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Personal characteristics associated with individual degree of family function in residents of Rumoi City, Hokkaido

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Abstract

Background: We assessed the association of personal factors with Family APGAR not only among the subjects in nonsingle households, but also in single households.

Methods: We randomly chose 1000 persons aged from 50 to 89 years in Rumoi City of the west area of Hokkaido as study candidates, and 493 subjects responded to the survey. We compared the group of high Family APGAR (FA) score of more than or equal to seven with the group of low FA score of less than or equal to 6 with regard to health-related QOL (HRQOL), measured with SF-8, Index of Social interaction (ISI), and other personal characteristics. Being in the low FA group indicates living with a status of poor family function.

Results: As a result of the multivariate logistic regression model, living in single households, currently smoking, a low score of mental component summary (MCS) in HRQOL, and a low score of ISI were all significantly associated with being in the low FA group. A low score of MCS was significantly associated with being in the low FA group both in the stratum of nonsingle households, and in the stratum of single households.

Conclusions: There were three risk factors of low FA. The first is a single household, second is currently smoking in a nonsingle household, and the third is low ISI. Worse mental status is found to be associated with low FA among the subjects not only in nonsingle households, but also in single households.

KEYWORDS

Family APGAR, quality of life, single household, smoking, social interaction

1 | INTRODUCTION

Our study hypothesis is that personal characteristics or lifestyles may affect individual degrees of family function according to the type of household. Family has been defined as a psychosocial group consisting of the subject and one or more persons in which there is a commitment for members to nurture each other,[1] and, therefore, the individual degree of family function is deduced as how much commitment each of the members has for nurturing each other. Research on family function has been performed mostly in the United States since the 1970s, and Family APGAR (abbreviated as FA),[1] Family Adaptability and Cohesion (FACEIII)[2] and Family Assessment Device (FAD)[3] have been developed for something typical.

FA is composed of five categories,[1] and the acronym of FA has been applied to the functional components of adaptability, partnership, growth, affection, and resolve. The score range is from 0 to 10 points. If the score of the subject is less than or equal to six points, he or she is classified to be poor in family function.[4] FA has been considered for validity and reliability[4]; a questionnaire, which has been translated into Japanese by Wada, is available[5]; and it is mainly applied in psychiatric[6] and pediatric territories.[7] But there are few studies of family function of the general Japanese population.

Family satisfaction was shown to be related to quality of life (QOL),[8] and family was indicated to be the most important source of social support.[9] Accordingly, QOL and social commitment are thought to be important parts of personal characteristics regarding individual degrees of family function.

Anthony Lehman refers to QOL as outcome assessment frameworks.[10] The main components of such a framework are a person's ability to function, access to resources and opportunities in the community, and sense of well-being. Three types of frameworks exist: (i) general QOL, (ii) health-related QOL (HRQOL), and (iii) disease-specific QOL. The HRQOL framework focuses on functional status and sense of well-being, and within these dimensions, covers only those aspects directly related to health. It is also reported that a person who has the roles at the home has better QOL than a person who does not have the roles.[11]

Our hypothesis is that a person with high family function can be assumed to have a higher QOL. In this study, we estimated the family function by Family APGAR and compared the relation with HRQOL.

The Health Survey Questionnaire Short Form (SF-8) is a representation of HRQOL.[12,13] The linear measure gauges eight health concept, ie., physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role, and mental health, with one item, respectively, and estimates a Physical Component Summary Score (PCS) and Mental Component Summary (MCS). The SF-8 score range is from 0 to 100 points and, when it is more than 50 points, HRQOL is estimated to be high.

With regard to social commitment, the Index of Social Interaction (ISI) was developed by Anme and Shimada,[14] and it is composed of five categories (four items of independence, five items of social curiosity, three items of interaction, two items of feelings of safety, and four items of participation in society). ISI score range is from 0 to 18 points, and when ISI score is equal to more than 15 points, it is high and social interaction is good.[14] Previous research showed that ISI relates to the life convalescence of elderly women,[14] but, to our knowledge, there are few studies related to the field of family structure.

The total number of households in Japan, as a whole, in 2014 was 50 431 000 and the number tends to increase every year.[15] When it is judged from household structure, a household only consisting of a married couple and a child is 28.8%, a single person household is 27.1%, and an only married couple's household follows with 23.3%. When it is judged from household type, single-person households and senior citizen households are increasing in tendency every year.

It is thought that family function could be measured, even in single households, if a single person thinks that he or she has a family member elsewhere. Therefore, we surveyed and assessed the association of personal factors with FA among the subjects not only in nonsingle households, but also single households.

2 | SUBJECTS AND METHODS

This research was performed in Rumoi City between May to June, 2015. Rumoi City is located West Hokkaido, and the total population is about 23 000 people. A study contains 1 000 male and female candidates in the age range between 50 and 89 years old that were randomly picked by Rumoi City Office from the basic resident register. It was stratified from 50 yearolds every 10 years up to 89 yearolds, and 125 men and 125 women were chosen at each age stratum. Because of the limited budget for the study, we decided on a sample size of 1 000 people in total.

A structured questionnaire was sent to them, and 483 subjects (255 men and 228 women) filled out and returned the survey to us (the response rate was 49.3%). In this study, we defined family as people who live together, and we explained same in the questionnaire.

We compared the group of high FA scores more than or equal to 7 with the group of low FA scores less than or equal to 6 regarding age in years, gender, type of household, presence of home doctor, habit of alcohol drinking, smoking status, history of heart disease, hypertension, diabetes mellitus, SF-8 (PCS and MCS), and ISI, using Student's t-test and chi-square test. Further, the stratified analysis was conducted according to the type of household, such as single households and nonsingle households. We performed a multivariable logistic regression analysis to adjust potential confounding factors. Analyses were performed using Dr. SPSS II. The significance level was set as the *P*-value being less than .05.

This study received approval from the Ethics Committee of Sapporo Medical University. We obtained written informed consent from each study subject.

3 | RESULTS

As shown in Table 1, 155 (32.0%) and 329 (68.0%) subjects were classified in low and high FA groups, respectively. Further, 94 (19.5%) and 389 (80.5%) subjects belonged to the strata of single and nonsingle households, respectively.

Mean age and its standard deviation in the low FA group (68.9- and 11.1- year old) were not significantly different from those of the high FA group (70.3- and 10.9-year old). The proportion of men in the low FA group (46.5%) was not significantly different from that in the high FA group (55.0%). The proportion of subjects in single households in the low FA group was significantly larger than that in the high FA group ($P<.001$). The proportion of subjects currently smoking cigarettes was significantly larger in the low FA group than that in the high FA group ($P=.008$). The proportion of subjects with low scores of PCS was significantly larger in the low FA group than that in the high FA group ($P=.046$). The proportion of subjects with low scores of MCS was significantly larger in the low FA group than that in the high FA group ($P<.001$). The proportion of subjects with low scores of ISI in the low FA group was significantly larger than that in the high FA group ($P<.001$).

In the stratum of single households, 52 (55.3%) and 42 (44.7%) subjects were classified as the low and high FA groups, respectively. In this stratum, the proportion of men in the low FA group was significantly larger than that in the high FA group. The proportion of subjects drinking alcohol daily in the low FA group was significantly larger than

TABLE 1 Characteristics of the study subjects by the low and high Family APGAR (FA) groups, according to total, and strata of the single household and the nonsingle household

		Total					Single household					Non-single household				
		Low FA Group		High FA Group			Low FA Group		High FA Group			Low FA Group		High FA Group		
Items	Contents	N=155	(%)	N=329	(%)	*P* value	N=52	(%)	N=42	(%)	*P* value	N=103	(%)	N=286	(%)	*P* value
Age in years[a]	Mean (SD)	68.9 (11.1)	-	70.3 (10.9)	-	.625	70.5 (11.2)	-	72.3 (11.8)	-	.599	68.1 (11.0)	-	69.9 (10.7)	-	.638
Gender	Men	72	(46.5)	181	(55.0)	.080	23	(44.2)	10	(23.8)	.032	49	(47.6)	171	(59.8)	.021
	Women	83	(53.5)	148	(45.0)	-	29	(55.8)	32	(76.2)	-	54	(52.4)	115	(40.2)	-
Type of household	Nonsingle household	103	(66.5)	286	(87.2)	<.001	-	-	-	-	-	-	-	-	-	-
	Single household	52	(33.5)	42	(12.8)	-	-	-	-	-	-	-	-	-	-	-
Home doctor	Yes	55	(35.5)	101	(30.7)	.299	21	(40.4)	11	(26.2)	.110	34	(33.0)	90	(31.5)	.432
	No	100	(64.5)	228	(69.3)	-	31	(59.6)	31	(73.8)	-	69	(67.0)	196	(68.5)	-
Alcohol drinking	Never	77	(49.7)	160	(48.6)	.411	16	(32.7)	28	(71.8)	.001	41	(39.8)	146	(51.2)	.103
	Often	53	(34.2)	100	(30.4)	-	23	(46.9)	6	(15.4)	-	40	(38.8)	82	(28.8)	-
	Daily drinking	25	(16.1)	69	(21.0)	-	10	(20.4)	5	(12.8)	-	22	(21.4)	57	(20.0)	-
Smoking status	Never	94	(60.6)	241	(73.3)	.008	30	(61.2)	27	(69.2)	.730	65	(63.1)	208	(73.0)	.056
	Ex-smoker	27	(17.4)	44	(13.4)	-	9	(18.4)	6	(15.4)	-	14	(13.6)	39	(13.7)	-
	Currently smoking	37	(23.9)	44	(13.4)	-	10	(20.4)	6	(15.4)	-	24	(23.3)	38	(13.3)	-
Heart disease	Yes	24	(15.5)	60	(18.2)	.521	7	(13.5)	5	(11.9)	.537	17	(16.5)	54	(18.9)	.354
	No	131	(84.5)	269	(81.8)	-	45	(86.5)	37	(88.1)	-	86	(83.5)	232	(81.1)	-
Hypertension	Yes	73.0	(47.1)	149	(45.3)	.769	22	(42.3)	20	(47.6)	.380	51	(49.5)	129	(45.1)	.256
	No	82.0	(52.9)	180	(54.7)	-	30	(57.7)	22	(52.4)	-	52	(50.5)	157	(54.9)	-
Diabetes mellitus	Yes	25.0	(16.2)	59	(17.9)	.700	7	(13.5)	4	(9.5)	.398	18	(17.5)	55	(19.2)	.425
	No	129.0	(83.8)	270	(82.1)	-	45	(86.5)	38	(90.5)	-	84	(82.5)	231	(80.8)	-
Physical component summary (PCS)	≥50	50.0	(32.3)	138	(41.9)	.046	19	(36.5)	19	(45.2)	.260	31	(30.1)	119	(41.6)	.025
	<50	105.0	(67.3)	191	(58.1)	-	33	(63.5)	23	(54.8)	-	72	(69.9)	167	(58.4)	-
Mental component summary (MCS)	≥50	52.0	(33.5)	185	(56.2)	<.001	18	(34.6)	25	(59.5)	.014	34	(33.0)	160	(55.9)	<.001
	<50	103.0	(66.5)	144	(43.8)	-	34	(65.4)	17	(40.5)	-	69	(67.0)	126	(44.1)	-
Index of Social Interaction (ISI)	≥15	53	(34.2)	213	(64.9)	<.001	18	(34.6)	22	(52.4)	.064	35	(34.0)	191	(66.8)	<.001
	≤14	102	(65.8)	115	(35.1)	-	34	(65.4)	20	(47.6)	-	68	(66.0)	95	(33.2)	-

SD, Standard deviation.

[a]Age was compared by the Student's *t* test, and other items were compared by the chi-square test.

that in the high FA group (*P*=.001). The proportion of subjects with low scores of MCS in the low FA group was significantly larger than that in the high FA group (*P*= .014).

In the stratum of the nonsingle household, 103 (26.5%) and 286 (73.5%) subjects were classified in the low and high FA groups, respectively. In this stratum, the proportion of subjects with a low score of PCS in the low FA group was significantly larger than that in the high FA group (*P*=.025). The proportion of subjects with low scores of MCS was significantly larger than that in the high FA group (*P*<.001). The proportion of subjects with low scores of ISI was significantly larger than that in the high FA group (*P*<.001).

Table 2 shows the age- and gender-adjusted odds ratio (OR) and its 95% confidence interval (CI) in the low FA group. Multivariable-adjusted ORs and their 95% CIs are also shown in Table 2, as age, gender, type of household, current smoking status, PCS, MCS, and ISI are simultaneously involved in the model. Age-and gender-adjusted OR and multivariable-adjusted OR of subjects in single households were 3.44 (95% CI 2.14–5.54) and 3.26 (95% CI 1.94–5.47), respectively. Age- and gender-adjusted OR and multivariable-adjusted OR of subjects currently smoking cigarettes were 2.69 (95% CI 1.57–4.59) and 2.32 (95% CI 1.30–4.15), respectively. Age- and gender-adjusted OR and multivariable-adjusted OR of subjects with low scores of PCS were 1.73 (95% CI 1.13–2.64) and 1.36 (95% CI 0.84–2.19), respectively. Age-and gender-adjusted OR and multivariable-adjusted OR of subjects with low scores of MCS were 2.48 (95% CI 1.66–3.70) and 2.15 (95% CI 1.38–3.34), respectively. Age- and gender-adjusted OR and multivariable-adjusted OR of the subjects with low scores of ISI were 3.60 (95% CI 2.40–5.39) and 2.80 (95% CI 1.82–4.30), respectively.

Table 3 shows age- and gender-adjusted OR and its 95% CIs in the low FA group in the stratum of single households. Multivariable-adjusted ORs with their 95% CIs were also shown in Table 3, as age, gender, alcohol drinking, MCS, and ISI are simultaneously involved in the model. In this stratum, age- and gender-adjusted OR and multivariable-adjusted OR of subjects with low scores of MCS were 2.49 (95% CI 1.54–4.02) and 2.89 (95% CI 1.13–7.37), respectively.

Table 4 shows age- and gender-adjusted OR with their 95% CIs in the low FA group in the stratum of nonsingle households. Multivariable-adjusted ORs with their 95% CIs are also shown in Table 4, as age, gender, currently smoking cigarette, PCS, MCS, and ISI are involved in the model. In this stratum, age- and gender-adjusted OR and multivariable-adjusted OR of the subjects currently smoking cigarettes were 2.58 (95% CI 1.39–4.79) and 2.50 (95% CI 1.30–4.80), respectively. Age- and gender-adjusted OR and multivariable-adjusted OR of the subjects with low scores of PCS were 1.95 (95% CI 1.17–3.25) and 1.49 (95% CI 0.87–2.60), respectively. Age- and gender-adjusted OR and multivariable-adjusted OR of subjects with low scores of MCS were 2.49 (95% CI 1.54–4.02) and 2.04 (95% CI 1.23–3.43), respectively. Age- and gender-adjusted OR and multivariable-adjusted OR of subjects with low scores of ISI were 4.01 (95% CI 2.48–6.50) and 3.51 (95% CI 2.14–5.78), respectively.

4 | DISCUSSION

The study subjects in single households were shown to have an increased risk of low FA compared to those in nonsingle households. Single household subjects have no family, so their FA score is low. However, in elderly persons, social support networks and neighborly companionship improve their subjective sense of health.[16] Social support networks will become increasingly important. Male, one-person households have been reported to have high rates of mortality,[17] and the incidence of diabetes mellitus type two is higher in males than females.[18] However, in this study, there was no relationship between heart disease, hypertension, or diabetes.

We conducted the stratified analysis according to type of household, such as single and nonsingle households. Both in the stratum of

TABLE 2 Age- and gender-adjusted odds ratios (ORs), and multivariable-adjusted ORs with their 95% confidence intervals (CIs) of being in the low Family APGAR (FA) group

		Age- and gender-adjusted				Multivariabl–adjusted			
Item	**Content**	**OR**	**95% CI**		***P* value**	**OR**	**95% CI**		***P* value**
Type of household	Single household	3.44	2.14	5.54	<.001	3.26	1.94	5.47	<.001
	Nonsingle household	1.00	-	-	-	1.00	-	-	
Smoking status	Never	1.00	-	-	-	1.00	-	-	-
	Ex-smoker	1.72	0.95	3.10	.074	1.59	0.83	3.01	.158
	Currently smoking	2.69	1.57	4.59	<.001	2.32	1.30	4.15	.005
Physical component summary (PCS)	≥50	1.00	-	-	-	1.00	-	-	-
	<50	1.73	1.13	2.64	.012	1.36	0.84	2.19	.210
Mental component summary (MCS)	≥50	1.00	-	-	-	1.00	-	-	-
	<50	2.48	1.66	3.70	<.001	2.15	1.38	3.34	<.001
Index of Social Interaction (ISI)	≥15	1.00	-	-	-	1.00	-	-	-
	≤14	3.60	2.40	5.39	<.001	2.80	1.82	4.30	<.001

Age, gender, type of household, smoking status, PCS, MCS, and ISI were involved in the logistic regression model.

TABLE 3 Age- and gender-adjusted odds ratios (ORs), and multivariable-adjusted ORs with their 95% confidence intervals (CIs) of being in the low Family APGAR (FA) group in the stratum of the single household

		Age- and gender-adjusted				Multivariable-adjusted			
Item	Content	OR	95% CI		*P* value	OR	95% CI		*P* value
Gender	Men	1.00	-	-	-	1.00	-	-	-
	Women	0.40	0.15	1.03	.560	0.52	0.17	1.62	.259
Alcohol drinking	Never	1.00	-	-	-	1.00	-	-	-
	Often	0.60	0.14	2.55	.491	0.51	0.11	2.32	.438
	Daily	1.40	0.47	4.15	.540	1.57	0.50	4.87	.382
Mental component summary (MCS)	≥50	1.00	-	-	-	-	-	-	-
	<50	2.49	1.54	4.02	<.001	2.89	1.13	7.37	.026
Index of Social Interaction (ISI)	≥15	1.00	-	-	-	-	-	-	-
	≤14	2.15	0.92	5.06	.790	1.70	0.68	4.23	.255

Age, gender, alcohol drinking, MCS, and ISI were involved in the logistic regression model.

TABLE 4 Age- and gender-adjusted odds ratios (ORs), and multivariable-adjusted ORs with their 95% confidence intervals (CIs) of being in the low Family APGAR (FA) group in the stratum of the nonsingle household

		Age- and gender-adjusted				Multivariable-adjusted			
Item	Content	OR	95% CI		*P* value	OR	95% CI		*P* value
Smoking status	Never	1.00	-	-	-	1.00	-	-	-
	Ex-smoker	1.41	0.69	2.89	.347	1.31	0.61	2.83	.487
	Currently smoking	2.58	1.39	4.79	.003	2.50	1.30	4.80	.006
Physical component summary (PCS)	≥50	1.00	-	-	-	1.00	-	-	-
	<50	1.95	1.17	3.25	.010	1.49	0.87	2.60	.158
Mental component summary (MCS)	≥50	1.00	-	-	-	1.00	-	-	-
	<50	2.49	1.54	4.02	<.001	2.05	1.23	3.43	.006
Index of Social Interaction (ISI)	≥15	1.00	-	-	-	1.00	-	-	-
	≤14	4.01	2.48	6.50	<.001	3.51	2.14	5.78	<.001

Age, gender, smoking status, PCS, MCS, and ISI were involved in the logistic regression model.

single households and nonsingle household, the tendency of low FA is appeared as a low score of MCS in SF-8. There are studies where low QOL related to low family satisfaction[5] and mental health-related family function.[19] As family is the smallest unit of the social closeness, single households influence MCS. Social support networks and neighborly companionship are important.

A low score of ISI was shown to increase the risk of low FA in nonsingle households, but not in single households. Low ISI decreasing the five-year survival rate in elderly people was reported.[14] A former study indicated that healthy obstructions occur with a decline of social support.[20] It is important to charge elderly people with a role in family and society.

Current smoking habit was a risk factor of low family function instead of an adjusted multivariable. It is not clear whether smoking decreases QOL or whether low QOL leads to smoking. The relation is judged by smoking and low FA, and smoking is a strong factor for risk of low FA; but it cannot be concluded because there may be a reverse cause and effect. So, we cannot suggest smoking cessation to the smoker only at this point.

There are some questionnaires for evaluating family function, but most of them consist of many items; for example, FACE III has 30 items and FAD has 53 items. In this study, we used an FA questionnaire that consisted of only five items, but in daily medical examinations, FA is suitable for screening.

For example, we may be able to expect a similar result in a small city of about 20 000 people in population. We expect that the low MCS group has a low response ratio, but low MCS also relates to low FA. In this study, the relation between FA and MCS may have been underestimated. It may have something to do with finding the actual values of FA by MCS.

In this study, we obtained a result that low FA related to low MCS. It is important to grasp family structure as a family physician. We should grasp the family structure of patients, and if low family function is suspected, it is desirable to do a screening by FA. It may be possible to take low MCS up by FA, and we may be able to help them.

Moreover, as family function changes with time, we need to estimate family function when people have life events.

There are several limitations of this study. First, this study is a cross-sectional design study. As the FA score changes over time, we need to complete more research about what factors influence the test. Second, participants of this study were selected by Rumoi City office at random, but those who returned the questionnaire might be aware that they are healthy. Third, this study was investigated in Rumoi City, Hokkaido. Therefore, these results may not apply to other areas. Last, the FA score questionnaire contains family elements, so it is difficult for single households to answer. Development of a questionnaire without the word "family" is suggested.

5 | CONCLUSION

In this study, there are three following risk factors of low FA. The first is single households, second is currently smoking in nonsingle households, and the third is low ISI.

Worse mental status is found to be associated with poor family function among subjects not only in nonsingle households, but also in single households.

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CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

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