

Impact of health literacy on health practices in the working life of young Japanese nurses and care workers

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Abstract: To continue to work healthily, health practices are necessary. This study assessed the impact of health literacy (HL) on health practices in the working life of young Japanese nurses and care workers, occupations with heavy physical and psychological burdens. A web-based survey was conducted with 500 women (330 nurses and 170 care workers) under the age of 30 in 2019. Data regarding their demographic characteristics, HL and health practices in their working life were collected. A significant association was found between high HL and better health practices, such as being likely to rest when tired, working at their own pace maintaining a good work-life balance and regularly performing self-check-ups, which were common to nurses and care workers. In addition, sub-analysis among the high-HL group revealed that the attendance of lectures regarding working life and health for new employees was effective for taking rest when needed, working when not overtired and a good work-life balance. The results of this study suggest that high HL relates to healthy practices in the working life of young Japanese nurses and care workers. Increasing HL or fundamentally enhancing attitudes towards their own health or both may, therefore, have some benefits for healthy working practices.

Key words: Young workers, Nurse, Care worker, Health literacy, Working life

Introduction

Securing the long-term and continuous employment of nurses and care workers is an urgent issue in Japan. The number of qualified health professionals, including nurses and care workers, seems to be increasing in Japan, but the

number of elderly people who need medical care is expected to increase within the next 10 years¹⁻³. There is also the underlying social issue of early turnover in these professions⁴⁻⁵. As a social outline of early turnover, the ‘Survey on the Attitudes of Children and Young People’ from the Cabinet Office reported that approximately 60% of people under the age of 30 have quit a job early, and psychosocial and health-related factors accounted for most of the reasons for quitting a job⁶. In a survey of nurses, it was reported that the proportion of workers who complained of poor physical conditions was twice as high as that for other

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workers⁷). According to the latest survey of approximately 20,000 care workers, physical burden has risen to the top worries in working life, and 30% of care workers were concerned about their own physical problems⁵). These social findings potentially imply that the rates of nurses and care workers who quit their jobs for health reasons may continue to be high. Healthy work is not only a life benefit for the individual, but is also considered an essential factor to prevent early turnover and secure human resources in these professions.

Many previous studies have suggested that health literacy (HL) is an important key factor in maintaining health⁸⁻¹³). HL is defined as the cognitive and social skills that determine the motivation and ability to access, understand and use information to maintain and promote health⁸⁻¹⁰). Previous studies have reported that high HL can improve and maintain worker health status, is associated with disease prevention and future health and improves work performance¹¹⁻¹²). The improvement of the self-health awareness is mediated by these factors. Daily health practices greatly contribute to the maintenance of health and the prevention of disease¹³), and appropriate health practices create a link between HL and health status.

Thus, it can be hypothesised that increasing the HL at a young age has the potential to reduce health problems in the future, to maintain long-term health and to lead to a healthier work-life via health practices and therefore may prevent workers from leaving their jobs due to health reasons. Previous reports have commented on the relationship between HL and health-related factors, including health practices, among workers from various occupations and age groups¹⁴⁻¹⁵). However, there are few reports on the relationship between HL and health practices among young workers, especially nurses and care workers, who have large physical and psychological burdens, and for whom the rate of early turnover remains high. Therefore, we examined the association between HL and health practices, particularly in the context of working life, among young Japanese nurses and care workers.

Methods

Participants

This was an internet-based cross-sectional study conducted in December 2019. The 500 women included in the study were all full-time workers in the fields of nursing or care work for the elderly. All participants were aged between 20 and 30 years and were recruited via the Social Research Company (Hamon Co., Ltd.). An explanation of

the study (its research purposes, the management and reporting of the data, the protection of personal information, the advantages and disadvantages associated with participation, etc.) was provided at the top of the web screen at the start of the questionnaire. We obtained informed consent from all study participants.

Measures

Demographic variables

We collected data on the following demographical variables: age, living arrangements (alone or with family), marital status, number of children in the family, presence of any diseases requiring treatment, frequency of obtaining health information through the internet, level of education (professional school, junior college, university or graduate school), qualification (registered nurse, assistant nurse, care worker, care manager, social worker, occupational therapist or physical therapist), workplace (hospital, other medical facility, nursing home or other care facility), work style (shift work system or not), total years of job experience, number of years in current employment, past experience of quitting a job, whether they had quit their first job due to health reasons, total number of days of unscheduled overtime work and/or work on non-work days in the past month, average working hours per week in the past month, and physical and psychological condition. To assess the level of physical and psychological condition, we used 29 items related to stress from 57 items of the Brief Job Stress Questionnaire of the Japanese Ministry of Health, Labour and Welfare¹⁶⁻¹⁸). This questionnaire was aimed at enhancing the workers' awareness of stress and self-care, and not at diagnosing or screening for psychiatric disorders. The 29 items used in this study comprised 18 items on 6 psychological indicators (vitality, irritation, anger, anxiety and depression) and 11 items on physical complaints. The scores for each item of the questionnaire were based on a 4-point Likert scale, ranging from 1 ('almost never') to 4 ('almost always'). We calculated the score for each of the 6 indicators and the total score.

Variables of health practices in working life

Data on the following were collected for healthy practices: rests when feeling tired or drowsy, works at own pace, maintains work-life balance, regularly performs self-check-ups and attends lectures or workshops about working life and health (new employee training, from post-training to the present).

To create the questions, we referred to the Health-Promoting Lifestyle Profile III questionnaire¹⁹), which we

adapted to be appropriate for the purposes of our study.

Health literacy (HL)

HL has been defined as the ability to access, understand and use information necessary to promote and maintain health and the cognitive and social skills that determine an individual's willingness and ability to use this information^{8–10}. Increasing HL is not only about improving the ability to properly understand health information but also by increasing the access to information and improving the ability to effectively use the information. To estimate HL, we used a validated questionnaire with three items on communicative HL (items i–iii) and two items on critical HL (items iv–v)¹². These questions asked whether the participant could (i) collect health-related information from various sources, (ii) extract the relevant information, (iii) understand and communicate the obtained information, (iv) consider the credibility of the information and (v) make decisions based on the information, specifically in the context of health-related issues. Each item was rated on a 5-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree'), and the points were totalled.

Statistical analysis

Variables are presented as mean \pm standard deviation for continuous variables or prevalence (%) for categorical variables. The total HL score was dichotomised based on the median score (low HL < 17, high HL \geq 17). This classification has been adopted in similar previous studies^{20–21}. The analysis was stratified by occupation: nurses and care workers. We used the *t*-test for continuous variables and the chi-square test or Fisher's exact test for comparisons of proportions between nurses and care workers and between two groups (low HL, high HL). We calculated the odds ratio (OR) and the 95% confidence intervals (95% CI) using a logistic regression model for variables related to a healthy working life in the high-HL group. The demographic variables with a significant difference between nurses and care workers were used as adjusting variables in the multivariate regression analyses. All statistical analyses were performed using SPSS version 22 (IBM Corp., Chicago, IL, USA). *P*-values of < 0.05 were considered statistically significant.

Ethics

This survey was conducted according to the Ethical Guidelines for Epidemiological Studies established by the Japanese government²². The Ethics Committee of the National Institute of Occupational Safety and Health approved the research protocol (No. 2019N-1-27).

Results

A total of 330 nurses and 170 care workers participated in this study. Table 1 and Table 2 show the participants' characteristics stratified by occupation. The mean age of the participants was 26.7 years for both nurses and care workers and 26.8 years in all. Statistically significant differences were found between nurses and care workers for the following variables: the percentage of participants who were living with a family member ($p < 0.001$), work style system ($p = 0.005$) and unscheduled overtime work ($p < 0.001$). We compared physical and psychological conditions between nurses and care workers, and statistically significant differences were found for the following: irritation ($p = 0.005$), fatigue ($p = 0.028$), anxiety ($p = 0.004$), depression ($p = 0.016$) and total score of physical and psychological condition ($p = 0.021$). These scores were significantly higher (i.e. worse condition) in care workers than in nurses. The scores between the HL groups in nurses and care workers showed no statistical differences for physical and psychological condition between the groups of nurses, except for vigour ($p = 0.016$). By contrast, in addition to vigour ($p = 0.005$), significant differences were found in the following physical and psychological scores among care workers (low HL group vs. high-HL group): fatigue (8.8 ± 2.6 vs. 7.9 ± 2.7 , $p = 0.035$), depression (15.1 ± 4.7 vs. 12.3 ± 4.9 , $p < 0.001$) and total score of the physical and psychological condition (73.0 ± 16.6 vs. 65.2 ± 17.4 , $p = 0.004$).

Table 3 shows the results of the logistic regression analysis of variables related to health practices in nurses. The results of the multivariate analyses showed that high HL was significantly associated with the following factors [OR (95% CI)]: working at own pace [2.05 (1.22–3.42)], maintaining work-life balance [2.14 (1.30–3.51)], regularly performing self-check-ups [1.99 (1.25–3.16)] and attending lectures and workshops [1.95 (1.20–3.16)]. Table 4 shows the results of the logistic regression analysis of variables related to health practices in care workers. The results of the multivariate analyses showed that high HL was significantly associated with the following factors [OR (95% CI)]: resting when feeling tired or drowsy [2.12 (1.11–4.05)], working at own pace [2.63 (1.28–5.41)], maintaining work-life balance [4.55 (2.26–9.18)] and regularly performing self-check-ups [2.89 (1.41–5.92)].

Regarding HL and related health practices, there were different results between nurses and care workers for 'attendance of lectures about working life and health during new employee training'. The above result indicated that

Table 1. Participants' demographic characteristics stratified by occupation

	Total (n=500)	Nurses (n=330)	Care workers (n=170)	<i>p</i> -value
Personal variables				
Age (year)	26.8±2.4	26.7±2.3	26.7±2.3	0.767
Living with family members	325 (65.0)	194 (58.8)	131 (77.1)	<0.001
Marital status, married	332 (66.4)	114 (34.5)	54 (31.8)	0.533
Have a child in the family	427 (85.4)	42 (12.7)	31 (18.2)	0.098
Presence of a disease requiring treatment, no	376 (75.2)	241 (73.0)	135 (79.4)	0.260
Use of Internet to collect information about health less than 1 time/month	266 (53.2)	174 (52.7)	92 (54.1)	0.768
Education				
Professional school, junior college	308 (61.6)	195 (59.1)	113 (66.5)	0.108
University, graduate school	192 (38.4)	135 (40.9)	57 (33.5)	
Occupational variables				
Qualification in nurses				
Registered nurse	303 (60.6)	303 (91.8)	-	-
Assistant nurse	14 (2.8)	14 (4.2)	-	-
Other	11 (2.2)	11 (3.3)		
Two or more qualifications	2 (0.4)	2 (0.6)		
Qualification in care workers				
Care worker	77 (15.4)	-	77 (45.3)	-
Care manager, social worker	6 (1.2)	-	6 (3.5)	
Occupational therapist, physical therapist	7 (1.4)	-	7 (4.1)	
Other	65 (13.0)	-	65 (38.2)	
Two or more qualifications	15 (3.0)		15 (8.8)	
Work place in nurses				
Hospital	274 (54.8)	274 (83.0)	-	-
Other medical facilities(private clinic and other)	56 (11.2)	56 (17.0)	-	-
Work place in care workers				
Nursing home	124 (24.8)	-	124 (72.9)	
Other care facilities (home visits, satellite style)	46 (9.2)	-	46 (27.1)	
Work style, shift work system	321 (64.2)	226 (68.5)	95 (55.9)	0.005
Number of total years of job experience, < 1 year	24 (4.8)	19 (5.8)	5 (2.9)	0.163
Number of years in the current employment, < 1 year	105 (21.0)	73 (22.1)	32 (18.8)	0.391
Past experience of quitting a job, more than 1 time	250 (50.0)	173 (52.4)	77 (45.3)	0.131
Quit first job due to health reasons *	33 (13.2)	25 (7.6)	8 (4.7)	0.381
Total number of days of unscheduled overtime work and/or work on non-work days in the past month				
0 day	123 (24.6)	67 (20.3)	56 (32.9)	<0.001
1-3 days	160 (32.0)	95 (28.8)	65 (38.2)	
4-6 days	77 (15.4)	56 (17.0)	21 (12.4)	
7 days ≤	140 (28.0)	112 (33.9)	28 (16.5)	
Average working hours per week in the past month				
≤ 40 hours	169 (33.8)	108 (32.7)	61 (35.9)	0.747
41- 60 hours	289 (57.8)	193 (58.5)	96 (56.5)	
61 hours ≤	42 (8.4)	29 (8.8)	13 (7.6)	

Values are represented as n (%) or means±sd. Variables were compared using chi-square tests.

* This variable was answered only by participants who have past a experience of quitting a job.

Table 2. Participants characteristics of physical and psychological condition stratified by occupation and HL score

	Total (n=500)	Nurses				Care workers				<i>p</i> -value *
		Sub total (n=330)	HL score			Sub total (n=170)	HL score			
			Low (n=137)	High (n=193)	<i>p</i> -value		Low (n=89)	High (n=81)	<i>p</i> -value	
Score[†]										
Vigor	9.1 ± 2.2	9.1 ± 2.1	8.8 ± 2.3	9.4 ± 1.9	0.016	9.1 ± 2.3	8.6 ± 2.3	9.6 ± 2.2	0.005	0.977
Irritation	7.7 ± 2.4	7.4 ± 2.3	7.4 ± 2.2	7.5 ± 2.3	0.696	8.1 ± 2.6	8.4 ± 2.5	7.7 ± 2.6	0.062	0.005
Fatigue	8.1 ± 2.5	7.9 ± 2.4	7.8 ± 2.4	7.9 ± 2.4	0.718	8.4 ± 2.7	8.8 ± 2.6	7.9 ± 2.7	0.035	0.028
Anxiety	7.0 ± 2.7	6.8 ± 2.4	6.9 ± 2.4	6.6 ± 2.4	0.294	7.5 ± 3.0	7.9 ± 2.8	7.1 ± 3.1	0.089	0.004
Depression	13.0 ± 4.7	12.7 ± 4.5	13.1 ± 4.4	12.3 ± 4.5	0.126	13.8 ± 5.0	15.1 ± 4.7	12.3 ± 4.9	<0.001	0.016
Physical complaints	22.0 ± 6.3	21.8 ± 6.0	21.6 ± 6.1	21.9 ± 6.0	0.601	22.4 ± 6.9	23.1 ± 7.1	21.5 ± 6.6	0.134	0.348
Total score of psychological and physical stress	66.9 ± 16.2	65.6 ± 15.5	66.3 ± 15.2	65.2 ± 15.7	0.533	69.3 ± 17.4	73.0 ± 16.6	65.2 ± 17.4	0.004	0.021

Values are means±s.d. Variables were compared using t-test.

* The *p*-values compared in each score in the total column between nurses and care workers

† The value of a high score indicates that the condition is bad. Vigor is a reverse score, with a high value indicating a better condition.

Table 3. Results of logistic analysis of health practices and HL in nurses

	HL score		Crude			Adjusted		
	Low (n=137)	High (n=193)	OR	95%CI	<i>p</i> -value	OR	95%CI	<i>p</i> -value
Rests when feeling tired or drowsy								
Rarely	52	51	1.00			1.00		
Sometime or usually	85	142	1.70	1.06 - 2.73	0.027	1.62	1.00 - 2.62	0.052
Works at own pace not to overtire								
Rarely	59	56	1.00			1.00		
Sometime or usually	78	137	1.85	1.17 - 2.93	0.009	2.05	1.22 - 3.42	0.006
Maintains work-life balance								
Rarely	52	41	1.00			1.00		
Sometime or usually	85	152	2.27	1.39 - 3.69	0.001	2.14	1.30 - 3.51	0.003
Regularly performing self-check-ups								
Rarely	90	93	1.00			1.00		
Sometime or usually	47	100	2.06	1.57 - 6.68	0.001	1.99	1.25 - 3.16	0.003
Attends lectures or workshop about working life and health								
At the new employee training								
No attendance	100	112	1.00			1.00		
Attended	37	81	1.95	1.22 - 3.14	0.006	1.95	1.20 - 3.16	0.007
From post-training to the present								
Never	128	170	1.00			1.00		
Attends sometime or usua	9	23	1.92	0.86 - 4.30	0.111	1.99	0.88 - 4.48	0.096

Abbreviation : OR, odds ratio; CI, confidence interval

Adjusted variables as follows: living with family member (presence, absence), work style (shift work, non-shift work), unscheduled overtime and/or work on non-work days over 1 time/month (0 day, 1-3 days, 4-6 days, 7 day or more) and total score of psychological and physical stress (continuous)

Table 4. Results of logistic analysis of health practices and HL in care workers

	HL score		Crude			Adjusted		
	Low (n=89)	High (n=81)	OR	95%CI	<i>p</i> -value	OR	95%CI	<i>p</i> -value
Rests when feeling tired or drowsy								
Rarely	47	27	1.00			1.00		
Sometime or usually	42	54	2.24	1.20 - 4.17	0.011	2.12	1.11 - 4.05	0.022
Works at own pace not to overtime								
Rarely	51	26	1.00			1.00		
Sometime or usually	38	55	2.84	1.52 - 5.32	0.001	2.63	1.28 - 5.41	0.009
Maintains work-life balance								
Rarely	50	17	1.00			1.00		
Sometime or usually	39	64	4.83	2.45 - 9.52	< 0.001	4.55	2.26 - 9.18	< 0.001
Regularly performing self-check-ups								
Rarely	69	48	1.00			1.00		
Sometime or usually	20	33	2.37	1.22 - 4.62	0.011	2.89	1.41 - 5.92	0.004
Attends lectures or workshop about working life and health								
At the new employee training								
No attendance	74	58	1.00			1.00		
Attended	15	23	1.96	0.94 - 4.08	0.074	1.78	0.83 - 3.82	0.138
From post-training to the present								
Never	81	74	1.00			1.00		
Attends sometime or usua	8	7	0.96	0.33 - 2.77	0.937	1.11	0.36 - 3.39	0.857

Abbreviation : OR, odds ratio; CI, confidence interval

Adjusted variables as follows: living with family member (presence, absence), work style (shift work, non-shift work), unscheduled overtime and/or work on non-work days over 1 time/month (0 day, 1-3 days, 4-6 days, 7 day or more) and total score of psychological and physical stress (continuous)

Table 5. Cross-tabulation results of attendance lectures or workshop at the new employee training and health practices in the high

	Nurses (n=193)			Care workers (n=81)		
	Attended (n=81)	No attendance (n=112)	<i>p</i> -value	Attended (n=23)	No attendance (n=58)	<i>p</i> -value
Rests when feeling tired or drowsy						
Rarely	14 (17.3)	37 (33.0)	0.020	11 (47.8)	16 (27.6)	0.116
Sometime or usually	67 (82.7)	75 (67.0)		12 (52.2)	42 (72.4)	
Works at own pace and not to overtime						
Rarely	13 (16.0)	43 (38.4)	0.001	9 (39.1)	17 (29.3)	0.435
Sometime or usually	68 (84.0)	69 (61.6)		14 (60.9)	41 (70.7)	
Maintains work-life balance						
Rarely	9 (11.1)	32 (28.6)	0.004	4 (17.4)	13 (22.4)	0.766
Sometime or usually	72 (88.9)	80 (71.4)		19 (82.6)	45 (77.6)	
Regularly performing self-check-ups						
Rarely	33 (40.7)	60 (53.6)	0.082	16 (69.6)	32 (55.2)	0.317
Sometime or usually	48 (59.3)	52 (46.4)		7 (30.4)	26 (44.8)	
Attends lectures or workshop about working life and health, from post-training to the present						
Never	70 (86.4)	100 (89.3)	0.654	21 (91.3)	53 (91.4)	1.000
Sometime or usually	11 (13.6)	12 (10.7)		2 (8.7)	5 (8.6)	

Values are presented as n . Variables were compared using chi-square tests.

nurses in the high-HL group attended many lectures or workshops about working life and health during new employee training. Sub-analyses were conducted to examine the effect of lecture attendance in the high-HL groups. Table 5 shows the results of the additional sub-analyses in the high-HL group of nurses ($n=193$) and care workers ($n=81$). Nurses who had attended lectures on working life and health during new employment training were more likely to rest when feeling tired or drowsy ($p=0.020$), to work at their own pace ($p=0.001$) and to maintain a work-life balance ($p=0.004$). Although there were no statistically significant differences among care workers, there was an opposite trend among care workers in the following practices: 'resting when feeling tired or drowsy', 'working at own pace' and 'regularly performing self-health check-ups', even if they attended lectures, i.e. care workers tended to be less likely to take up health practices even when they had attended lectures.

Discussion

Our data showed that high HL was significantly associated with some healthy practices. The following practices: 'resting when feeling tired or drowsy', 'working at own pace', 'maintaining work-life balance' and 'regularly performing self-check-ups' were common among nurses and care workers, and those behaviours were more common when the HL was high. A high HL was strongly related to maintaining a work-life balance: the adjusted OR was 2.14 for nurses and 4.55 for care workers.

A higher HL was associated with attendance of lectures among nurses, but not among care workers. To explore the noticeable differences between the two occupations, it was necessary to examine the following interpretations, as our study had a cross-sectional design, (1) people with fundamentally higher HL tended to be more likely to attend lectures during new employee training or (2) attendance of lectures can improve and enhance HL level. The second theory also provides a hypothesis that attending lectures increases HL and consequently affects other health practices. Therefore, additional sub-analyses on the high-HL group were performed on variables related to healthy practices according to the attendance of lectures during new employee training. By limiting groups with high HL (probably including fundamentally high-HL persons), we could reveal whether lecture participation affected health practices regardless of the naturally high level of HL. The findings from the sub-analyses showed that even people with high HL were more likely not to have good health practices if

they had not attended the lectures, indicating that the attendance of lectures about working life and health might contribute to health practices. This trend was consistent in nurses, but a different trend was observed for some health practices in care workers. The different trends between nurses and care workers may be attributable to the contents of lectures, the work environment or inherent differences in education. There are no previous studies to support these findings and, unfortunately, our study only focused on practices or behaviours and did not further examine the detail content of lectures and educations. Numerous studies have been accumulated on the relationship between HL and education, the effects of educational interventions on increasing HL have been studied in limited the target populations, such as students, patients and the elderly general population, and have been also reported mostly from overseas²³⁻²⁶. A previous report had pointed out that there was no difference between Europeans and Japanese in knowledge and understanding for disease prevention, but a higher percentage of Japanese adults have difficulty in the assessment and use of healthcare knowledge²⁷. Personal triggers, age, past history of disease, level of basically education and other socio-economic and environmental factors were reported as background factors^{23-26, 28-29}, but specific factors may be underlying in Japanese between health education and practices. The number of people attending lectures was low in this study. The percentage of people who had attended lectures or workshops about working life and health during new employee training was 24.5% ($n=81$) in nurses and 13.5% ($n=23$) in care workers in this study. Therefore, it was unable to perform an interaction analysis of the background factors. Meanwhile, the relevant factors identified by these previous studies were not definitive because it varied according to the research subject and method. Our study target was professionals with advanced education, women under 30s of age and working full-time, the factor contributions may also differ in our study from previous studies. Although underlying factors may exist, we have adjusted for essential confounding factors in the analysis.

The other limitations of this study are the use of the internet survey, which used registered persons of an internet survey company. The internet penetration rate has increased over the past decade, and the internet usage rate of people under the age of 30, the subject of this study, exceeds 90%³⁰. It was expected that health-conscious and frequent internet users would be more likely to participate in these surveys, and 53.2% of our participants obtained information on health from the internet less than once per

month. If this percentage could be compared with other health worker groups, the bias of our study participant could be made clearer. However, fundamental target selection bias and sample errors may have occurred.

Recently, it has been reported that HL affects various fields, such as sources of medical services, prevention of disease and health management and communication in the medical field^{31–32}. Increasing the HL of healthcare professionals may lead to increased interest in their own health awareness and healthy working, which may help to improve the quality of patient care as well as their own health. Further research on health education is expected for care workers and nurses to enrich their learning and knowledge to practice and apply the knowledge gained from professional courses not only for patients but also for themselves.

Conclusion

This study revealed a positive association between HL and healthy practices among young Japanese nurses and care workers, which suggests that increasing HL may lead to a healthy working life and appropriate self-healthcare practices.

Conflict of Interest

The authors declare that there are no conflicts of interest.

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