	31.4	522	37.7	1.135	0.313
		No	48	68.6	861	62.3		
Do you eat three meals a day?	Male	Yes	29	72.5	784	79.7	1.209	0.317
		No	11	27.5	200	20.3		
	Female	Yes	58	82.9	1251	88.5	2.022	0.180
		No	12	17.1	163	11.5		
Do you brush your teeth more than twice a day?	Male	Yes	26	65.0	544	55.3	1.453	0.258
		No	14	35.0	439	44.7		
	Female	Yes	52	74.3	1160	82.4	2.965	0.063
		No	18	25.7	248	17.6		

people sleeping well and also drinking alcohol. For females, there was a tendency for the percentage to be lower in the independent living group for those eating 3 meals a day and also brushing their teeth more than twice a day. There was a tendency for the percentage to be higher in the independent living group for those females smoking.

#### 4. Dietary habits.

For dietary habits in the questionnaire we divided subjects into two groups –the ‘do’ group and the ‘do not’ group for the five items shown in table 5, then we conducted a cross table analysis according to those living independently and living with others. Results are shown in table 5. For the item ‘do you eat meals with family or friends’ the percentage of those who responded yes to this question was significantly

Table 5 The number of people living independently and living with others according to itemized dietary habits

			Live independently		Live with others		$\chi^2$	Significant probability
			No.of people	(%)	No.of people	(%)		
Do you have meals with family or friends?	Male	Yes	9	24.3	634	65.8	26.640	0.000***
		No	28	75.7	330	34.2		
	Female	Yes	26	37.1	1068	77.1	56.824	
		No	44	62.9	318	22.9		
Do you use convenience stores or eat out?	Male	Yes	15	40.5	192	19.9	9.239	0.006**
		No	22	59.5	772	80.1		
	Female	Yes	5	7.0	59	4.3	1.255	
		No	66	93.0	1329	95.7		
Do you eat three meals a day?	Male	Yes	29	72.5	784	79.7	1.209	0.317
		No	11	27.5	200	20.3		
	Female	Yes	58	82.9	1251	88.5	2.022	
		No	12	17.1	163	11.5		
Do you eat snacks between meals or before bed time?	Male	Yes	7	17.5	186	18.9	0.052	1.000
		No	33	82.5	796	81.1		
	Female	Yes	21	30.0	562	39.9	2.729	
		No	49	70.0	847	60.1		

\*\* : p&lt;0.01

\*\*\* : p&lt;0.001

lower in the living independently group. In addition, for the items 'do you eat three meals a day' and 'do you eat snacks between meals or before bedtime' there was a tendency for females responding yes to these items to be a lower percentage in the living independently group. Conversely, for the item 'do you use convenience stores or eat out' –for males responding yes to this item the percentage was significantly higher in the living independently group.

##### 5. Food intake circumstances.

For food intake circumstances, in the questionnaire we divided subjects into two groups –the 'eat' group and the 'not eat' group for the nine items shown in table 6 then we conducted a cross table analysis according to those living independently and living with others. Results are shown in table 6. There was a tendency for the percentage of males eating meat or fish everyday to be significantly lower, and we can see the same tendency for those eating vegetables and *miso* soup. However, there was a tendency for the percentage of those consuming dairy products

to be higher in the living independently group. In addition, for females- for those consuming meat, fish or *miso* soup, the percentage was significantly lower in the living independently group.

##### Discussion.

According to the 'National Livelihood Survey 2006'<sup>9)</sup> conducted by The Health, Labor and Welfare Ministry, on June 1<sup>st</sup> 2006 the total number of households aged over 40 years was 36,292,000. And within this figure, the number of one person households was 7,837,000 (percentage of total 21.6%) and this percentage is increasing annually.

Regarding the differences in lifestyle habits according to the two groups- living independently and living with others, we can see the survey concerning alcohol consumption circumstances, however, we hardly see surveys concerning other lifestyle habits. According to circumstances regarding alcohol consumption, there is a paper<sup>2)</sup> showing that males over 60 years old, and living with others need im-

Table 6 The number of people living independently and living with others according to itemized lifestyle habits

			Live independently		Live with others		$\chi^2$	Significant probability
			No.of people	(%)	No.of people	(%)		
Do you eat meat or fish everyday?	Male	Yes	21	52.5	672	69.1	4.926	0.036*
		No	19	47.5	300	30.9		
	Female	Yes	38	54.3	1148	81.6	31.428	0.000***
		No	32	45.7	259	18.4		
Do you eat fish more than three times a week?	Male	Yes	28	70.0	670	69.3	0.009	1.000
		No	12	30.0	297	30.7		
	Female	Yes	37	52.9	1016	72.3	12.358	0.001***
		No	33	47.1	389	27.7		
Do you eat more than 4 eggs a week?	Male	Yes	23	57.5	524	54.0	0.187	0.747
		No	17	42.5	446	46.0		
	Female	Yes	32	45.7	626	44.4	0.045	0.902
		No	38	54.3	783	55.6		
Do you eat Soy products every day?	Male	Yes	19	47.5	497	50.7	0.159	0.748
		No	21	52.5	483	49.3		
	Female	Yes	45	64.3	930	66.2	0.114	0.796
		No	25	35.7	474	33.8		
Do you eat dairy products every day?	Male	Yes	29	72.5	553	57.0	3.775	0.071
		No	11	27.5	417	43.0		
	Female	Yes	49	70.0	1034	73.4	0.402	0.580
		No	21	30.0	374	26.6		
Do you eat vegetables at each meal?	Male	Yes	13	33.3	514	53.0	5.839	0.021*
		No	26	66.7	455	47.0		
	Female	Yes	45	64.3	902	64.1	0.001	1.000
		No	25	35.7	505	35.9		
Do you eat fruits everyday?	Male	Yes	22	55.0	580	59.2	0.278	0.625
		No	18	45.0	400	40.8		
	Female	Yes	52	75.4	1059	75.2	0.001	1.000
		No	17	24.6	350	24.8		
Do you eat miso soup everyday?	Male	Yes	21	56.8	666	69.0	2.484	0.147
		No	16	43.2	299	31.0		
	Female	Yes	37	52.1	930	66.9	6.559	0.014*
		No	34	47.9	461	33.1		
Do you often eat pickled vegetables?	Male	Yes	24	64.9	703	73.1	1.213	0.264
		No	13	35.1	259	26.9		
	Female	Yes	46	64.8	959	68.9	0.529	0.512
		No	25	35.2	433	31.1		

\* : p<0.05      \*\*\* : p<0.001

provement- i.e. they consume far more alcohol than those living independently. For females there is no difference for this lifestyle habit.

Through this investigation, we carried out a study

on how much influence living independently or living with others has on lifestyle or dietary habits. Results show differences between males and females. For males, there is hardly any difference for the

overall lifestyle habits total points between the living independently group and the living with others group. Looking at each item, the items which had a higher percentage in the living independently group were lifestyle habits like 'do exercise' 'not drinking alcohol' 'brushing teeth more than twice a day'. For the other five items the percentage is higher in the living with others group. For females the total score assigned for lifestyle habits was higher in the living with others group than the independent living group. When we look at each item, the only item where the higher percentage comes from the independent living group is 'not drinking alcohol', the other seven items for the living with others group has a higher percentage. That is to say, for males, even though they live independently, many people prefer not to disturb their regular lifestyle habits like do exercise and brush their teeth etc. However, for females, we can say, with the exception of 'drinking alcohol' they usually maintain good daily lifestyle habits when they live with their families, and then when they start living independently there is a tendency to disturb such lifestyle habits.

There are various papers regarding the differences in dietary habits for the elderly living independently or with others. Yano et al.<sup>3)</sup> reported there is no difference between those living independently and those living with others concerning sufficiency rate in dietary allowance as well as food composition basis sufficiency rate, however, people living independently, use more pre-cooked food or tend to miss meals more and the content of meals is extremely poor. Also according to Kumae et al.<sup>4)</sup> for males, the number of foods eaten, both energy amount and protein intake is lower in the living independently group compared with living with others group, but for females there is no difference between the two groups. Ikeda et al.<sup>5)</sup> reported that those living independently scored low on the Balance Score (A non-bias assessment of the nutritive food groups) and scored high on the salt content score (concern for high consumption of salt). Teshima et al.<sup>6)</sup> reported, that people who live independently have a lower intake of rice,

fruit and vegetable and the quantity of intake amount varies widely. Okumura et al.<sup>7)</sup> reported that people living independently are deficient in protein intake. Yamanaka et al.<sup>2)</sup> say for both males and females the percentage of protein 'deficiency' is higher for those living independently and regarding green and yellow vegetables, males living independently have a higher 'deficiency' percentage, however for calcium, pale vegetables, carbohydrates, fat, salt content both those living independently and those living with others show a similar pattern.

Through this research, regarding dietary habits for both males and females, the living independently group use convenience stores more as well as eat out more and the percentage of people who eat three meals a day or eat meals with family or friends has decreased. Kumagai et al.<sup>10)</sup> shows that elderly peoples appetite is more than three times higher if they eat with their families than if they eat alone, and regarding those living independently, if there is more opportunity to have a chance to eat with family, this results in an increase in appetite, which in turn, we can assume prevents low nutritive intake. Also regarding the percentage of people who eat snacks between meals and before bedtime, there is not much difference in the male group for the living independently and living with others group, but for females, and those living independently the percentage decreases. These results suggest that people who live independently simply finish their daily meals on their own and this is in agreement with Yano et al.<sup>3)</sup> research.

Regarding food intake, the males in the living independently group consume more dairy products and the percentage of those eating meat or fish, vegetables, fruit, *miso* soup, pickled vegetables daily is higher in the living with others group. For the other 3 food groups there is hardly any difference between the living independently and living with others group. For females, the percentage of people who eat meat, fish, dairy products, *miso* soup, pickled vegetables daily is higher in the living with others group and for the other four items there is hardly

any difference between the living independently and living with others group. From this we suggest that for both males and females living independently there is less food intake quantity especially for food containing high levels of protein, this is in agreement with Okumura et al.<sup>7)</sup> and Yamanaka et al.<sup>2)</sup> research. Kumagai et al.<sup>11)</sup> indicated that in order to maintain life function it is crucial to consume good forms of protein like meat and milk and if we consider this research we can say those living with others have better dietary habits which can help maintain life function. Sakamoto et al.<sup>12)</sup> reported that within the people living in the independently group, those receiving delivered meals have a higher protein intake than those who do not receive that service. In addition, Okuno et al.<sup>13)</sup> reported that meal services have a positive effect on the food intake habits and the health condition for elderly people living independently, so we can assume that the delivery meal service is one effective way to increase the protein intake quantity for those living independently.

Concerning daily life, especially for females, we can say if they keep good lifestyle habits or good dietary habits 'for their family' when they live with their family, after they start living independently, there are many cases where females find maintaining such good habits troublesome and such habits become irregular.

Everyday if they are able to think 'for themselves and for their families', it could be said, that with this thought, even when these females start living independently they are then able to continue the same lifestyle and dietary habits. If such an inclination exists, and additionally, if there can be an increase in eating with someone else as much as possible, or utilizing meal delivery service, it is hoped that even when people start living independently, they can maintain a good lifestyle and dietary habits.

Finally in order to carry out this research, we are grateful to all who cooperated with this investigation.

## References

- 1) National Institute of Population and Social Security Research : Estimates of the number of households in Japan (national estimates), 2005-2030. *Association Health Statistics*. 2008
- 2) Yamanaka K., Hirose A., Okada K., Igata A., Takekawa R. : Nutritional Differences between Middle Age and Elderly People Living Alone and Living with Others. *Nagoya University of Arts and Sciences The Journal of Liberal Arts*. 2006; 2: 81-90
- 3) Yano A., Iso N., Kumakura H., Bando M., Arai H., Odagaki K., Tanaka R., Nagai T. : Survey on the Dietetic Life of the Old People Who Live Alone in Urban District. *Japanese Journal of Gerontology*. 1979; 1: 112-123
- 4) Kumae T., Ohshita Y., Machida K., Shimaoka A. : Influence of Family Make-up on Nutritional Intakes of Aged Persons. *Japanese Journal of Public Health*. 1986; 33: 729-739
- 5) Ikeda J., Asano M., Kitani T., Nagata H. : Study on Food Intake Frequency among Elderly Persons. *Jpn. J. Nutr.* 1991; 49: 257-271
- 6) Teshima T., Nishikawa H. : Dietary Habits as Indicated by Food Consumption Patterns among Elderly Japanese Women Living Alone in a Large City. *Journal of Health and Human Ecology*. 2000; 66: 38-50
- 7) Okumura T., Okayasu Y., Kobayashi M., Kurashige K., Hirayama M., Shimazaki T. : An investigation into the actual conditions of diet for elderly people living alone. *Rinsyou eiyou*. 1975; 57: 271-278
- 8) Teshima T., Kawakami J. : Follow-up study of elderly people living alone, their diet and living circumstances. *Seikatu Bunka Kenkyu*. 2002; 9: 133-147
- 9) Health, Labor and Welfare Ministry: National Livelihood Survey 2006. *Association Health Statistics*. 2008
- 10) Kumagai O. et al. : Relevant factors concerning elderly peoples' appetite within a home-based district. *Japanese Journal of Public Health*. 1997; 44(10) : 1283
- 11) Kumagai S., Shibata H., Watanabe S., Amano H., Suzuki T., Nagai H., Haga H., Yasumura S. : Relationship of dietary patterns to change in functional capacity (intellectual activities) in the community dwelling elderly. *Japanese Journal of Gerontology*. 1995; 16: 146-155
- 12) Sakemoto S., Huruie T., Horinouti K., Kourogi I., Suzuki S., Kuno (Nagata) K. : The nutritive state of elderly people living alone according to those receiving or not receiving meal service delivery. *Japanese Journal of Public Health*. 2004; 51: 631-639



- 13) Okuno K., Mitsuhashi K., Yasutake Y. : Home Delivered Meals: Effect on Dietary Habits and Health of the Elderly Living Alone. *Jpn. J. Nutr.* 1989; 47: 179-188

## 中年および高齢者の同居、独居別にみた生活習慣 および食生活の差について

石田 静乃\* 須崎 尚\* 岡田希和子\* 山中 克己\*

### 要旨

目的：中年および高齢者の生活習慣や食生活の実態を把握し、それらが独居、同居の違いによってどのような影響を受けるのかを明らかにする。

方法：2002年11月から12月に、愛知県 N 市に在住する40歳から69歳の男性1029名、女性1489名を対象として、自記式質問紙（生活習慣、食生活および食品摂取状況）による調査を実施した。

結果：生活習慣合計点（良好であるほど点数が高い）は男性では独居・同居で差はみられなかったが、女性では独居者のほうが低い傾向が見られた。生活習慣各項目では、男性では、よく眠れる人、飲酒をする人の割合は独居群のほうが低い傾向が見られた。女性では1日3食食べる人、1日2回以上歯を磨く人の割合は独居群のほうが低い傾向が見られ、喫煙する人の割合は独居群のほうが高い傾向が見られた。食生活については、「家族、友人と食事するか」については男女とも食事をする人の割合は独居群のほうが有意に低かった。また、「1日3食食べるか」、「間食や夜食を食べるか」については女性では食べる人の割合は独居群のほうが低い傾向が見られた。一方、「コンビニや外食を利用するか」については男性では利用する人の割合は独居群のほうが有意に高かった。食品摂取状況については、男性では肉か魚を毎日食べる人の割合は独居群のほうが有意に低く、野菜、みそ汁を摂取している人の割合も同様の傾向が見られたが、乳製品を摂取している人の割合は独居群のほうが高い傾向が見られた。また女性では、肉、魚、みそ汁を摂取している人の割合が独居群のほうが有意に低かった。

結論：生活習慣については女性で、食生活および食品摂取状況については男女とも独居、同居の違いによる影響がみられた。