

# The effect of skill mix in non-nursing assistants on work engagements among home visiting nurses in Japan

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## The effect of skill mix in non-nursing assistants on work engagements among home visiting nurses in Japan

**Aim** This study evaluated the effect of a skill-mix programme intervention on work engagement in home visiting nurses.

**Background** A skill-mix programme in which home visiting nurses are assisted by non-nursing workers is assumed to foster home visiting nurses' work engagement.

**Method** Pre- and post-intervention evaluations of work engagement were conducted using self-administered questionnaires. A skill-mix programme was introduced in the intervention group of home visiting nurses. After 6 months, their pre- and post-intervention work engagement ratings were compared with those of a control group.

**Result** Baseline questionnaires were returned by 174 home visiting nurses (44 in the intervention group, 130 in the control group). Post-intervention questionnaires were returned by 38 and 97 home visiting nurses from each group.

The intervention group's average work engagement scores were 2.2 at baseline and 2.3 at post-intervention; the control group's were 3.3 and 2.6. Generalised linear regression showed significant between-group differences in score changes.

**Conclusion** The skill-mix programme might foster home visiting nurses' work engagement by improving the quality of care for each client. Future research is needed to explain the exact mechanisms that underlie its effectiveness.

**Implications for nursing management** In order to improve the efficiency of services provided by home visiting nurses and foster their work engagement, skill-mix programmes might be beneficial.

**Keywords:** community care, nursing management, skill mix, work engagement

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## Introduction

Developing a healthy workplace for home visiting nurses (HVN) is essential for ensuring both HVNs' work engagement and quality patient care from home

visiting nursing agencies. The use of skill mix has been proposed as a potential solution to improve nurses' work environments (James & Mario 2002, Lawrence & David 2010); however, the effects of the introduction of a skill mix in home visiting nursing has not been

examined through controlled trials. In a previous study, we found that the introduction of such a skill mix with non-nursing assistants might have a positive effect on HVNs' work environment (Naruse *et al.* 2013).

The ageing of the population (Mary 2007) and its deinstitutionalisation have led to a rapid increase in the demand for home visiting services, since elderly people who need medical treatment tend to use such services (Naruse *et al.* 2011). Nurse managers in each home visiting agency must develop healthy workplaces in order to meet the rising demand for HVNs, despite a severe nursing shortage (Simoens *et al.* 2005). One means nurse managers might use to develop a healthy workplace might be expanding their workforce by attracting more nurses to home visiting nursing.

### Overview of the work engagement literature

Employee work engagement is a positive, fulfilling, work-related state of mind characterised by vigour, dedication and absorption (Schaufeli *et al.* 2002). Work engagement is one of the indices that describe the degree of workplace health. Nurses with higher levels of work engagement tend to be more willing to keep working (Simpson 2009, Kanste 2011), provide patient-centred care (Abdelhadi & Drach-Zahavy 2011) and report higher work efficiency (Laschinger & Leiter 2006). Improving HVNs' work engagement levels would contribute to both job retention and the delivery of quality service. Recent studies show that supervisor support, colleague support and opportunities for professional skill development contribute to work engagement among hospital nurses (Opie *et al.* 2010, Jenaro *et al.* 2011). Vinje and Mittelmark (2008) reported that in a community health nursing setting, when HVNs recognise their success in their practice, they feel engaged in work. According to our previous study, nurse managers and nurses who felt that there was a positive relationship between work and family also perceived that they received a greater amount of support from a supervisor, and nurses belonging to a mid-sized agency had higher work engagement (Naruse *et al.* 2012).

### Home visiting nursing services in Japan

In Japan, home visiting nursing services are available under two reimbursement insurance systems: the long-term care insurance system and the health-care insurance system. HVNs provide educational support for clients and care-givers, personal care and medical treatment. HVNs provide care based on a physician's

referral, and the cost of providing care is calculated by the time required to provide care under these insurance systems. In 2010, about 0.32 million clients were estimated to have received home visiting nursing care (0.24 million under the long-term care insurance system and 0.08 million under the health-care insurance system). About 83.2% of clients were aged 65 years or older, and each client received nurse visits 6.2 times/month on average (Social Statistics Division, Japan 2010). HVNs provided over 97% of their visits without any assistance (Japan Visiting Nurse Foundation 2011), due to the shortage of nurses and the absence of a certification process for nursing assistance within the Japanese home care system. There might have been visits during which HVNs wasted their time and could not provide efficient, quality care. For example, clients were required to lay on their right or left side while HVNs treated their sacral ulcers. If clients could not hold this position, then HVNs would need to use one hand to position the clients' bodies and treat ulcers with the other hand. Positioning clients' bodies could have been performed by a non-nursing person, but HVNs were required to do this during unaccompanied visits. To improve this situation, we developed a new skill-mix programme for home visiting nursing service agencies in 2009 (Naruse *et al.* 2013). In this programme, HVNs can be relieved from non-nursing tasks by delegating these tasks to non-nursing assistants. We found that, with the help of assistants, HVNs were more satisfied with the care they provided and spent less time at clients' homes.

These improvements in providing care might significantly enrich HVNs' success in performing daily work tasks, because HVNs spend most of their time in a patient's home (Japan Visiting Nurse Foundation 2011). Work environments in which employees can complete tasks successfully foster their willingness to dedicate their efforts and abilities to providing quality work (Hobfoll 2002, Laschinger *et al.* 2009, Salanova *et al.* 2011). In our programme, assistants help HVNs complete their tasks successfully; consequently, HVNs might become more dedicated to their work.

If the skill-mix programme is shown to foster work engagement among HVNs, the programme can be recommended as a strategy for improving both the efficiency of systems and the work environment of HVNs. This finding would be beneficial for developing a more efficient and healthy workplace for HVNs.

### Aim

The present study evaluates the effect of a skill-mix programme intervention on agency-based HVNs. The

target outcome of the intervention was HVNs' work engagement.

## Methods

### Study design

A pre- and post-intervention study with a comparison group was conducted.

### Study samples

Characteristics of the study sample are shown in Figure 1. This study was carried out in 2010 in three districts of Fukuoka, Japan, one urban and two rural. A total of about 0.4 million people lived in these three districts, which contained 34 home health agencies, and 27 agreed to participate. The average number of HVNs employed by each agency was 7.4. The research followed a quasi-experimental design, with three of the participant agencies (agencies A, B and C) being selected to participate in a 6 month intervention designed to promote work engagement among HVNs. HVNs in these three intervention agencies were assigned to the intervention group. The agencies were not randomly chosen. Rather, we gave preference to those that expressed an active interest in the application of a skill mix to their home visiting nursing systems. The HVNs from the other 24 agencies were assigned to the control group.

### The skill-mix programme for home visiting nursing agencies

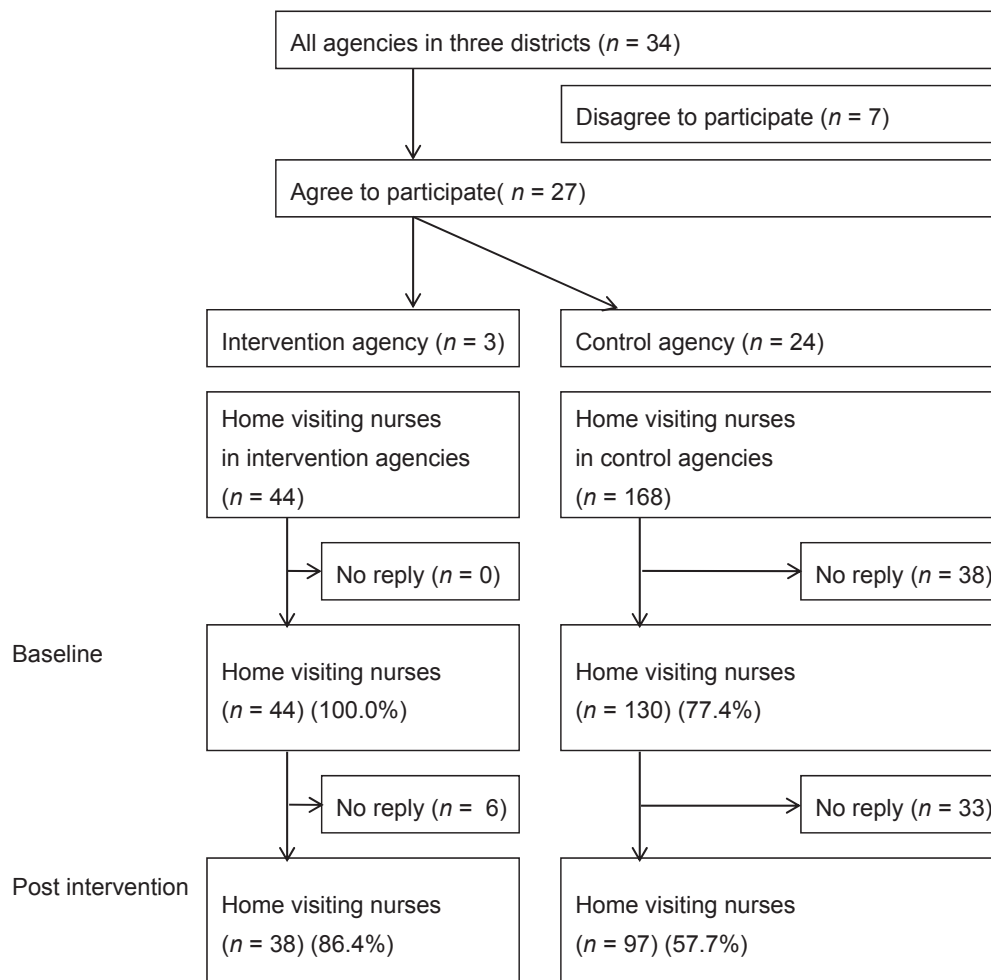
The Job Demands–Resources (JD-R) model (Schaufeli & Bakker 2004), shown in Figure 2, was used as a conceptual framework to establish the intervention programme. The JD-R model explains the relationship between work environment and employee well-being. Job resources, which aid work engagement, refer to 'those physical, psychological, social or organisational aspects that: (1) reduce job demands and the associated physiological and psychological costs; (2) are functional in achieving work goals; and (3) stimulate personal growth, learning and development' (Demerouti *et al.* 2001). Job resources fall into the following categories: organisational (e.g. salary); organisation of work (e.g. assistant staff); interpersonal and social relations (e.g. co-worker support); and tasks (e.g. assistance from co-worker in one task). This study focused on only job resources and work engagement, but not job demands, burnout and negative health-related outcomes.

The assumptions of the study are shown in Figure 3. At the agency level, which serves as the organisation of work level in the present study, care workers were newly employed as non-nursing assistants in this study. In the intervention agencies, HVNs could ask an assistant for help in visits.

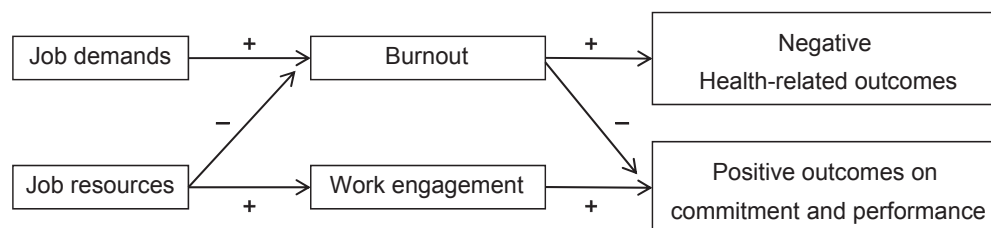
When clients required physical support to hold a position, HVNs needed to provide treatment while supporting the clients' positions. When clients exhibited violent behaviour, HVNs needed to pay attention not only to the clients but also to their own safety. If HVNs always needed the assistance of a care giver to provide care safely, then HVNs would not be able to provide controlled care. Furthermore, HVNs would not be able to offer respite to care givers, and the care givers could not leave their clients. Such situations waste time and provide quality care inefficiently. When assistants visited clients' homes with HVNs, they helped HVNs with personal care or medical treatments and performed trivial tasks. For example, assistants supported clients' body positions, allowing HVNs to provide care effectively. While HVNs provided direct care, the assistants prepared care materials, such as warm water or diapers. Such assistance was assumed to help HVNs to concentrate on providing care and to increase the time that HVNs had to provide care in clients' homes. These changes were assumed to encourage HVNs to provide quality care. In our previous study, HVNs tended to be more satisfied with the care they provided when they had assistants (Naruse *et al.* 2013). These positive changes in individual tasks were expected to result in higher work engagement among HVNs.

### Implementation of the programme

In July 2010, a baseline evaluation was conducted. Self-administered questionnaires assessing work engagement were mailed to HVNs. After the evaluation, the skill-mix programme was implemented at the beginning of August 2010. In the intervention agencies, one assistant/agency was employed and they worked all weekdays to help HVNs. When two or more HVNs asked for help from the same assistant at the same time, the nursing manager of the agency adjusted the assistant's schedule. Six months after the skill-mix programme was implemented, the HVNs' work engagement was re-evaluated using self-administered questionnaires that were mailed in January 2011. Each assistant received an educational programme from the nursing manager of the agency at the beginning of August. The programme concerned



**Figure 1**  
Study design and samples.



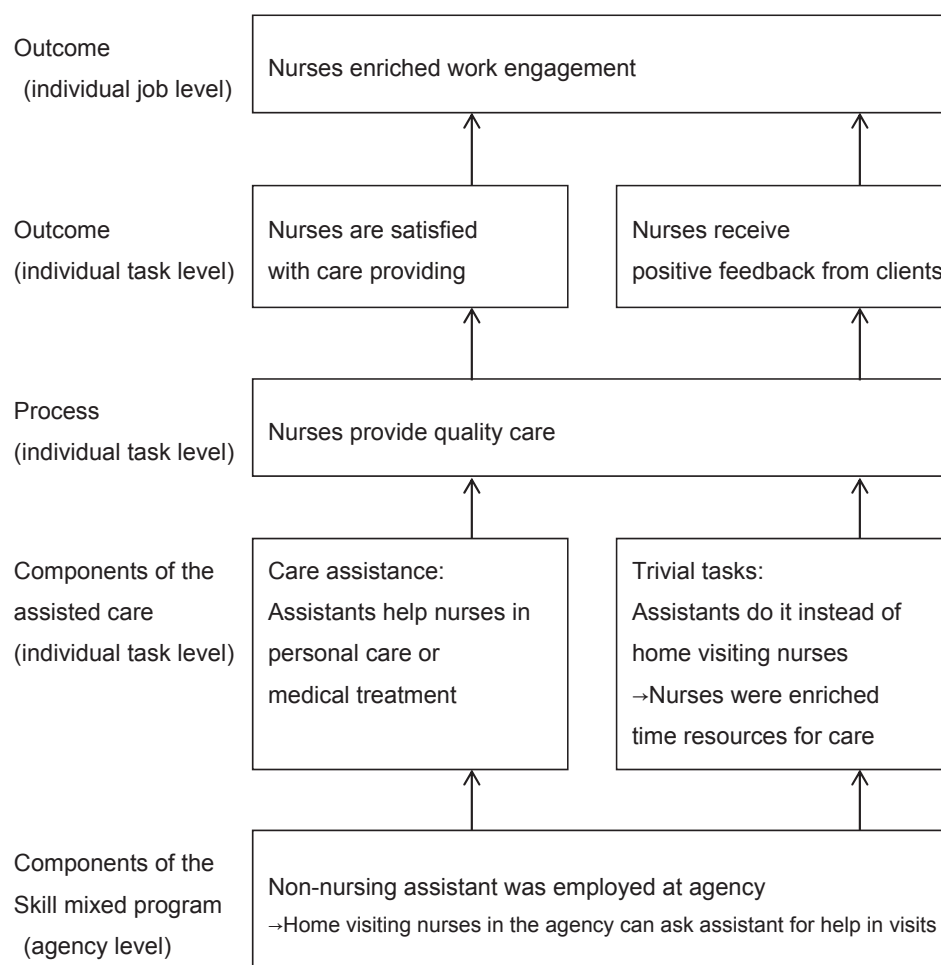
**Figure 2**  
Job Demands–Resources Model (Schaufeli & Bakker 2004).

the manner in which the assistant should help HVNs in clients' homes. We developed this programme along with six HVNs.

## Instruments

We collected data on the demographic characteristics of HVNs and their work engagement. Demographic data included age, job status (normal staff or nurse

manager), years of nursing experience and employment status (full- or part-time). The Utrecht Work Engagement Scale–Japan version (UWES-J) (Shimazu *et al.* 2008) was used to measure work engagement. This instrument comprised nine items, each rated on a seven-point scale ranging from 'never' to 'always.' A sample item is, 'I find the work that I do full of meaning and purpose'. Scores on all items were summed and divided by nine. Higher scores indicated greater



**Figure 3**  
Assumptions of the study and the skill-mix care delivery programme.

work engagement. Cronbach's alpha ( $\alpha$ ) in this study was 0.927.

The intervention-group HVNs were asked about the experience of assisted care with the question, 'Did you experience assisted care during the study term?'. As it was difficult for HVNs to provide the correct number of assisted care visits during the intervention period, we developed the above question in collaboration with three supervisory HVN managers. According to the managers, when an HVN answered 'yes' for the above question, the HVN was considered to experience the visits regularly in his/her work.

### Data analysis and statistics

Data analysis was performed in three steps. First, demographics were compared between the intervention group and control group. Next, the effect of the intervention on work engagement scores was evaluated by generalised linear regression, with the main

effect of two groups. The model included baseline data as a co-variate, and interaction terms of baseline and group assignment. The analysis was conducted following the intention-to-treat principle. The work engagement score of drop-out participants was imputed with the baseline work engagement score. Third, per-protocol analyses (including only follow-up participants' data) were performed to examine the effects of the intervention as a function of the success of its implementation. Values of  $P < 0.05$  (two-sided) were considered statistically significant. All analyses were performed using SPSS v. 17 for Windows (SPSS Inc., Chicago, IL, USA).

### Ethical considerations

The Ethics Committee of the Graduate School of Medicine at the University of Tokyo approved this study. All participating HVNs gave informed consent. Written consent was obtained from all nurse

managers of the participating agencies. Only HVNs who agreed to participate sent questionnaires to the researchers.

## Results

### Characteristics of participants

In total, 212 HVNs (44 in the intervention agencies, 168 in the control agencies) were enrolled in the study and received baseline questionnaires. In the intervention agencies, 44 HVNs (response rate 100%) returned the baseline questionnaire and 38 HVNs (response rate 86.4%) completed the follow-up questionnaire. Among these 38, eight HVNs did not experience assisted care. In the control agencies, 130 HVNs (response rate 77.4%) returned baseline questionnaires and 97 (response rate 57.7%) completed follow-up questionnaires. Participants' average age was 43 years, with an average of 17 years of nursing experience. Approximately 15% were managers. About 50% worked full time.

Comparisons of the baseline data between the intervention and control groups are shown in Table 1. There were no significant differences in demographic variables between study groups.

Comparisons of the baseline demographic data between participants who completed the study ( $n = 135$ ) and those who dropped out ( $n = 39$ ) are shown in Table 2. Participants who dropped out were younger ( $P = 0.009$ ) and had less home visiting nursing experience ( $P < 0.001$ ) than those who completed the study.

### Assisted visits in intervention agencies

The number of clients and visits by intervention agencies within the study period (6 months) are

shown in Table 3. The average number of clients/month was 95.2 and the visits were made 783.3 times/month. Assisted care visits were made 40.3 times/month on average, which was about 5.1% of the total visits.

### Change in work engagement score

The work engagement scores at baseline and follow-up for each group and the coefficients in the generalised linear regression model are shown in Table 4. In the intention-to-treat analysis, the average work engagement score in the intervention group at follow-up (2.3) was higher than that at baseline (2.2). Among the control-group HVNs, the score at follow-up (2.6) was lower than that at baseline (3.3). The difference in score change between groups was significant ( $P < 0.001$ ). In the per-protocol analysis, the average work engagement scores in the intervention group did not decrease: 2.84 at baseline and 2.85 at follow-up. On the other hand, scores in the control group decreased: 3.06 at baseline and 2.95 at follow-up. The difference in score change between groups was significant ( $P < 0.001$ ).

In the intervention group, eight HVNs did not receive assistance with care during the duration of the study. The mean work engagement score of these eight HVNs was 3.0 (SD = 0.7) at baseline and 3.0 (SD = 0.6) at follow-up. For sensitivity analysis, data from these participants were excluded; only the data from the 36 HVNs in the intervention group and the 130 HVNs in the control group were used. The average work engagement scores in the intervention group at follow-up and baseline were the same (2.8). The score in the control group at follow-up (3.0) was lower than that at baseline (3.1). The difference in score change between groups was significant

**Table 1**

Means, standard deviations (SD), and numbers (%) of baseline characteristics of participants in study groups (including dropout participants at post-test)

	Intervention group ( $n = 44$ )	Control group ( $n = 130$ )	<i>P</i>
Age (years)	43.8 $\pm$ 8.0 (31.0–62.0)	43.3 $\pm$ 7.0 (28.0–63.0)	0.686*
Nurse experience	18.0 $\pm$ 7.7 (2.0–41.0)	17.5 $\pm$ 6.7 (3.0–42.0)	0.696*
Home visiting nurse experience	7.2 $\pm$ 5.1 (1.0–20.0)	6.7 $\pm$ 5.0 (1.0–27.0)	0.436*
Job status			
Normal staff	37 (84.1)	115 (88.5)	0.441 <sup>†</sup>
Nursing manager	7 (15.9)	15 (11.5)	
Employment status			
Part-time	22 (50.0)	56 (43.1)	0.484 <sup>†</sup>
Full-time	22 (50.0)	74 (56.9)	
Work engagement score	2.8 $\pm$ 0.6 (1.3–4.8)	3.1 $\pm$ 0.9 (0.1–6.0)	0.071*

\*Unpaired *t*-test.

<sup>†</sup>Chi-squared test.



**Table 2**

Means, standard deviations (SDs) and numbers (%) of baseline characteristics in followed and drop-out participants

	Followed participants ( <i>n</i> = 135)	Drop-out participants ( <i>n</i> = 39)	<i>P</i>
Age (years)	44.2 ± 7.2 (30.0–63.0)	40.7 ± 6.7 (28.0–53.0)	0.009*
Nurse experience (years)	18.2 ± 6.9 (2.0–42.0)	15.7 ± 6.7 (3.0–30.0)	0.052*
Home visiting nurse experience (years)	7.6 ± 5.1 (1.0–27.0)	4.3 ± 3.7 (1.0–11.0)	<0.001*
Job status			
Normal staff	119 (88.1)	33 (84.6)	0.587 <sup>†</sup>
Nursing manager	16 (11.9)	6 (15.4)	
Employment status			
Part-time	57 (42.2)	21 (53.8)	0.207 <sup>†</sup>
Full-time	78 (57.8)	18 (46.2)	
Work engagement score	3.0 ± 0.8 (0.4–6.0)	3.1 ± 1.1 (0.1–6.0)	0.463*

\*Unpaired t-test.

<sup>†</sup>Chi-squared test.**Table 3**

Average number of home visiting nursing service provision in three intervention agencies within study term (6 months)

Agency ID	Number of clients/month	Number of visits/month	Number of assisted visits/month
A	86.8	1022.3	28.5
B	87.0	565.0	48.5
C	111.8	762.5	43.8
Average	95.2	783.3	40.3

( $P < 0.001$ ). Furthermore, per-protocol analysis excluding data from the eight intervention group participants was conducted; only the data from 30 HVNs in the intervention group and 97 HVNs in the control group were used. The average work engagement scores in the intervention group at follow-up and baseline were the same (2.8). The score for the control group at follow-up (3.0) was lower than that at baseline (3.1). The difference in score changes between groups was significant ( $P < 0.001$ ).

## Discussion

### Main findings

The aim of this study was to evaluate the effect of the introduction of a skill-mix programme in home visit nursing agencies. Intervention group HVNs' work engagement scores at follow-up were the same as at baseline. In contrast, control group HVNs' scores decreased at follow-up. HVNs who did not receive the intervention lost some degree of work engagement during the 6 months of observation; furthermore, the skill-mix programme had a positive effect on work engagement and prevented a decline in work engagement among HVNs in the intervention group.

### The positive effects of the skill-mix programme on work engagement

The introduction of the skill-mix programme was believed to enrich the workforce and skill variety in home visit nursing agencies. In the JD-R model, the antecedents of work engagement are individual or job resources (Schaufeli & Bakker 2004). Our results supported the hypothesis of the JD-R model, that the enrichment of individual or job resources might foster employees' work engagement. The introduction of the skill-mix programme might foster HVNs' work engagement by improving the quality of care for each client, referring to the assumption framework. The more HVNs felt satisfied with the care they provided, the more they recognised themselves to be meaningful person for their clients. The experience of meaningfulness was essential for HVNs to increase their enthusiasm for home visiting nursing work (Vinje & Mittelmark 2008). HVNs thrive when they understand that their visits are genuinely meaningful to their clients.

However, the assumption that the skill-mix programme fostered work engagement among HVNs should be further studied. We found no difference attributable to the experience of assisted visits among HVNs. All assistants in each agency visited their clients with HVNs about 40 times/month on average, and this number was much smaller than the total number of all HVNs' visits. Consequently, not just the experience of assisted care but also a crossover effect within an intervention agency might have fostered work engagement.

Crossover is defined as the transfer of positive (or negative) experiences from one person to another (Westman 2001). When an HVN was satisfied with his/her care in an assisted visit, he/she would inform colleagues of the benefit of assistance. This informa-

**Table 4**

Means, standard deviations (SD) of work engagement score and the changes in study groups

	Baseline score (Mean ± SD)	Post-intervention (Mean ± SD)	Changes of score (Mean ± SD)	GLM*	
				B <sup>†</sup>	P
Intention to treat analysis (n = 174)					
Intervention	2.82 ± 0.6	2.83 ± 0.6	0.01 ± 0.6	1.544	<0.001
Control	3.10 ± 0.9	3.01 ± 0.9	−0.07 ± 0.5		
Per protocol analysis (n = 135)					
Intervention	2.84 ± 0.7	2.85 ± 0.6	0.01 ± 0.7	1.544	<0.001
Control	3.06 ± 0.8	2.95 ± 0.8	−0.12 ± 0.6		

\*GLM, generalized liner regression model with main effect of study groups, including baseline data as co-variate and interaction term of baseline and group assignment.

<sup>†</sup>Coefficient of study groups (intervention = 1, control = 0).

tion might be a source of vicarious experience of success, which could enrich the colleagues' dedication to their tasks. Even though the number of assisted visits in one agency was small, the experience of success was repeatedly shared among HVNs, and their work engagement was therefore fostered. However, details of this process were not examined in this study; future research which explores this process is needed.

### The decrease in work engagement in the control group

Our results indicate that HVNs' individual or job resources decreased at follow-up compared with baseline. At follow-up, every HVN had experienced more job-related tasks, and these enriched their knowledge, skills and experiences. We believe that job-related resources for providing care – for example, cars, mobile 'phones and medical supplies – did not change drastically between baseline and follow-up. The environment of the study districts would also not have changed drastically between baseline and follow-up because of the region's warm, humid climate.

We focused on the number of business days at baseline and follow-up. The baseline and follow-up survey asked about HVNs' work life during July and January, respectively. In January, HVNs took New Year holidays for 4 days. In July, there was only one public holiday, as compared to four holidays during January. Every home visiting nursing agency has a system of giving a compensatory day off for working on a holiday. When there were more holidays, more HVNs took a compensatory weekday off. This situation could have decreased the workforce in an agency and thus decreased job resources for HVNs. This practice is associated with a decrease in job resources for HVNs and low work engagement.

However, the mechanisms by which work engagement decreased among HVNs were not examined in this study. Furthermore, because the baseline score of HVNs in the control group was higher than the average score (2.9) for Japanese women (Shimazu *et al.* 2007), the decreased work engagement among HVNs could be considered as a regression towards the mean. Future studies should explore changes in HVNs' work engagement over a 1 year period. This would provide a better understanding of work engagement among HVNs and facilitate the development of effective strategies for fostering their work engagement.

### Limitations

This study has some limitations. First, the assignment of HVNs to the intervention and control groups was not randomised. Additionally, baseline work engagement scores differed between groups, resulting in a bias that could weaken confidence in attributing post-intervention between-group differences to the intervention. In addition, we selected the three intervention groups because these three agencies were highly motivated and accountable in carrying out a skill-mix programme. The decision was essential for a successful implementation of the intervention (Sidani 1998); however, it threatens the external validity of the findings. Furthermore, this study could not be blinded for participants. The improvement observed in HVN work engagement may have been caused by a sense of special treatment among intervention group HVNs. The decline in work engagement among control group HVNs may have been due to the recognition that they were not offered the help of non-nursing assistants, putting them at a disadvantage in the work environment. Finally, the contents of the intervention programme had a critical limitation. Before initiating



the skill-mix programme, the researchers and nurse managers in the intervention agencies had research meetings in which the key characteristics of the programme were identified. Although it was believed that each agency needed more than one assistant in order to provide enough help for HVNs, we could employ only one assistant in each agency, because few non-nursing assistants were available. This manpower shortage might have influenced the recognition of a lack of resources among HVNs in the intervention group, and it could have delayed the positive effect of a skill-mixed programme on their work engagement. Future research is necessary to determine who should be employed as non-nursing assistants. In this study, we utilised care workers as assistants. If non-certified individuals could play the assistant role, this programme could be more feasible and effective.

### Implications for nursing management

Home visiting nurse managers are required to make their workplaces healthier and meet the rising demands for HVNs despite a nursing shortage. Our studies showed that the employment of non-nursing assistants improved HVNs' work engagement and efficiency at clients' homes. These results could be used to develop a new strategy to improve the HVNs' workplace. It is also easier to employ assistants than nurses because non-nursing assistants might cost less and are easily available.

In this study, the employment of assistants cost about \$US 2000/month, which was about 50–60% of the employment cost of HVNs. In a small agency with up to four or five HVNs, the cost might seem to be large and thus would not be a cost-effective strategy. However, in a large agency with more than 10 HVNs, the cost might not appear to be so huge. Future studies might focus on clarifying the cost effectiveness of employing non-nursing assistants and identifying the kind of agencies in which such skill-mix programmes could be financially and practically feasible.

### Conclusions

Efforts to reform and restructure workplaces in order to generate a more efficient, effective and productive health-care workforce are attracting significant attention (O'Brien-Pallas & Baumann 2000, Langhorne 2006, Gregory *et al.* 2007). Our results indicate that the introduction of a skill-mix programme in home visiting nursing agencies could improve the efficiency of services provided and HVNs' work engagement.

The big challenge of this intervention programme was to develop a system that could accommodate efficient service provision and foster HVNs' work-related well-being. Such a programme is beneficial for both nursing managers and HVNs. Assessing work engagement among HVNs would help nursing managers to improve health-care workplace audits and prevent overloaded HVN systems.

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### Ethical approval

Ethical approval was obtained from the Ethics Committee of the Graduate School of Medicine at the University of Tokyo (Approval No. 3096).

### References

- Abdelhadi N. & Drach-Zahavy A. (2011) Promoting patient care: work engagement as a mediator between ward service climate and patient-centered care. *Journal of Advanced Nursing* 13, 1–12.
- Demerouti E., Bakker A.B., Nachreiner F. & Schaufeli W.B. (2001) The Job Demands–Resources Model of burnout. *Journal of Applied Psychology* 86, 499–512.
- Gregory D.M., Way C.Y., LeFort S., Barrett B.J. & Parfrey P.S. (2007) Predictors of registered nurses' organizational commitment and intent to stay. *Healthcare Management Review* 32, 119–127.
- Hobfoll S.E. (2002) Social and psychological resources and adaptation. *Review of General Psychology* 6, 307–324.
- James B. & Mario R.D.P. (2002) Skill mix in the health care workforce: reviewing the evidence. *Bulletin of the World Health Organization* 80, 79–85.
- Japan Visiting Nurse Foundation. (2011) 24 jikan houmon kango service teikyo no arikatani kansuru tyosa kenkyu jigyo hokokusho [Study on the round-the-clock care system in Japanese home visiting nursing services]. In *Health Labor Sciences Research Report*, pp. 80–81. Tokyo.
- Jenaro C., Flores N., Orgaz M.B. & Cruz M. (2011) Vigour and dedication in nursing professionals: towards a better understanding of work engagement. *Journal of Advanced Nursing* 67 (4), 865–875.
- Kanste O. (2011) Work engagement, work commitment and their association with well-being in healthcare. *Scandinavian Journal of Caring Sciences* 25, 754–761.
- Langhorne R.C. (2006) Action report healthcare reform: workplace abuse and harassment of nurses. *Virginia Nurses Today* 14, 26.
- Laschinger H.K.S. & Leiter M.P. (2006) The impact of nursing work environments on patient safety outcomes. *Journal of Nursing Administration* 36 (5), 259–267.

- Laschinger H.K.S., Wilk P., Cho J. & Greco P. (2009) Empowerment, engagement and perceived effectiveness in nursing work environments: does experience matter? *Journal of Nursing Management* 17, 636–646.
- Lawrence H.P. & David W.A. (2010) A question of delegation, unlicensed assistive personnel and the professional nurse. *Journal of Gerontological Nursing* 36, 18–21.
- Mary B.W. (2007) Population aging: a global overview. In *Global Health and Global Aging* (M. Robinson, N. William, P. Clarence & L. Norris eds), pp. 15–30. Jossey-Bass, San Francisco, CA.
- Naruse T., Nagata S., Taguchi A. & Murashima S. (2011) Classification tree model identifies home-based service needs of Japanese long-term care insurance consumers. *Public Health Nursing* 28 (3), 223–232.
- Naruse T., Sakai M., Watai I. *et al.* (2012) Individual and organizational factors related to work engagement among home visiting nurses in Japan. *Japan Journal of Nursing Science* doi: 10.1111/jjns.12003
- Naruse T., Taguchi A., Kuwahara Y., Nagata S. & Murashima S. (2013) Effects of non-nursing assistance on home visit nurses' time spent in Japan: one group repeated pretest-posttest trial. *Home Health Care Management and Practice* 25 (1), 18–22.
- O'Brien-Pallas L. & Baumann A. (2000) Toward evidence-based policy decisions: a case study of nursing health human resources in Ontario, Canada. *Nursing Inquiry* 7, 248–257.
- Opie T., Dollard M., Lenthall S. *et al.* (2010) Levels of occupational stress in the remote area nursing workforce. *Australian Journal of Rural Health* 18 (6), 235–241.
- Salanova M., Lorente L., Chambel M.J. & Martinez I.M. (2011) Linking transformational leadership to nurses' extra-role performance: the mediating role of self-efficacy and work engagement. *Journal of Advanced Nursing* 67, 2256–2266.
- Schaufeli W.B. & Bakker A.B. (2004) Job demands, job resources and their relationship with burnout and engagement: a multi-sample study. *Journal of Organizational Behavior* 25, 293–315.
- Schaufeli W.B., Salanova M., Bakker A.B. & Gonzalez-Rom V. (2002) The measurement of engagement and burnout: a two sample confirmative analytic approach. *Journal of Happiness Studies* 3, 71–92.
- Shimazu A., Kosugi S., Suzuki A. *et al.* (2007) The reliability and validity of Japanese Utrecht Work Engagement Scale, testing with gender and generation of participants. *Journal of Occupational Health* 49, 77. [in Japanese].
- Shimazu A., Schaufeli W.B., Kosugi S. *et al.* (2008) Work engagement in Japan: validation of the Japanese version of the Utrecht work engagement scale. *Applied Psychology An International Review* 57 (3), 510–523.
- Sidani B. (1998) Intervener and setting characteristics. In *Evaluating Nursing Interventions: A Theory-driven Approach*. (D. Ruth, ed.), pp. 87–104. Sage, Thousand Oaks, CA.
- Simoens S., Villeneuve M. & Hurst J. (2005) Tackling nurse shortages in OECD countries. *OECD Health Working Papers* 19.
- Simpson M.R. (2009) Predictors of work engagement among medical–surgical registered nurses. *Western Journal of Nursing Research* 31 (1), 44–65.
- Social Statistics Division, Japan. (2010) *Survey of institutions and establishments for long-term care*. Available at: <http://www.e-stat.go.jp/SG1/estat/List.do?lid=000001086111>, accessed 20 July 2012.
- Vinje H.F. & Mittelmark M.B. (2008) Community nurses who thrive: the critical role of job engagement in the face of adversity. *Journal for Nurses in Staff Development* 24, 195–202.
- Westman M. (2001) Stress and strain crossover. *Human Relations* 54, 557–591.