

# Characteristics and Influencing Factors of Tiny Positive Events in the Daily Life of Elderly People Living Alone

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## Research Article

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# Abstract

## Background

The aging population has become a common social problem in China, and the number of elderly people living alone is increasing. The aim of this study was to explore the status and influencing factors of tiny positive events in the daily life among elderly people living alone, and to compare the urban and rural dwelling elderly. The goal of this study was to provide basis developing a more targeted and personalized positive experience strategy and to provide a scientific reference for the prevention of and interventions for loneliness and social isolation.

## Methods

A total of 280 old people living alone in Wenzhou were surveyed by a multistage probability sampling method, and a cross-sectional survey was conducted by using a general condition questionnaire and a positive event questionnaire of older persons. The data were analyzed by descriptive statistics, t-tests, analysis of variance, multiple response analysis, chi-square test and multiple linear regression analysis. All statistical analyses were performed using SPSS Statistics 22.0, and the two-tailed level of significance was set at 0.05.

## Results

The amount of tiny positive events in the elderly living alone was lower than the medium level, which was concentrated in the dimension of the surrounding environment. The most important positive events showed the characteristics of the hierarchy of needs. Education, economic source, monthly income, two-weeks illness and the frequency of children's visits were the important factors affecting positive events. The urban elderly focused on social and self-worth events, while the rural elderly people focused more on personal and family matters.

## Conclusion

In the future, we can combine these characteristics and influencing factors into interventions for the elderly living alone to create more positive events in their daily life and increase their positive experiences.

## Introduction

Older people living alone are a population with a high risk of disease and mortality. As the global ageing process accelerates, the number of elderly people living alone is also rising significantly. Currently Asian countries such as Korea and Japan have reported 23% [1] to 34.4% [2] of elderly people living alone. Even in China, which emphasizes a culture of filial piety, the proportion of elderly people living alone has risen

to nearly 17.5% [3]. The number of individuals in this group will continue to increase in the future as global fertility rates decline and the average life expectancy increases.

The physical health status of elderly people living alone is significantly lower than that of those who do not live alone. Compared with the latter, elderly people living alone have poor self-health management skills, low levels of mental health [4], a high prevalence of chronic diseases such as hypertension and diabetes and a high incidence of unintentional injuries [5, 6], and a high risk of death [7].

Among the many factors affecting the health status of elderly people living alone, loneliness and depression are important factors affecting the psychological well-being [8] and the quality of life of older people [9]. A Chinese Social Tracking Survey of the Elderly reported that about one quarter of older Chinese people experience loneliness, and the proportion of older people living alone who experience severe loneliness is five times higher than that of old people not living alone [10]. In addition, the level of depression among elderly people living alone is higher than that of those who do not live alone [11]. Loneliness and depression have a cause and effect negative feedback loop, and they can have important health consequences [12].

The more positive experiences in daily life, the higher the sense of well-being [13]. Increasing the positive experiences of older people and improving their sense of well-being are effective means of reducing their depression and lowering the incidence of loneliness. Studies have shown that social participation, communication, moderate learning, recreational sports and leisure activities, as positive events in daily life, can lead to positive experiences, reduce depression and alleviate loneliness in older people [14]. Coll-Planas et al. set up a network of contacts in small groups around health care centres and communities to increase social interaction among older people, with significant reductions in loneliness and depressive symptoms after the intervention [15]. Savikko et al. grouped 117 homebound older adults with feelings of loneliness into exercise, therapeutic writing, and art activities, and the older adults effectively reduced their loneliness by doing things together, sharing experiences with peers, and having heuristic discussions [16]. Tse et al. organised gardening activities for 27 older people in nursing homes, and after eight weeks there was a significant increase in their life satisfaction and a significant improvement in their social networks [17].

In addition to interventions that involve group or small-group interactions with the elderly, increasing the elderly's personal interactions with those around them or pleasant experiences during small everyday events can also be effective in reducing negative emotions and improving well-being. Kamei T et al. had the elderly interact with volunteers and children in one-on-one sessions for 6 months, and after 6 months there was a significant increase in life satisfaction and a significant decrease in depression levels [18]. In addition, singing and outdoor exercise had a significant effect on positive emotions in the elderly [19, 20]; increasing the number of positive experiences in daily life by creating a virtual environment led to feelings of joy and relaxation, reduced sadness and anxiety, and increased satisfaction and presence [21].

All of the above studies have shown that increasing the pleasant experiences of tiny everyday events among the elderly is beneficial in reducing negative emotions, increasing their sense of well-being and

improving their health.

Chinese elderly people living alone tend to have low levels of education and have deep roots in collectivism and filial culture. Coupled with living alone and poor health, this can limit their ability to form social relationships, and thus the tiny positive events in their daily lives should have their own unique characteristics. To increase the positive experiences in their daily lives among older people living alone, it is important to first understand which events are the tiny positive events that are important in their daily lives? What are the characteristics of these events? At present, there is a lack of research information in this area. Our research questions are:

- (1) What is the level of the amount of tiny positive events in the daily life of elderly people living alone?
- (2) Which events are the most important positive events for the elderly living alone?
- (3) What factors influence the amount of tiny positive events among the elderly living alone?
- (4) Are there any differences in the tiny positive events of the elderly living alone between urban and rural areas?

## **Methods**

### **Setting and participants**

This study was a community-based cross-sectional study of older adults in Wenzhou, Zhejiang Province, China. Samples were obtained by a multistage probability sampling method. First, we took the urban (county) and street (town) as the layer, randomly select 1 urban street and 1 rural street from 4 urban districts and 7 counties in Wenzhou, then we selected 2 neighbourhood committees from urban areas and 3 natural villages from rural areas to investigate all eligible elderly living alone.

The inclusion criteria were: age  $\geq$  60 years old; community living but alone; no cognitive impairment or communication impairment; informed consent to participate in this investigation. Exclusion criteria: failure to cooperate with the investigators; no answer to the investigators knocking at the door. Among the 2 neighbourhood committees and 3 natural villages surveyed, a total of 1506 elderly people were included, among which 294 elderly people living alone met the survey criteria. Four elderly people refused to participate in the survey, eight elderly people did not participate in the survey due to a lack of communication, three elderly people were not included as research objects due to incomplete final data, and 280 elderly people finally completed the survey.

### **Research Instruments**

#### **General Information Questionnaire**

The collected information includes factors at the individual level (sex, age, marriage, education, previous occupation, frequency of visits), economic situation (financial resources, monthly income), disease factors (chronic disease status and two-week illness) and regional factors (place of residence: urban, rural).

## Positive Event Questionnaire

Based on the literature review, the research team developed the questionnaire based on the definition of positive events and the results of interviews with 26 older people in the community and 3 residents' committees. It included positive events experienced by older people in 3 dimensions: daily behavioural activities, self-characteristic and surrounding environment. Each dimension consists of 3 items, and each item consists of 4 specific options and 1 "other option". The "other option" needs to list the specific options, as shown in Fig. 1. The range of scores for each dimension was 0 to 15; the total score of the questionnaire is 0 to 45, and the higher the score, the more positive events. Each question began with the sentence "Which of the following do you find enjoyable, happy, satisfying, desirable or honourable" and the participants were asked to choose one or more of the following options. Five experts were consulted before the formal survey and the questionnaire was revised and pre-surveyed among 30 older people. The content validity index (CVI) of the questionnaire was 0.96 and the Cronbach alpha coefficient was 0.849.

## Data Collection

The investigation was carried out mainly by a concentrated investigation and supplemented by household interviews. The centralized survey was to obtain data through interviews after the health examination for the elderly living alone (the questionnaire was to ask questions after the health examination for the elderly living alone, and the health examination personnel were community health care workers and senior nursing students). For the group surveyors who did not participate in the interview, with the help of the community management staff, the interview time was appointed for them to conduct in-person interview at the elderly person's residence.

The investigators were members of the research team and 20 nursing students who had received formal training before the investigation and spoke the local dialect fluently. During the survey, the investigator was not allowed to discuss the survey material and checked for any missed questions before submitting the questionnaire.

Before the survey, oral consent was obtained from the elderly (many of whom could not write), and written consent was signed by the elderly or signed by the community leader. The research institute ensured that the information of all respondents will be kept confidential and used for research only. This study was approved by the Ethics Committee of Wenzhou Medical University. (Ethical certificate number:2015-001).

## Data Analysis

Continuous data are presented as mean  $\pm$  SD if the variables had a normal distribution or similar, and t-tests were used to compare the differences between groups. Otherwise, the median (1st quartile, 3rd

quartile) was used. Categorical information was described by the frequency (%) and differences between groups were assessed using t-tests and analysis of variance. Variables that were significant in the one-way analysis of variance ( $p < 0.05$ ) were subjected to multiple linear regression analysis to assess the factors influencing the positive event scores. Multiple response analyses combined with cross-tabulation chi-square tests were used to compare whether there were differences in the selection of items between urban and rural elderly living alone. All analyses were conducted using Epidata 3.1 and spss 22.0.

## Results

### Sociodemographic characteristics

The 280 elderly people who completed the study ranged in age from 60–96 years, with an average age of  $76.90 \pm 8.56$  years, with 96 (34.3%) men and 184 (65.7%) women, and their other socio-demographic information detailed in Table 1.

Table 1  
Socio-Demographic Information of the  
Participants

Variable	N(%)
Residence	
City	133(47.5)
Village	147(52.5)
Marital status	
Married	52(18.9)
Unmarried or widowed	226(81.1)
Age	
≥60	61(21.8)
≥70	103(36.8)
≥80	116(41.4)
Education	
Illiteracy	189(67.5)
Primary school	59(21.1)
Junior middle school and above	32(11.4)
Previous occupation	
Administrative staff	33(12)
Worker	98(35.6)
Famer	123(43.9)
Unemployed	26(9.5)
Monthly income	
≤¥1000	52(18.6)
≤¥2000	91(32.5)
≤¥3000	90(32.1)
>¥3000	47(16.8)
Chronic disease	
None	117(41.8)

Variable	N(%)
Yes	163(58.2)
Two-week illness	
None	197(70.4)
Yes	83(29.6)
Financial resources	
Pension	141(50.4)
Child support	118(42.1)
Savings	21(7.5)
Visiting frequency	
≤1time/month	121(43.2)
2-3times/month	55(19.6)
≥4times/month	104(37.1)

## Status of tiny positive events

Among the 280 elderly people living alone, their Positive Events Questionnaire scores ranged from 7 to 35 points with a mean score of  $20.48 \pm 5.63$ . Using half of the total questionnaire score (22.5) as the medium level, the tiny events experienced by the elderly living alone are at the medium to low level.

Among the three dimensions of positive events, the highest scores were for the surrounding environment dimension and the lowest scores were for the daily behavioural activities dimension. The top three scores for the questionnaire items were for life expectation, social support and self-expectation, indicating that the elderly living alone received more positive events in these areas. The scores for each dimension and each item of the questionnaire are presented in Table 2.

Table 2  
Scores for each dimension and each item of the daily positive events ( $\bar{x} \pm S$ , points)

Projects		Score	Projects	Score	Projects	Score
Dimension	Daily behavioural activities	$5.25 \pm 2.32$	Self-characteristic	$7.06 \pm 2.23$	Surrounding environment	$8.17 \pm 2.22$
Items	Family activities	$1.90 \pm 1.11$	Self-satisfaction	$2.09 \pm 1.01$	Life satisfaction	$2.48 \pm 1.12$
	Leisure activities	$1.80 \pm 0.95$	Self-glory	$2.46 \pm 1.20$	Social support	$2.47 \pm 1.01$
	Collective activities	$1.54 \pm 0.94$	Self-expectation	$2.51 \pm 1.01$	Life expectation	$2.87 \pm 1.13$

## Most important positive events

When we surveyed the elderly living alone about their daily tiny positive events, we also asked what they considered to be the most important positive event in each category. The results showed that using new media, sports activities, events with friends and family, doing what you love, respect received, good health, freedom of time, good family ties and children's success were the most important positive events in each of the nine categories. The composition ratios of these events in the entries they belonged to were 27.5%, 43.6%, 53.6%, 42.5%, 37.1%, 77.1%, 58.9%, 44.3% and 43.2% respectively, as shown in Fig. 1.

## Univariate analysis of scores for tiny positive events

Univariate analysis was conducted using the questionnaire scores as dependent variable and sociodemographic and health-related characteristics as independent variables. The results showed that marital status, previous occupation, chronic disease, education, visiting frequency, monthly income, financial resource and two-week illness had significant effects on the number of positive events in the elderly living alone ( $p < 0.05$ ). The results are detailed in Table 3.

Table 3  
Univariate analysis of scores for the tiny positive events

<b>Variable</b>	<b>Score( <math>\bar{x} \pm S</math>, points)</b>	<b>t/F</b>	<b>P value</b>
Residence			
City	21.02 ± 5.17	1.542	0.124
Village	19.99 ± 5.98		
Gender			
Male	19.55 ± 6.26	-2	0.061
Female	20.96 ± 5.22		
Marital status			
Married	22.52 ± 5.30	3.007	0.003**
Unmarried or widowed	19.99 ± 5.61		
Age			
≥ 60	20.93 ± 6.09	0.255	0.775
≥ 70	20.34 ± 5.36		
≥ 80	20.36 ± 5.65		
Education			
Illiteracy	19.67 ± 5.51	6.431	0.002**
Primary school	22.44 ± 5.45		
Junior middle school and above	21.63 ± 5.75		
Previous occupation			
Administrative staff	21.09 ± 5.23	2.764	0.042*
Worker	21.48 ± 5.61		
Famer	19.96 ± 5.75		
Unemployed	18.38 ± 4.98		
Monthly income			
≤¥1000	16.25 ± 4.46	13.657	0.000**
≤¥2000	21.46 ± 5.65		

\*  $p < 0.05$ ; \*\*  $p < 0.01$

Variable	Score( $\bar{x} \pm S$ , points)	t/F	P value
$\leq$ ¥3000	21.39 $\pm$ 5.25		
>¥3000	21.51 $\pm$ 5.43		
Financial resource			
Pension	18.52 $\pm$ 5.26	24.33	0.000**
Child support	23.01 $\pm$ 4.99		
Saving	19.43 $\pm$ 6.05		
Visiting frequency			
$\leq$ 1time/month	18.27 $\pm$ 5.49	25.797	0.000**
2-3times/month	24.20 $\pm$ 4.58		
$\geq$ 4times/month	21.08 $\pm$ 5.11		
Chronic disease			
None	21.41 $\pm$ 5.36	-2.366	0.019*
Yes	19.81 $\pm$ 5.74		
Two-week illness			
None	21.60 $\pm$ 5.10	-5.383	0.000**
Yes	17.82 $\pm$ 5.95		
* $p < 0.05$ ; ** $p < 0.01$			

## Multivariate analysis of positive event scores

Taking the questionnaire score as the dependent variable, the significant factors in the univariate analysis were used as independent variables to conduct the linear regression analysis. The results showed that the model is meaningful ( $F = 10.648$ ,  $p < 0.001$ ) and does not exhibit collinearity, and the visiting frequency, educational level, monthly income, two-week illness and financial resources were the main factors affecting the positive events ( $p < 0.05$ ). The results are shown in Table 4.

Table 4  
Multiple regression analysis of factors influencing tiny positive events

<b>Variables</b>	<b><i>B</i></b>	<b><i>SE</i></b>	<b><math>\beta</math></b>	<b><i>t</i></b>	<b><i>sig</i></b>	<b><i>VIF</i></b>
Constant	13.037	1.594		8.179	0.000*	
Marital status (ref., unmarried or widowed)						
Married	0.711	0.724	0.05	0.982	0.327	1.096
Education (ref., illiteracy)						
Primary school	1.609	0.753	0.117	2.137	0.034*	1.265
Junior middle school and above	3.271	1.055	0.185	3.101	0.002**	1.512
Previous occupation (ref., unemployed)						
Administrative staff	-0.522	1.443	-0.03	-0.362	0.718	2.905
Worker	0.853	1.09	0.072	0.783	0.435	3.629
Famer	-0.119	1.027	-0.011	-0.116	0.907	3.486
Monthly income (ref., $\leq$ ¥1000)						
$\leq$ ¥2000	2.237	0.895	0.186	2.5	0.013*	2.358
$\leq$ ¥3000	2.631	0.932	0.219	2.823	0.005**	2.543
>¥3000	3.696	1.111	0.246	3.328	0.001**	2.314
Financial resources (ref., saving)						
Pension	-0.003	1.181	0	-0.002	0.998	4.68
Child support	3.345	1.113	0.294	3.005	0.003**	4.057
Visiting frequency (ref., $\leq$ 1time/month)						
2-3times/month	3.305	0.844	0.234	3.914	0.000**	1.511
$\geq$ 4times/month	1.127	0.679	0.097	1.659	0.098	1.447
Chronic disease (ref., yes)						
None	0.917	0.59	0.08	1.553	0.122	1.138
Two-week illness (ref., yes)						
$R^2 = 0.377$ ; $\text{adj.}R^2 = 0.342$ ; * $p < 0.05$ ; ** $p < 0.01$						

Variables	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>sig</i>	<i>VIF</i>
None	1.926	0.663	0.157	2.904	0.004**	1.232
R <sup>2</sup> = 0.377; adj.R <sup>2</sup> = 0.342; * <i>p</i> <0.05; ** <i>p</i> <0.01						

Footnote: Dependent variable = the score on the Positive Event Questionnaire

## Comparison of positive events for older people living alone in different places of residence

In the univariate analysis, we found there was no significant difference in the score of positive events between urban and rural elderly people living alone, but we do not know whether there is a difference between the two in terms of categories. To clarify this, we first compared the scores for each item using the t-tests. The results revealed that in terms of scores for each entry, urban elderly living alone scored significantly higher than rural elderly on the entries of self-satisfaction, life satisfaction and social support, and rural elderly living alone scored significantly higher ( $p < 0.05$ ) than urban elderly in regard to their own hopes and life expectations, as shown in Table 5.

Table 5

Comparison of scores for each item on positive events for older people living alone in urban and rural areas

Dimension	Item	Residence( $\bar{x} \pm S$ , points)		<i>t</i>	<i>P</i> value
		City(n = 133)	Village(n = 147)		
Daily behavioural activities	Family activities	1.93 ± 0.96	1.88 ± 1.22	0.366	0.715
	Leisure activities	1.89 ± 0.93	1.72 ± 0.96	1.467	0.143
	Collective activities	1.62 ± 0.94	1.48 ± 0.94	1.246	0.214
Self-characteristic	Self-satisfaction	2.40 ± 1.09	1.80 ± 0.83	5.088	0.000*
	Self-glory	2.48 ± 1.25	2.45 ± 1.15	0.225	0.822
	Self-expectation	2.26 ± 0.95	2.73 ± 1.02	-3.995	0.000*
Surrounding environment	Life satisfaction	2.86 ± 1.07	2.12 ± 1.01	5.909	0.000*
	Social support	3.02 ± 0.91	2.67 ± 0.88	3.253	0.001
	Life Expectation	2.57 ± 1.16	3.14 ± 1.03	-4.28	0.000*
* <i>p</i> <0.001					

Secondly, the selection of specific items within each item were compared. We used the method of multiple response analysis combined with cross table chi-square tests to analyze the selection proportion

of these items. The results showed (Fig. 2) that in terms of family activities, a high proportion of the urban elderly chose to use new media, while a high proportion of the rural elderly chose to plant and do crafting. In the items of leisure activities, the proportion of urban elderly people choosing parties and sports activities was high. In terms of self-satisfaction, the proportion of urban old people choosing former occupation and retirement benefits was relatively high. In terms of life satisfaction, the proportion of urban elderly choosing housing conditions and community environment is higher, while the proportion of rural elderly choosing freedom of time was higher. In terms of social support items, the urban elderly had a higher proportion of good family ties and government's concern. Among the items of life expectation, a higher proportion of rural elderly chose family reunions, children's success and stable life ( $P < 0.05$ ).

## Discussion

Well-being is based on a series of small, emotional experiences in one's daily life [22], and it is particularly important for the elderly living alone to increase these positive daily events. The results of the survey of 280 elderly people living alone in this study showed that the amount of tiny positive events in their daily lives was at a moderate to low level and there is still much room for improvement. From the overall perspective of the questionnaire, the elderly living alone scored the highest in the three items of self-expectation, life expectation and social support, indicating that they had more positive items in these three aspects. The reason for this may be that for the elderly living alone for a long time, the objects and sources of positive experience are relatively small, and it's easier to obtain positive experiences from their own hopes, life expectations and people who can get in touch with. Therefore, on the basis of maintaining the original positive items, it is necessary to expand the items that the elderly living alone experience positively in terms of daily behaviour and activities and their own characteristics. In addition, we also found that although the emotional support in their daily lives came more from relatives, friends and neighbours, the most important and desired support was from their spouses and children.

The elderly living alone consider "good health and sports activities" as important events, indicating that the elderly living alone care very much about physical health (because only physical health can meet their most basic needs for physiology and safety [23]), and that it is important in their life that they can participate in physical activities with independent functions. "Freedom of time and doing what you love" as an important positive event for elderly people living alone is also a goal that many people pursue throughout their lives. Compared to most Chinese elderly people who help with their grandchildren, those who live alone feel that this is a great blessing for them, as they are able to achieve the complete liberation, not being controlled by work or household chores. "Good family ties and child's success" is the wish of the elderly living alone, and it is also a common wish of the elderly in China. Although the children of elderly people living alone are not living with them, family and children always have an important place in the hearts of elderly people, but they are deeply influenced by the traditional Chinese "family culture", as the concept of "family harmony makes everything happy" is deeply rooted in the minds of elderly people. Older people also see the success of their children as the greatest comfort for the rest of their lives. Some studies have shown that older people still have a strong desire to realize their self-worth, and many are

willing to do so in various ways [24]. This is also reflected in this study, where "events with friends and family, respect received and using new media" are important positive events for the elderly living alone. This is because in these activities they feel that they are not separated from society and have a better sense of being and value. The difference is that the daily life scope and social scale of the elderly living alone are small, and social activities are mainly limited to contact with relatives and friends. Based on the above analysis, health care workers should strive to create conditions for the elderly living alone to improve their health, exercise and learn new media, urge family members to have regular contact with the elderly living alone and help them to increase their social activities to enhance their positive experience of small daily events.

This study found that tiny positive events among elderly people living alone was mainly influenced by their monthly income, financial resources, literacy, frequency of visits, and two-week illness, which is similar to the results of De Labra, Fu Yi et al [25, 26]. In terms of monthly income, those earning less than ¥1,000 per month had significantly lower positive event scores than those earning more than ¥1,000 per month. It may be that people with higher levels of income are more likely to have their needs met in terms of purchasing goods, entertainment and seeking medical care, as income levels have a significant positive effect on life satisfaction and can give older people a greater sense of pride [27, 28]. In terms of financial resources, those who are supported by their children have more positive events than those who are on a pension, which is consistent with Daniel's study [29]. This is because children who take the initiative to fulfil their financial obligations for the elderly while doing their own filial duty and caring will better compensate for the lack of security of the elderly [30], resulting in positive emotional experiences for the elderly. Frequent visits from children are an important factor in the well-being of older people [31], and this was confirmed in this study. In this study, those whose children visited them 2–3 times/month had significantly higher positive event scores than those who visited them 1 time/month or less, suggesting that appropriate visits from children can provide psychological support at a time when they are most eager for emotional comfort, which is conducive to increasing positive emotions and improving the mental health of older people. The level of literacy can determine the speed and variety of ways in which the elderly receive and acquire new things, thus influencing their positive experiences of everyday exposure. The results of this study showed that the number of positive events was significantly higher among those with high levels of primary and lower secondary education than those who were illiterate, which is consistent with the previous research [32]. Health status is an important indicator of the quality of life and well-being of older people [33]. This study found that older people living alone with a medical condition had significantly lower positive event scores than those without the condition, suggesting that recent illness not only affects the older people's own physical health, but also reduces their positive experience of things and the number of tiny positive events they experience.

There were differences in the categories of tiny positive events between urban and rural elderly living alone. The gap in the quality of life between urban and rural older people is gradually narrowing, but the gap still exists [34]. This study found no significant difference between urban and rural elderly living alone in terms of the total scores of positive events, but urban elderly living alone scored higher than rural elderly living alone on the items of self-satisfaction, life satisfaction and social support, and

correspondingly the latter scored significantly higher than the former on the items of self-expectation and life expectation. Specifically, the biggest difference in terms of self-satisfaction is that a significantly larger proportion of elderly people living alone in urban areas choose their previous occupation and retirement benefits than those living alone in rural areas. In this study, the former are mostly workers, while the latter are mainly farmers, and retirement benefits may also differ depending on the pension insurance system. In terms of life satisfaction, a much larger proportion of urban elderly living alone chose housing status, community environment and medical conditions than rural persons, which may be related to the higher level and diversity of community construction and health management in urban areas[35]. In terms of social support, the proportion of urban elderly living alone choosing good family relationships and government care was relatively high. At present, although China's social security system has been gradually improved, the overall level of urban and rural areas is still different. In addition, the rural labour force includes more migrant workers and the proportion of family members who have been away from home for a long time is higher, both of which will affect the social support of the rural elderly [36]. Therefore, in terms of life expectation, the elderly living alone in rural areas would prefer to have their families reunited, their children's lives and careers to be successful and their own retirement to be more secure.

In addition, the use of new media was more popular among older people living alone in cities, while older people in rural areas preferred planting and crafts. For those who have been farmers all their lives, being able to continue growing flowers and vegetables is a way to escape boredom in life. And planting and making crafts can also help them supplement the family income. The urban elderly living alone are more educated and have an advantage in pursuing new things. In terms of leisure activities, the biggest difference is that urban older people living alone prefer to participate in more social activities such as gatherings and sports activities, which may be related to their individual values. Urban older people may prefer to integrate into society to make the most of their remaining time and energy. In general, urban elderly living alone have more positive experiences in terms of pursuing new things, participating in social activities, satisfaction with their living conditions and the surrounding environment, and a realisation of self-worth, while rural elderly living alone have more positive experiences in terms of being able to use their free time, doing things they enjoy, and engaging in family matters. Therefore, when intervening in the health of elderly people living alone, community workers can make reference to the characteristics of tiny positive events of urban and rural elderly people to maintain and enhance the positive events of elderly people living alone.

## **Study Limitations**

The content of the questionnaire was obtained mainly through the participants' self-reports and may be subjective in its variability; the current survey was conducted mainly in one area of Wenzhou. Although the migrant population in Wenzhou comes from most provinces in China and accounts for 31% of the population, it is mainly derived from the central and western interior provinces and is not yet representative of the situation of all older people in China. The questionnaire in this study was designed

by the research team themselves and no questionnaire similar to this study has been found, so the results in this study cannot be compared with the results of other studies.

## **Declarations**

### **Ethics approval and consent to participate**

The study was approved by the Ethics Committee of Wenzhou Medical University (Approval No. 2015-001). Written informed consent was obtained from all participants. All methods were carried out in accordance with their guidelines and regulations, and participants agreed to use the data in the research project.

### **Consent for publication**

Not applicable.

### **Availability of data and materials**

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

### **Competing interests**

All other authors declare that they have no competing interests.

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### **Authors' contributions**

LLH and ZQY designed this study, LLH, YQJ, EJZ, WJL, LJZ and CCZ collected data. LLH and ZQY conducted the statistical analyse. EJZ, BXH, LJZ, and XLC interpreted data. ZQY and LLH reviewed the result and wrote manuscript. ZQY, LLH, YQJ, CCZ, WJL and BXH revised manuscript. All authors read and approved manuscript.

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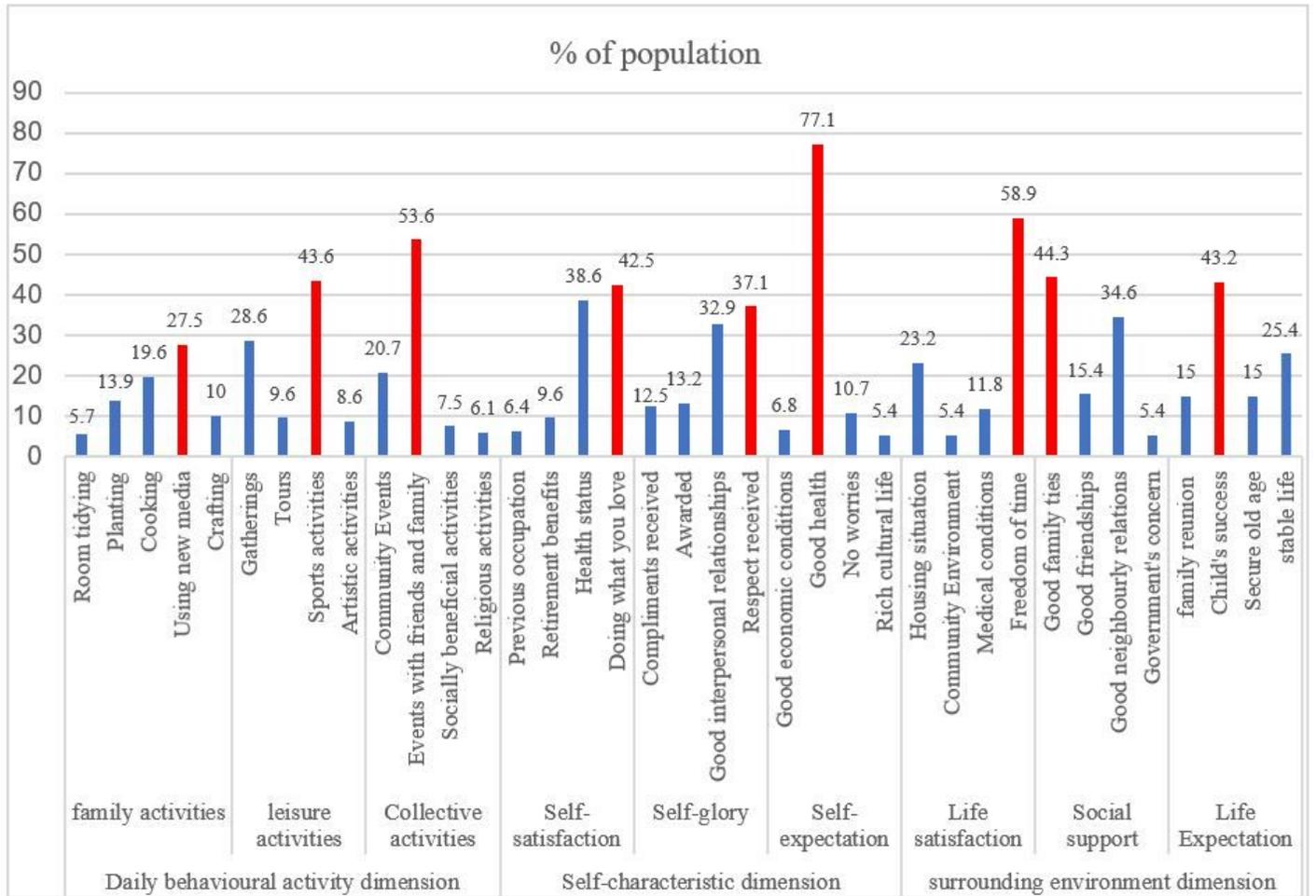
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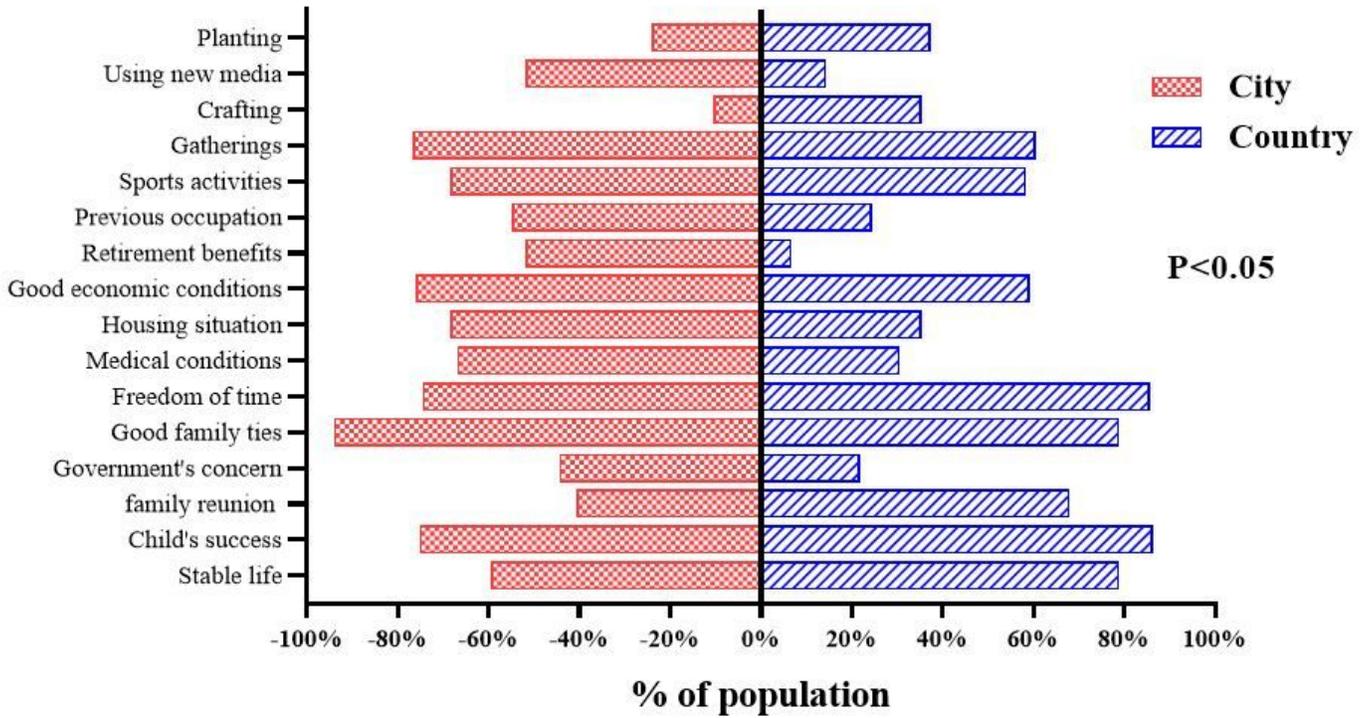
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## Figures



**Figure 1**

The most important positive events in each dimension for older people living alone Footnote: Each item contains the specific content of the "Other" option, but it is not listed in the figure because the selection ratio of the option is less than 5%



**Figure 2**

Differences in specific positive events for older people living alone in urban and rural areas (non significant differences are not shown)