

Determinants of Life Satisfaction among Japanese Agricultural Workers

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Abstract

The purpose of this study was to investigate the factorial structure of life satisfaction in agricultural workers. One hundred and sixty-five (87 males and 78 females) agricultural workers mainly engaged in plastic greenhouse cultivation in southern Japan, ranging in age from 19 to 72 years (mean = 44.3 years), completed a questionnaire. Scores of life satisfaction showed a higher tendency in males than in females, and those in elders were higher than in younger people. Conversely, females showed higher stress scores than males, and younger people's score were higher than the elders. Multiple regression analysis was performed to analyze the factorial structure of satisfaction. It is suggested that the level of life satisfaction is positively related to social support, and is negatively related to the impact of stressful life events, globally perceived stress and subjective symptoms of ill health. Stress levels depended on factors concerning the psychological demands of work, work posture, work hours and work environment. Different factorial structures were observed between female and male workers. Findings from this study suggest that a strong social support network may assist in enhancing life satisfaction. Furthermore, the ill health and stress experienced in agricultural work were associated with a reduced life satisfaction.

Key words: life satisfaction, social support, agricultural work, work-related stress, perceived stress.

Introduction

It is generally recognized that agriculture is one of the most hazardous occupations in Japan, since it is physically demanding and time-consuming work, lacking in hygienic control of work conditions and providing poor sanitation in living conditions as well as other factors related to the delay of hygienic improvement in rural circumstances. Recently, the work mode and socio-economic situation of agriculture have changed rapidly. For example, the introduction of cultivation in plastic greenhouses, artificial pollination, advances in agricultural machinery, the use of various kinds of pesticides in large quantities, and agricultural management using the internet. These changes have been accompanied by changes in daily rural lives and family structures, i.e., urbanization and industrialization in rural communities. These changes are resulting in a new development of problems of safety and health among agricultural workers. These types of problems may not be recognized or accurately assessed by

traditional concepts and methods of determining agricultural work load and analyzing agriculture-related diseases. According to these changes, there is a wide variety of factors currently affecting the safety and health of agricultural workers and these factors interact in a complicated manner, requiring comprehensive consideration to analyze the actual situation and the etiology of safety and health among agricultural workers. Furthermore, our perspective on health is changing from a focus on disease control to an achievement of life satisfaction for each individual, i.e., seeking quality of life (QOL). In that regard, in 1998, the necessity for a clean environment and improved safety and health practices in the agricultural work place was discussed at a conference in Kiev¹⁾. However, no systemic investigation has been conducted to develop analytical methods or to promote safety and health among agricultural workers.

From that viewpoint, using the hypotheses that the actual state of safety and health among agricultural workers may be affected by a decrease in QOL due to stress caused by factors ranging from the change in agriculture as described above and that coping with that stress may increase QOL among agricultural workers, we conducted an investigation by organizing a nationwide study group to develop a new method of analyzing the actual state of QOL and stress among agricultural workers^{2,3,4)}.

Using the questionnaire form developed by that study group,

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we conducted a questionnaire survey to clarify the actual state of stress and QOL and to determine what factors are necessary to enhance QOL among agricultural workers in Kumamoto Prefecture.

Methods

Sample:

A cross-sectional sample of 165 agricultural workers living in Kumamoto Prefecture southern Japan (87 males and 78 females) were recruited. The sample ranged in age from 19 to 72 years, with a mean age of 44 (M=44.3, SD=11.6 years). The subjects mainly worked in plastic greenhouses to grow vegetables, or fruit, such as eggplant and melons. Approximately 6%, 12%, 39%, 37%, and 5% of the workers cultivated 50, 100, 200, 500, and more than 500 acres, respectively. The annual household income from agriculture in 3%, 1%, 11%, 7%, 12%, and 48% was 500,000 1,000,000, 3,000,000, 5,000,000, 10,000,000 and

more than 10,000,000 yen, respectively. The mean family number was 5 persons (2-8 persons). Ninety-four percent families had children under 11 years of age, and 76% of the families had members over 65 years of age.

Procedure:

A new version of the Life & Health questionnaire developed by the study group as above mentioned^{2,3,4}, which included 67 items in 13 subscales was distributed to each subject (see Table 1). Four subscales; global perceived stress (Q1), social support networks (Q7), rural life and family impact on disturbing life events (Q5), and subjective symptoms of ill health (Q10) were selected as factors to estimate life satisfaction. Self-assessment of life satisfaction (Q8) was measured by answers to "Feel satisfaction with rural life and agricultural work". The responses were rated on a 7-point scale from "Very dissatisfied (-3)" to "Very satisfied (3)", high scores indicating higher satisfaction. Globally perceived stress was measured by answers to "Do you

Table 1 The structural characteristics of the Life & Health questionnaire

Subscales	Scale
	1 = Never little 2 = Mostly little 3 = Little 4 = A moderate amount 5 = Much 6 = Mostly much 7 = Very much ↓
Q1 Globally perceived stress (1 item)	1 2 3 4 5 6 7
	0 = Never / Slight 1 = Sometimes / Moderate 2 = Routinely / High ↓
Q2 Social networks (4 items)	0 1 2
Q3 Work-related psychological stress (6 items)	0 1 2
Q4 Work-related physical stress (11 items)	0 1 2
Q5 Life events-related stress (9 items)	0 1 2
Q6 Type A behavior (4 items)	0 1 2
	-2 = Strongly disagree -1 = Disagree 0 = Neither agree nor disagree 1 = Agree 2 = Strongly agree ↓
Q7 Social support networks (10 items)	2 1 0 -1 -2
	-3 = Very dissatisfied -2 = Mostly dissatisfied -1 = Slightly dissatisfied 0 = Neither satisfied nor dissatisfied 1 = Slightly satisfied 2 = Mostly satisfied 3 = Very satisfied ↓
Q8 Life satisfaction (1 item)	3 2 1 0 -1 -2 -3
Q9 Yesterday's behavior (1 item)	-
	0 = No 1 = Yes ↓
Q10 Subjective symptoms (17 items)	0 1
Q11 Subjective health state (1 item)	-
Q12 Introduce some specific methods to manage your stress (1 item)	-
Q13 Please comment on your good feeling on agricultural work (1 item)	-

feel any stress in your life and/or work?”. The responses were rated on 7-point scale from “Very much (7)” to “Never little (1)”, high scores indicating higher stress levels. Work-related psychological stress (Q3) was measured by a 6 items, 3-point scale covering stressors, such as work demands and work controls. Work-related physical stress (Q4) was measured by an 11 items, 3-point scale covering stressors, such as work environment, work posture, work hours and work load. Life events-related stress (Q5) was measured by a 9 items, 3-point scale covering impact events experienced in rural life and agricultural work, high scales indicating more frequent experiences of impact life events. Q3, Q4 and Q5 required “yes” or “no” answers to mentioned stressors. A 3-point scale was used to measure stress levels if the answer was “Yes” (0 = Slight, 1 = Moderate, 2 = High). If the answer was “No”, a score of 0-point was given, high scores indicating higher work-related stress. Social support (Q7) was evaluated on 4 items out of a total of 10 using a 5-point scale, which covers four support forms: business partners, close people, community organization, and support groups. The responses were scaled from strongly disagree (-2 points) to strongly agree (2 points), a high scale indicating more frequent use of the supports. Subjective symptoms (Q10) were measured by a 14 items, 2-point (Yes =1, No =0) scale covering stress symptoms and burnout symptoms. The subjects also completed a demographic form which included questions about their age, marital status, family size, and income as related to agricultural work. The subjects were divided into 3 age groups: under 39-years (n=61), 40 to 59-years (n=78), and over 60-years (n=27). The SPSS statistical package subprogram multiple regression analysis was used for model structure analysis. The χ square comparison of two proportions and the student t-test were used to evaluate the results between males and females.

Results

Scores of life satisfaction showed a tendency that males' scores were higher than females', and elders' were higher than younger peoples'. Scores of globally perceived stress showed a tendency for females to be higher than males, and younger people to be higher than elders (see Table 2).

Tables 3 and 4 show the response rates for work-related psychological stressors and physical stressors and perceived stress levels, respectively. Males showed higher response rates for the psychological stressors than females. Responses to the factors “learning new technology” and “on time shipments” showed the highest perception of stress in job control and job demands. The response rates for physical stressors were different between males and females. Higher response rates for the factors “overload”, “inadequate machinery”, “poor work environment”, “work hours” and “irregular hours” were noted for males, and “poor work posture” and “other work” showed higher response rates among females. The factors “overload”, “heat of work

Table 2 Scores of life satisfaction and globally perceived stress between the sex and age groups

	Age groups			All subjects
	~ 39y	40 ~ 59y	60y ~	
Life satisfaction				
Male	0.0 ± 1.2	0.5 ± 0.9	1.1 ± 1.4	0.4 ± 1.2
Female	0.1 ± 0.9	0.4 ± 1.2	0.4 ± 1.4	0.3 ± 1.2
Globally perceived stress				
Male	4.3 ± 1.5	3.8 ± 1.8	2.8 ± 1.6	3.9 ± 1.7
Female	4.5 ± 1.6	3.7 ± 1.5	4.0 ± 1.9	4.1 ± 1.6

Values are expressed as mean ± SD.

No statistical significances were found between the male and female groups using the t-test.

Table 3 The response rates and stress level on work-related psychological stress (Q3) (N=165)

	Response rate of “Yes” (N (%))			Stress level (N (%))						
	Male	Female	All subjects	High		Moderate		Slight		
				Male	Female	Male	Female	Male	Female	
Job control	Learning	76 (87.4)	56 (71.8)	132 (80.0)	6 (7.9)	8 (14.3)	39 (51.3)	22(39.3)	31 (40.8)	26 (46.4)
	Knowledge and skills	74 (85.1)	56 (71.8)	130 (78.8)	5 (6.8)	5 (8.9)	44 (59.5)	32(57.1)	25 (33.8)	19 (33.9)
	Job retraining	71 (81.6)	47 (60.3)	118 (71.5)	8 (11.3)	3 (6.4)	31 (43.7)	15(31.9)	32 (45.1)	29 (61.7)
Job demands	Time	65 (74.7)	55 (70.5)	120 (72.7)	17 (26.2)	18 (32.7)	38 (58.5)	32(58.2)	10 (15.4)	5 (9.1)
	Difficulty	52 (59.8)	38 (48.7)	90 (54.5)	7 (13.5)	9 (23.7)	37 (71.2)	23(60.5)	8 (15.4)	6 (15.8)
	Competition	30 (34.5)	23 (29.5)	53 (32.1)	3 (10.0)	7 (30.4)	20 (66.7)	11(47.8)	7 (23.3)	5 (21.7)

Values are expressed as number of subjects (%).

No statistical significances were found between the male and female groups using the χ square test.

Table 4 The response rates and stress level on work-related physical stress (Q4) (N=165)

	Response rate of “Yes” (N (%))			Stress level (N (%))						
	Male	Female	All subjects	High		Moderate		Slight		
				Male	Female	Male	Female	Male	Female	
Work load	Overload	41 (47.1)	38 (48.7)	79 (47.9)	4 (9.8)	9 (23.7)	18 (43.9)	20(52.6)	19 (46.3)	9 (23.7)
	Poor posture	32 (36.8)	44 (56.4)	76 (46.1)	2 (6.3)	7 (15.9)	18 (56.3)	23(52.3)	12 (37.5)	14 (31.8)
	Inadequate machinery	18 (20.7)	8 (10.3)	26 (15.8)	2 (11.1)	1 (12.5)	10 (55.6)	4(50.0)	6 (33.3)	3 (37.5)
Work Environment	Working at heights	6 (4.6)	1 (1.3)	7 (4.2)	0 (0.0)	0 (0.0)	1 (16.7)	0 (0.0)	5 (83.3)	1 (100)
	Outdoor climate	75 (86.2)	54 (69.2)	129 (78.2)	5 (6.7)	9 (16.7)	28 (37.3)	22(40.7)	42 (56.0)	23 (42.6)
Work hours	Heat	59 (67.8)	47 (60.3)	106 (64.2)	8 (13.6)	13 (27.7)	30 (50.8)	25(53.2)	21 (35.6)	9 (19.1)
	Noise	23 (26.4)	17 (21.8)	40 (24.2)	2 (8.7)	1 (5.9)	14 (60.9)	11(64.7)	7 (30.4)	5 (29.4)
	Dust	20 (23.0)	15 (19.2)	35 (21.2)	4 (20.0)	3 (20.0)	11 (55.0)	11(73.3)	5 (25.0)	1 (6.7)
Work hours	Long hours	60 (69.0)	45 (57.7)	105 (63.6)	8 (13.3)	14 (31.1)	35 (58.3)	24(53.3)	17 (28.3)	7 (15.6)
	Irregular hours	56 (64.4)	38 (48.7)	94 (57.0)	6 (10.7)	8 (21.1)	24 (42.9)	20(52.6)	26 (46.4)	10 (26.3)
	Other work	19 (21.8)	21 (26.9)	40 (24.2)	4 (21.1)	4 (19.0)	5 (26.3)	10(47.6)	10 (52.6)	7 (33.3)

Values are expressed as number of subjects (%).

No statistical significances were found between the male and female groups using the χ square test.

Table 5 The response rates and stress level for life events-related stress (Q5) (N=165)

	Response rate of "Yes" (N (%))			Stress level (N (%))					
	Male	Female	All subjects	High		Moderate		Slight	
				Male	Female	Male	Female	Male	Female
Family life									
Injury/illness	36 (41.4)	37 (47.4)	73 (44.2)	11 (30.6)	12 (32.4)	18 (50.0)	16 (43.2)	7 (19.4)	9 (24.3)
Child education	20 (23.0)	24 (30.8)	44 (26.7)	3 (15.0)	8 (33.3)	8 (40.0)	9 (37.5)	9 (45.0)	7 (29.2)
Caring for the aged	20 (23.0)	21 (26.9)	41 (24.9)	6 (30.0)	10 (47.6)	12 (60.0)	9 (42.9)	2 (10.0)	2 (9.5)
Disagreements in the neighbourhood	13 (14.9)	7 (9.0)	20 (12.1)	3 (23.1)	3 (42.9)	6 (46.2)	4 (57.1)	4 (30.8)	0 (0.0)
Divorce/separation	3 (3.5)	0 (0.0)	3 (1.8)	0 (0.0)	0 (0.0)	2 (66.7)	0 (0.0)	1 (33.3)	0 (0.0)
Death of family member/friend	0 (0.0)	2 (2.6)	2 (1.2)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)
Rural life									
Decrease in income	65 (74.7)	50 (64.1)	115 (69.7)	21 (32.3)	22 (44.0)	35 (53.8)	20 (40.0)	9 (13.9)	8 (16.0)
Debt	34 (39.1)	31 (39.7)	65 (39.4)	14 (41.2)	16 (51.6)	16 (47.1)	9 (29.0)	4 (11.8)	6 (19.4)
Difficulties with business partners	13 (14.9)	9 (11.5)	22 (13.3)	2 (15.4)	1 (11.1)	9 (69.2)	7 (77.8)	2 (15.4)	1 (11.1)

Values are expressed as number of subjects (%).

No statistical significances were found between the male and female groups using the χ square test.

Table 6 The response rates for subjective symptoms (Q10) (N=165)

Items	Male (N (%))	Female (N (%))	All subjects (N (%))
Back, shoulder pain	24 (27.6)	36 (46.2)	60 (36.4)
Headaches	6 (6.9)	12 (15.4)	18 (10.9)
Poor health	6 (6.9)	6 (7.7)	12 (7.3)
Sadness	6 (6.9)	8 (10.3)	14 (8.5)
Cold hands and/or feet	5 (5.7)	23 (29.5)	28 (17.0)
Poor strength	5 (5.7)	7 (9.0)	12 (7.3)
Unhappiness with oneself	4 (4.6)	10 (12.8)	14 (8.5)
Feeling run down	2 (2.3)	7 (9.0)	9 (5.5)
Difficulty sleeping	2 (2.3)	4 (5.1)	6 (3.6)
Feeling unsettled at work	2 (2.3)	6 (7.7)	8 (4.8)
Perfuse sweating	1 (1.1)	4 (5.1)	5 (3.0)
Shortness of breath	1 (1.1)	3 (3.8)	4 (2.4)
Dizziness upon standing	1 (1.1)	15 (19.2)	16 (9.7)
Decrease in body weight	1 (1.1)	3 (3.8)	4 (2.4)

Values are expressed as number of subjects (%).

No statistical significances were found between the male and female groups using the χ square test.

Table 7 The scores of involvement in a social support network (Q7) (N=165)

Items	Male	Female	All subjects
Business partners	1.49 ± 0.58	1.17 ± 0.57	1.29 ± 0.59
Close people	1.41 ± 0.64	1.57 ± 0.61	1.51 ± 0.63
Community	1.33 ± 0.58	1.23 ± 0.63	1.27 ± 0.61
Support group	0.39 ± 0.59*	0.39 ± 0.60*	0.39 ± 0.59*

Values are expressed as mean ± SD.

*p<0.05; significantly different between support group and others

environment" and "work hours" showed the highest perception of physical stress. The response rates for significant life events are presented in Table 5. The factors "injury or illness of family members", "a decrease in income", "debt", showed higher responses and stress perception than other life events. Higher response rates for subjective symptoms were seen (Table 6) with a back and/or shoulder pain. Table 7 shows scores of each subject's involvement in a social support network. The scores of group support were significantly lower ($p<0.05$) than other factors.

To determine factorial structure of life satisfaction by multiple regression analysis we adopted the scores of social support, life events, subjective symptoms and globally perceived stress as independent factors. As shown in Fig.1, multiple regressions indicated that life satisfaction had a positive relationship with good social support networks, and a negative relationship to stressful life events, subjective symptoms, and globally perceived stress. The globally perceived stress level depended upon factors concerning work-related psychological

stress, and work-related physical stress. The work-related psychological stress resulted from job demands and job control. The work-related physical stress resulted from stressors such as work load, work environment and work hours. The globally perceived stress had more significant relationship with psychological stress perception than with physical stress perception. The globally perceived stress showed a more significant negative effect to life satisfaction than stressful life events and subjective symptoms. Multiple regression results showed that there are no significant differences among the age groups (under 39-year, 40 to 59-year and over 60-year) in the model of life satisfaction. No significant correlation was found between life satisfaction and income, either.

Discussion

Cultivating crops in a plastic greenhouse is the most popular way of cultivation in the present Japanese agriculture. The subjects in this study represent characteristics of typical current agricultural workers in Japan. The Life & Health questionnaire was developed to measure stress and to define the sources of stress among agricultural workers^{2,3,4}. This questionnaire has been confirmed to be useful in descriptive and intervention studies concerning stress and coping with stress among agricultural workers.

The potential stressors included in this study pointed to work-related psychological stress and work-related physical stress among agricultural workers. Furthermore, major sources of globally perceived stress are from work-related psychological stress and work-related physical stress. The globally perceived stress was the greatest negative factor to life satisfaction among all the factors studied.

In Japan, agricultural work is usually a family business. Men and women have defined responsibilities between farm work and housework. The men are not only farm workers, but also they manage the family business. The women perform house keeping duties, such as cooking, child care, and caring the aged, and at the same time they are also engaged in the almost same work as the men on their farms. Our data showed that the physical load is not a major stressor in current agricultural work. Perceived psychological stress during agricultural work is greater than physical stress, and such factors as learning new technology and on-time shipments have become major stressors. Long work hours, poor posture while at works, and work environment (especially heat) contribute to physical stress. Poor work posture can increase back pain, headaches and shoulder pain^{5,6}. The

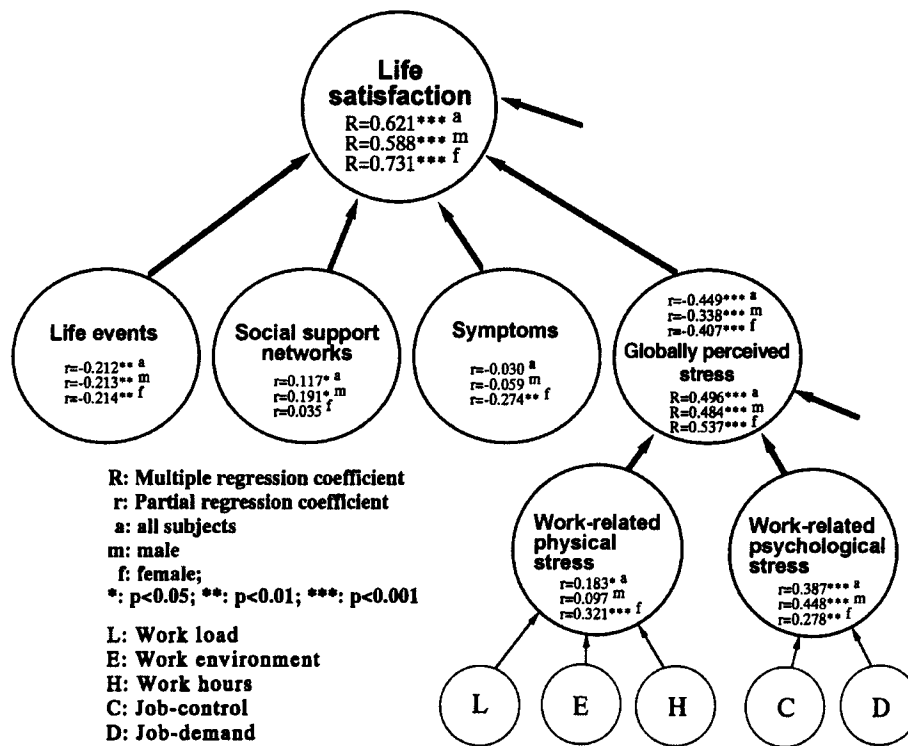


Fig. 1 A factorial structure of life satisfaction of agricultural workers

agricultural workers worked more than 8 hours per day and more than 300 days per year in plastic greenhouses without regular holidays and with long and irregular work hours. These conditions may increase the effects of stressors from the agricultural work elements mentioned above.

The psychological demand-control model was developed by Karasek⁷⁾. In this model, stressful jobs are characterized by high work demands coupled with low control, whereas active jobs are characterized by high demands coupled with high control. Low stressful jobs are characterized by low demands coupled with high control, whereas passive jobs are characterized by low demands coupled with low control. According to these criteria, agricultural work should be characterized by low demands coupled with high control, to be a low stressful job (see Table 2).

Ueda and colleagues proposed that social networks play an important role in enhancing life satisfaction of agricultural workers²⁾. The relationship between social support and life satisfaction was examined in this study. Social supports rather than social network, are considered to be more directly related to health and well-being. Social supports can be defined as the subjective feelings of belonging, of being accepted, loved, esteemed, valued, and needed for oneself, not for what one can do for others⁸⁾. In this study, social support was depicted as business partners (i.e. supervisor, colleagues and employees), close people (i.e. spouse, children, parents and in-laws), community organizations (i.e. information, education and services), and support groups (i.e. government, agricultural associations and friends). Multiple regression analyses indicated that social support was positively related to life satisfaction. The data suggested that social support can enhance life satisfaction of agricultural workers. During the past decade, the relationship between social support and mental and physical health has been examined in several studies. Moss⁹⁾ and Calloghan¹⁰⁾ found that social support was directly related to health and well-being. In a subsequent

study, Bhagat¹¹⁾ found that the familial support system can especially be an important source for guidance, renewal, and emotional support. A lower level of support appears to be consistently linked to higher rates of morbidity and mortality, and insufficient social support is considered a “risk factor” for mortality from a number of acute and chronic diseases¹²⁾. Social support may be directly linked to health by promoting health, by providing information, and/or by providing tangible resources¹³⁾. Psychologically, social support may provide a sense of meaning to life or be associated with more positive affective states, such as an improved sense of self-worth and an increased sense of control. Biologically, social support may enhance positive neuroendocrine and immunologic responses despite the presence of stressors¹⁴⁾. This study demonstrated that social support is directly linked to enhancing life satisfaction among agricultural workers. But the group support showed a lower score than other supports. It indicated that the power of group support in the agricultural sector is poor. In Japan, group support includes the Japanese Agricultural Association, the local agricultural association and the local plant division group. Ueda and colleagues emphasized that an important way of increasing contentment is to improve the government’s agricultural policy and to increase support to agriculture⁴⁾. Further research on these support systems and their functions is necessary. To achieve this aim, development of a new instrument and analyzing model is essentially required to enhance the capacity of stress-coping as well as to improve of QOL among agricultural workers.

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