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Low Back Pain in Female Caregivers in Nursing Homes

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1. Introduction

In recent years, Japan has become a fast-aging population with the greatest longevity in the world. According to the statistics of Japan, the proportion of the elderly aged 65 years or older reached 20.8% in fiscal, and is estimated to reach 39.6% in 2050 (Japanese Health, Labor, and Welfare Ministry, 2006).

In such an aged society, various health issues occur in caregivers in nursing homes. Particularly in female caregivers, high blood pressure (Hosono et al., 2009) and coronary heart disease (Lee et al., 2003) have been reported to be at high risk. Additionally, caregivers have high prevalence rates of low back pain (LBP) and a high incidence of worker's compensation claims for back injuries (Dehlin et al., 1976; Jorgensen et al., 1994; Fujimura et al., 1995). LBP is common in various occupations, its presence being related to activities requiring repetitive lifting and repeated activities for which anomalous postures tend to be adopted (Josephson et al., 1998). Such work characteristics are common among nursing caregivers. The prevalence of LBP in nursing is high in comparison with other occupations and in relation to other types of work (Ahlberg-Hulten et al., 1995). Risk factors include physical work such as manual lifting and transferring of patients, working conditions such as working time and rest during the night shift, and the working environment (Fujimura et al., 1995). Among these factors, exposures to frequent manual lifting and transferring of patients were widely recognized factors.

On the other hand, for female caregivers, it was reported that dissatisfaction with working conditions and the workplace environment was high (Fujimura et al., 1995), mental stress from work and human relations tended to be high (Ahlberg-Hulten et al., 1995; Failde et al., 2000), and physical fitness elements such as flexibility and muscular strength were low (Kinugasa et al., 1995). Caregivers in nursing homes perform shift work, including night work. In shift workers, a high risk of sleep interruption was reported (Nicholson et al., 1999). A study reported that caregivers who provided care at night suffered from a general

sense of fatigue, physical disorders, and reduced mental energy compared with employed women (Tsukasaki et al., 2006). A systematic review indicated that female caregivers had higher levels of burden and depression, and lower levels of subjective well-being and physical health (Pinquart et al., 2006). Therefore, it is necessary that the issue of health in caregivers in nursing homes should include not only low back pain, but also mental and physical health status, and how to interpret these factors.

There are some exercise interventions for the lumbago patient (Cherkin et al., 1996; Frost et al., 1998; Kuukkanen et al., 1998), but so far there are few randomized controlled trials (RCTs) for caregivers in nursing homes. Furthermore, there is no study that assumed mental and physical health status as secondary outcome measurements. In a recent study (Bowen et al., 2009), there was an effort to attach great importance to the feasibility-like accumulation of evidence. Because the possibility of generalization is a serious matter, we needed to examine an intervention program with a few burdens to caregivers in a realistic care scenario. The objective of this review was to summarize the evidence from RCTs on the prevention and curative effects for LBP, and to suggest the concrete strategy as a future agenda.

2. Methods

2.1 Criteria for considering studies included in this review

2.1.1 Types of studies

Studies were eligible if they were RCTs.

2.1.2 Types of intervention, language, and participant

Studies included at least one treatment group in which all therapy was applied. The use of medication, exercise, alternative therapies or lifestyle changes are described, and must have been comparable in the groups studied. There was no restriction on the basis of language. In Japan, nursing is definitely distinguished from care but there are many countries in which this is not the case. Therefore nurses and nursing students were included as search terms. Furthermore, this study established the principal objective in relation to female caregivers, but target articles were included even if they had a small number of male caregivers relative to a majority of female caregivers.

2.2 Search methods for studies identification (Bibliographic database)

We searched the following databases from January 1, 1990 up to July 20, 2011: MEDLINE via PubMed, Web of Science. All searches were performed by a specific searcher (hospital librarian) who was qualified in medical information handling, and who was experienced in searches of clinical trials.

2.3 Review methods

2.3.1 Selection of trials

In order to make the final selection of studies for the review, all criteria were applied independently by two authors to the full text of articles that had passed the first eligibility screening. Disagreements and uncertainties were resolved by discussion.

2.3.2 Summary of studies and data extraction

Two review authors selected the summary from each of the structured abstracts.

2.3.3 Benefit, harm, and withdrawals

The GRADE Working Group (Atkins et al., 2004) reported that the balance between benefit and harm, quality of evidence, applicability, and the certainty of the baseline risk were all considered in judgments about the strength of recommendations. Adverse events, withdrawals, and cost for intervention were especially important information for researchers and users of clinical practice guidelines, and we present this information with the description of each article.

3. Results

The literature searches included 352 potentially relevant articles (Figure 1). Abstracts from those articles were assessed and 11 papers were retrieved for further evaluation (checked for relevant literature). Five publications were excluded because they did not meet the eligibility criteria (see Appendix).

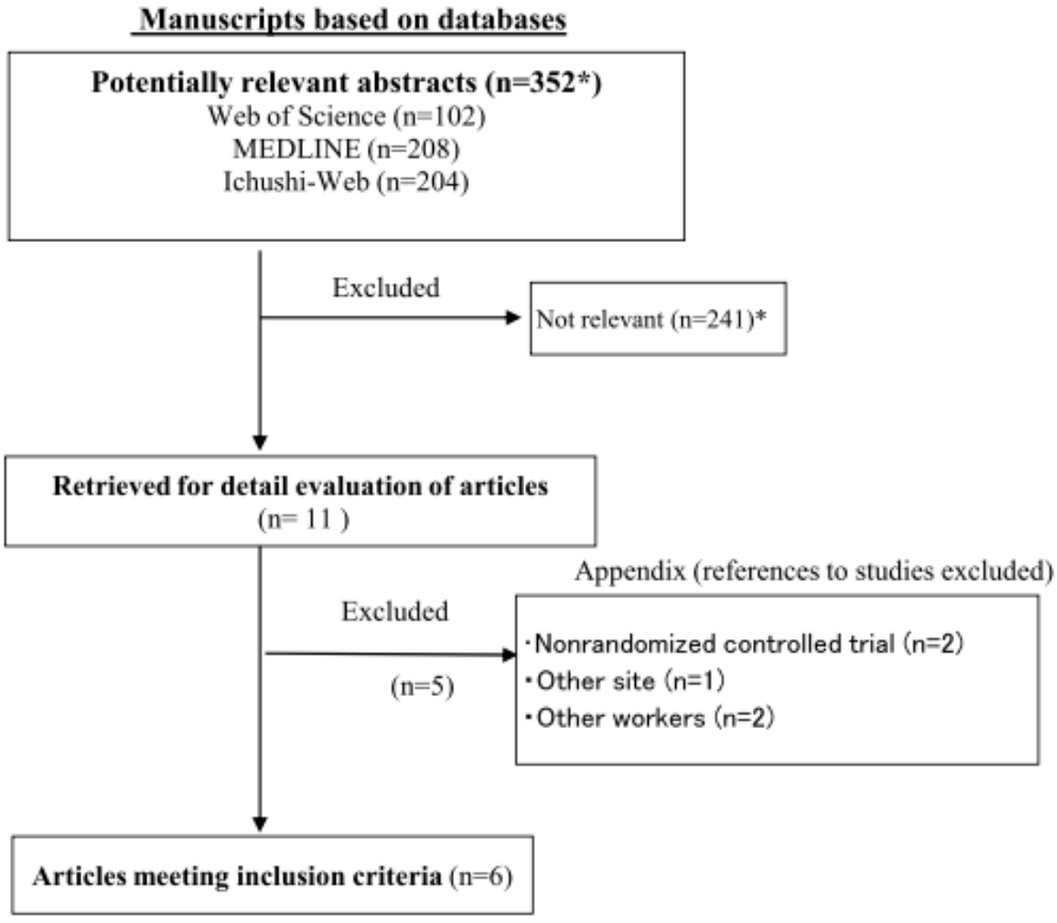


Fig. 1. Flowchart of trial process *reduplication

Six studies met all inclusion criteria, and Table 1 presents the structured abstracts of these six articles. Table 2 provides a brief summary of the six articles. The types of intervention were as follows: multidimensional method (Miyamoto et al., 1998 and Svensson et al., 2008); transfer technique and stress management (Jensen et al., 2006); lumbar support (Roelofs et al., 2007); stretching exercise (Kamioka et al., 2011); and cognitive behavioral theory (Menzel et al., 2006).

Author	Miyamoto M, et al.	Jensen LD, et al.
Citation	Orthop Surg Traumatol 1998; 41: 223-230. (in Japanese with English abstract)	Spine 2006; 31 :1761-1769.
Title	Prospective study for the occurrence of low-back pain in newly-employed nurses educated at the back school	Prevention of Low Back Pain in Female Eldercare Workers: Randomized Controlled Work Site Trial
Aim/Objective	To assess the efficacy of exercise programs for LBP.	To evaluate the effectiveness of an ergonomic and psychosocial intervention in reducing low back pain (LBP) among health care workers.
Setting/Place	Nippon Medical School Hospital	University Hospital of Aarhus
Participants	One hundred and forty-five female nurses (mean 21.7 yrs, range; 20-33yrs) who were newly employed by the hospital.	A total of 234 home care workers, nurses, and nurse's aides from 3 separate eldercare wards were invited to participate in the trial. The invited eldercare workers included all permanent staff engaged in client care at the 3 wards. Of these 234 workers, 210 (90%) agreed to participate. The participation rate in the 3 wards was 85% (mean 44.0 ± 8.5 yrs), 96% (mean 44.6 ± 9.8 yrs), and 89% (mean 44.6 ± 8.4 yrs), respectively.
Intervention	The back school consisted of three courses; a)introductory (lecture on biomechanics and physiology of spine), b) intermediate (lecture on a) + body-mechanics and the trunk muscle exercise for LBP prevention), c) full-course (lecture of a)+b) and exercise of LBP prevention.	The TTI was based on the Stockholm training concept, which aims to reduce the biomechanical load on the back, minimize work in asymmetric postures, and prevent sudden unexpected loads (Figure 2). The SMI was developed to adress the work stress in health care with particular attention to prevention of burnout and development of stategies for stress management (Figure 3). The reference groups had lessons of their own choice in matters unrelated to the intervention programs but of the same duration as the active intervention lessons (*e.g.*, on skin care, proper treatment of a person with diabetes, work, and asthma and safety procedures in chemicals handling).
Main and secondary outcomes*	Habits of trunk muscle exercise and LBP history	The primary outcome was a self-reported rating of the LBP intensity.The implementation of the TTI program was evaluated by comparing ROM values. The SMI program was evaluated by comparing values obtained before and after intervention for each of the 3 dimensions of the SMI program: The Maslach Burnout Inventory, Setterlind's Stress Scores, and rating of social support.
Main results	The adherence of LBP exercise was good in order of c,b,a, but the prevalence of LBP did not have a significant difference among groups. However, in subgroup analysis, high-intensity group(>150days/y) was lower than low-intensity group (149days/y>)in prevalence of LBP.	We found no difference in LBP in any of the intervention arms over the study period.
Conclusion	The adherence of LBP exercise may produce good effects on the prevention of LBP.	The study showed no effect of a transfer technique or stress management program targeting LBP. Thus, there is a need for discussing other priorities in the prevention of LBP among health care workers.

*Two included studies did not distinguish main or secondary outcomes.

Table 1-a. Summary of articles based on structured abstracts

Author	Roelofs PDDM, et al.	Svensson AL, et al.
Citation	Ann Intern Med. 2007; 147: 685–692.	Occupational Medicine 2009; 59: 563–569.
Title	Lumbar Supports to Prevent Recurrent Low Back Pain among Home Care Workers	Multidimensional intervention and sickness absence in assistant nursing students
Aim/Objective	To determine the effectiveness of lumbar supports in the secondary prevention of low back pain.	To ascertain if a multidimensional prevention programme combining psysical training, patient transfer technique and stress management prevents sickness absence and LBP in NA students.
Setting/Place	Home care organization in the Netherlands	Two schools of health and social care in Copenhagen
Participants	360 home care workers with self-reported history of low back pain. The lumbar support group (n=183) was mean 41.8 ± 9.7 yrs, and control group (n=177) was 41.5 ± 9.8 yrs.	The study population comprised 766 female NA students from two schools of health and social care in Copenhagen,Denmark. In all, 668 NA students from 38 classes participated in the study. Students were randomly allocated to the control or intervention group, resulting in 389 students being assigned to the intervention group (20 clusters; mean 26 ± 5yrs.) and 279 students to the control group (18 clusters; mean 25 ± 5 yrs.).
Intervention	Short course on healthy working methods, with or without patient-directed use of 1 of 4 types of lumbar support. Participants could select 1 of 4 types of lumbar supports, supplied by Bauerfeind B.V., Haarlem, the Netherlands. LumboTrain and LumboTrain Lady are individually adjustable, hook-and-loop fastening, fully elastic supports that are available in 5 sizes for men or women.	The LBP prevention programme consisted of an integrated approach of three preventive measures; physical training (48 h), patient transfer technique education (20 h) and stress management with personal development (22 h).
Main and secondary outcomes*	Primary outcomes were the number of days of low back pain and sick leave over 12 months. Secondary outcomes were the average severity of low back pain and function (Quebec Back Pain Disability scale) in the previous week.	Sickness absence was self-reported. The question was phrased 'how many days during the last 12 months have you been absent due to your own sickness?' [17]. Questions concerning LBP were taken from the Standardisd Nordic Musculoskeletal Questionnaire [18,19].
Main results	Over 12 months, participants in the lumbar support group reported an average of −52.7 days (CI, −59.6 to −45.1 days) fewer days with low back pain than participants who received only the short course. However, the total sick days in the lumbar support group did not decrease (−5 days [CI, −21.1 to 6.8 days]). Small but statistically significant differences in pain intensity and function favored lumbar support.	Of 766 female NA students, 668 (87%) completed the baseline questionnaire. Sickness absence during the study period increased in both groups but the increase was significantly lower in the intervention group than the control group, mean (standard deviation) number of days 12 (20) versus 18 (34), $P < 0.05$. The intervention group reported no change in the mean level of general health perception, energy/fatigue or psychological well-being at follow-up, while the control group reported a decline on those scales. There were no significant differences in the prevalence of LBP at follow-up between the intervention and control group.
Conclusion	Adding patient-directed use of lumbar supports to a short course on healthy working methods may reduce the number of days when low back pain occurs, but not overall work absenteeism, among home care workers with previous low back pain. Further study of lumbar support is warranted.	Compared to the control group, the intervention group had significantly less sickness absence. The intervention had no preventive effect on LBP prevalence.

*Two included studies did not distinguish main or secondary outcomes.

Table 1-b. Summary of articles based on structured abstracts

Author	Kamioka H, et al.	Menzel NN, et al.
Citation	Environ Health Prev Med (2011); 16: 97–105.	Pain Management Nurs 2006; 7: 53–63.
Title	Effectiveness of intervention for low back pain in female caregivers in nursing homes: a pilot trial based on multicenter randomization	Back pain in direct patient care providers: early intervention with cognitive behavioral therapy
Aim/Objective	To evaluate the intervention effect of a lecture and stretching exercise on caregivers in nursing homes.	To assess the feasibility and effect size of a cognitive behavioral therapy (CBT) intervention to reduce the measures of back pain, stress, and disability in direct care providers working with back pain.
Setting/Place	The intervention program and the evaluation were carried out in each nursing home, the locations of which were as follows: nursing home A (Setagaya-ku, Tokyo), nursing home B (Koshigaya City, Saitama Prefecture), nursing home C (Konosu City, Saitama prefecture), and nursing home D (Tomi City, Nagano prefecture).	The University of Florida Health Sciences Center Institution
Participants	0f the 88 female caregivers (mean 36.2±13.0 yrs) in the target population, all (100%) consented to participate when provided with enough explanation. 44 were randomly assigned by lottery to the intervention group and 44 to the control group.	The participants included 27 female and 5 male nurses or nursing assistants at 550-bedtertiary care academic medical center in Florida. The mean age of participants was 40.3 years.
Intervention	The intervention program consisted of a lecture and stretching exercise (Table 1). The lecture, which lasted for 30 min, was given by an orthopedist with extensive clinical experience (20 years). The stretching exercise program consisted of classical exercises aimed at the reduction and prevention of lumbago. The program contained the original eight elements of stretching based on the William and Mackenzie exercises utilized widely in the kinesitherapy of rehabilitation (Table 1).	The cognitive behavioral therapy intervention was a weekly stress and pain management session over 6 weeks led by a clinical psychologist. The sessions were held at the medical center and offered one day per week either mid-afternoon (before the evening shift began) or late afternoon (before day shift ended). The topics covered were in relaxation techniques, activity rest cycle, distraction techniques, cognitive restructuring mini-relaxation on the job, on-the-job stress management, assertiveness training, and sleep hygiene/nutrition/exercise.
Main and secondary outcomes*	A 10-cm visual analogue scale (VAS) for low back pain was the main outcome measurement. It was evaluated whether the fingers of both hands could reach the floor (finger-floor distance: FFD) from a standing position during anteflexion.	Visual analogue scale (VAS) for low back pain was the main outcome measurement. It evaluated whether the fingers of both hands could reach the floor (finger-floor distance: FFD) from a standing position during anteflexion.
Main results	A total of 29 (33%) participants withdrew by 12 weeks. Regarding the reasons for withdrawal, 28 participants resigned, and one took a leave of absence due to exacerbation of lumbago. Adherence to the stretching exercises was 2.3 ± 1.3 (mean ± SD) times per week. No significant differences were seen for any outcome measurements. The high adherence group (≧3 times per week) did not show a change in the VAS, but the low adherence group (<3 times per week) and control group showed a tendency towards an increased score (p = 0.068).	Pain intensity scores declined in the intervention group, indicationg a large effect (p=0.06). However, stress scores increased. Depression scores accounted for one-third of the variance on hours absent because of back pain.
Conclusion	Even with the conduct of one OJT, and exercises of only 6 min every day, the adherence of caregivers was low, and there appeared to be few effects of the OTJ.	Although there was a hIgh dropout rate in the intervention group, a cognitive-behavioral intervention shows promise as a secondary prevention intervention.

*Two included studies did not distinguish main or secondary outcomes.

Table 1-c. Summary of articles based on structured abstracts

Author	Miyamoto M, et al.	Jensen LD, et al.	Roelofs PDDM, et al.	Svensson AL, et al.	Kamioka H, et al.	Menzel NN, et al.
Type of intervention	Multidimension	Transfer technique (TTI) and stress management (SMI)	Lumbar support	Multidimension	Stretching exercise	Cognitive behavioral theory
Effects noted*						
Main outcome (for pain)	No effect	No effect	Effect	No effect	No effect	No effect
Secondary outcomes	Habits of exercise; effect	All items; no effects	Severity and function; effect	Sickness absence; effect	All items; no effects	Stress; no effect
Withdrawals rate**	No description	TTI; 21%, SMI; 19%	22%	36%	14%	50%
Adverse event	No description	No description	No description	No description	No event	No description
Cost of intervention	No description	No description	50–70 euros/ participant's support	No description	2,000 dollars/all intervention	17 dollars/h/participant

* 'Effect' is in case of statistical signifinance ($p<0.05$).
** For main outcome measurement

Table 2. Brief summary of six articles

In the main outcome measurement (for pain-relieving), it was only lumbar support that was statistically significantly effective (Svensson et al., 2008). For the multidimensional interventions, it was only sick absence (Svensson et al., 2008) and exercise habits (Miyamoto et al., 1998) were statistically significantly effective in the secondary outcomes. Withdrawal rates were described in 5 articles, and tended to be high (14-50%). Adverse events were not described in most articles.

Three articles did not provide information on the costs of intervention. For lumbar support, it cost 50-70 euros per one unit (Roelofs et al., 2007). For stretching exercise, it cost 2,000 dollars as an overall training expense (Kamioka et al., 2011). And, for cognitive behavioral intervention, the compensation to a participant of one hour was shown to be 17 dollars (Menzel et al., 2006).

We could not perform a meta-analysis due to the heterogeneity of the RCTs.

4. Discussion

4.1 Overall evidence

We did not use the CONSORT 2010 (Moher et al., 2010), example of an extension for trials assessing nonpharmacologic treatments (Boutron et al., 2008), and CLEAR-NPT checklists

Fig. 2. A sample of lumber support for caregivers (made in Hakujuji corporation, Japan)

(BoutronI et al., 2005) as quality assessments of articles. However, all studies had acceptably clear descriptions. Our study was able to clarify that coping with LBP was extremely difficult for female caregivers (nurses).

For LBP, it was a surprising fact that only lumbar support showed significant effect (Roelofs et al., 2007). The authors suggested that the experienced benefit (overall good adherence of wearing; 78%) most likely outweighs the discomfort of the device (Figure 2). This device stabilizes the low back directly by letting the trunk work more. However, there is a concern that the muscular strength of the abdominal and back muscles will decrease when subjects continually use the device. Unfortunately, it is not known if this problem could be avoided by regulating the timing and duration of use of this device.

4.2 Why other interventions were ineffective

Five RCTs did not show the effects of interventions. A well designed RCT (Jensen et al., 2006) tried to evaluate the effectiveness of the Trans Technique Intervention (TTI; Table 3) and the Stress Management Intervention (SMI; Table 4) in reducing LBP, but both program had no effect on LBP status after 2 years. The authors suggested that the important question remain as to whether the lack of improvement in low back health in the active intervention arms is caused by insufficient implementation of the interventions or if it is the intervention itself that failed to produce better low back health. The authors also described a need for discussing other priorities in the prevention of LBP. Female caregivers always have a tight schedule in the workplace, which may be the main reason they are often not able to use the techniques that they learned. Therefore, we assume that even if an intervention program produces a lasting effect, continuous reinforcement is necessary.

In another well designed RCT (Svensson et al., 2008), a multidimensional program combining physical training, patient transfer technique and stress management had no preventive effect on LBP prevalence (sickness absence). The authors explained that it was sometimes hard to motivate patients to participate in the multidimensional program. We assume that the lack of motivation and readiness of the participants for the program produced a negative result. The authors emphasize that future studies for LBP should focus on the implementation of intervention programs in order to obtain precise information on participation and adherence.

In a RCT based on cognitive behavioral therapy (Menzel et al., 2006), a statistically significant effect was not observed. There was a high dropout rate (50%) in the intervention group. The authors described that the participants either found attending a session at a specific time and day of week difficult or they judged the intervention to be not helpful. We assume this result was caused by a lack of motivation of the participant.

In our RCT (Kamioka et al., 2011), we evaluated the intervention effect of on-the-job training (OJT; a lecture by an orthopedist and stretching exercise) on caregivers in Japanese nursing homes. Unfortunately, even with conducting one OJT and exercising only six minutes every day, adherence of caregivers was low and there appeared to be few effects of the intervention. In the subgroup analysis for the high adherence group (>3 times per week), lumbago tended to be reduced, but in the low adherence group (3 times per week>) and the control group, it tended to be worse ($p=0.068$). This overall ineffectiveness could be attributed to poor adherence by the participants, which was also a problem in other trials.

The TTI was based on the Stockholm training concept. The main principles in the concept are:

1. To reduce the biomechanical load on the back
2. To reduce asymmetric postures
3. To reduce the risk of sudden unexpected load

The technique can be used in all person transfers no matter whether the need is slight support or a transfer of totally dependent person. Lifting and sliding devices, adjustable bed, turntables and slings must be available. Transfer of disabled persons is performed according to the following guidelines

1. Rolling and dragging instead of lifting
2. Work without rotation
3. As little flexion as possible
4. Reduced friction
5. Use of the person's natural movement pattern
6. Close contacts with the aim of making the person to be transferred participate as much as possible in the transfer.

Four supervisors from the project were introduced and trained in the concept during a 3-day work shopby members of the Stockholm training group. The original Swedish manual was translated into Danish and provided the main contents of the education.

After the randomisation, all members of the 7 TTI groups received 2x4 hours of introduction in the basic principles of the training concept, mainly classroom education where each person was trained in about 30 transfer situations. One or two persons from each of the 7 TTI groups volunteered to become instructors, 11 altogether. The instructors were trained for 30 hours in a combination of practical and theoretical lessons in accordance with the concept at the start of the Intervention period. The following 2-6 months focused on implementation of the concept where the instructors had the floor responsibility for supervising their colleagues by observation and bedside education. Besides this ongoing task, the instructors took part in educating the newly employed and formed the link to the occupational health service in matters concerning ergonomics. The instructors established a network and met every second month during the study period to maintain and develop their competence.

Table 3. Contents of the Transfer Technique Intervention (TTI) (Jansen et al., 2006)

The purpose of the SMI programme was to reduce work stress by enhancing coping with stress, preventing burn out and strengthening communication skills. An experienced occupational psychologist developed the program and instructed two fellow psychologists to ensure that the process and the education became similar in the 6 SMI groups. The training took place over 20 weeks with group sessions every fortnight, each session lasting 2 hours. Between sessions, the participants were given assignments concerning implementation of the themes of the session in their daily practice. In addition, every person had her own developing project based on her personal answers from the baseline questionnaire.

Contents of the SMI programme:

1. Analysis of the organisation with the aim of establishing a collective understanding of the resources and weaknesses of the group. This analysis was used to define the developing project for the group with the goal of reducing the psychosocial strain at work.
2. Work with feed back, introduction of criticism and praise as a model of development. Group task concerning self-care.
3. Prevention of burn out, use of tools to recognise connection of one's own demands and others' expectations.
4. Introduction of a model for collegial supervision, establishing ethical rules and selection of subject for collegial supervision.
5. Practical collegial supervision training, examples of stress in different work situations. Introduction of a method to appraise stress.
6. Further work with stress reduction and conflict solving.
7. Behavior related stress and coping strategies, working with personal strategies for coping with stress.
8. Roles and group dynamics. Negotiation of new roles. Internal dialogue about stress.
9. Practicing stress management
10. Status of the personal and collective developing projects and planning of future activities.

A representative from each group volunteered to become a instructor with responsibility for maintaining the process and solving upcoming problems. Like in the TTI, the instructors formed a network with meetings every second month.

Table 4. Contents of the Stress Management Intervention (SMI) (Jansen et al., 2006)

4.3 Future educational program and research agenda

4.3.1 Educational program agenda

Figure 3 shows the educational program for prevention of LBP in nursing facility. First, based on transtheoretical model, identification of the stage of the participant is necessary. Second, before the main interventions, researchers should perform a thorough orientation to promote understanding of the program. Included in the contents of the program should be loss and profit for oneself by participating and protecting one's body, and success and failure samples that are easy to understand. However, unfortunately, in spite of such efforts, it is assumed that there are a few caregivers who will be indifferent or refuse to participate. It is important to the orientation to transfer caregivers to more progressive behavior stages. Greater effects from performing main interventions can be expected when a participant is ready and has enough understanding of the program. In addition, the intervention program should be performed repeatedly and continuously. However, in this concept model, cost-benefit is not considered.

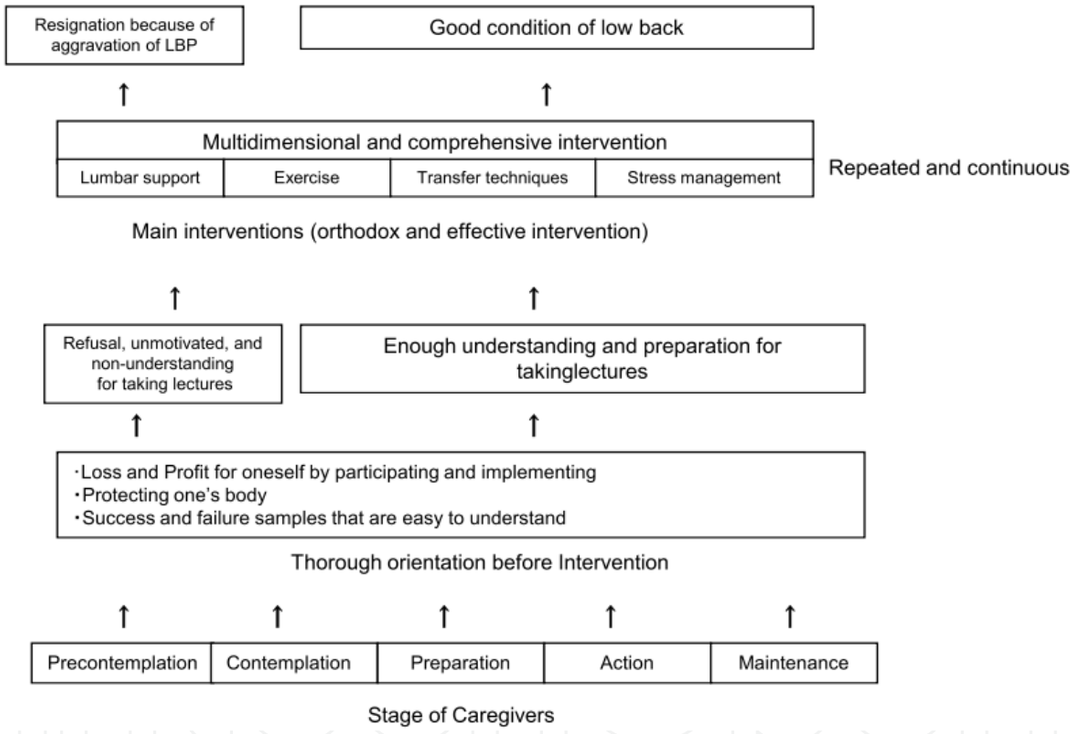


Fig. 3. Concrete educational program for prevention of LBP in nursing facility (Kamioka & Honda, 2011)

4.3.2 Research agenda

Table 5 shows the current evidence (strength of effect) and future research agenda for various interventions. Researchers should present not only the efficacy data, but also any adverse events or harmful phenomena. In particular, they should clarify problems such as muscle weakness caused by wearing lumbar support too often. In various intervention methods, the re-inspection of an effect by an appropriate study design is necessary. It is essential to scientifically explain the mechanism of effect at the same time. Furthermore, in the exercise intervention, it is

necessary to make the details of at exercise kind (contents), frequency, time and the period clear. Researcher must judge whether caregiver can enforce them as adherence practically.

Type of intervention	Evidence of effects	Research agenda
Lumbar support	Strong	Study about the timing of the use Study on adverse event such as muscle weakness
Transfer technique	Weak or poor	Can the person whom a skill is high in prevent LBP?
Stress management	Weak or poor	For stress-relieving the degree of effect? The mechanism of effect of LBP prevention by stress-relieving?
Exercise	Weak or poor	The combination of exercise that effect is high in? The degree of effect of a person having high adherence?
Cognitive behavioral theory	Weak or poor	For cognitive befavior the degree of effect? The mechanism of effect of LBP prevention by cognitive befavior?
Multidimension	Weak or poor	The most suitable combination of intervention methods?

Table 5. Current evidence and future research agenda

4.4 Study limitations

This study was based on the PRISMA statement (Liberati A et al., 2009) except for the meta-analysis. However, there were several limitations to the study. Some selection criteria were common across studies, as described above, but bias remained due to differences in eligibility for participation in each study. Publication bias was also a limitation. Although there was no linguistic restriction in the eligibility criteria, we searched studies with only English and Japanese key words. Furthermore, we could not check the references by a hand search. In addition, a nursing job (in a hospital) is essentially different from a care job (in a nursing facility), but, depending on the country, these are approximately similar working institutions. Therefore, an information bias by having included both may exist.

5. Conclusions

For LBP, it was a surprising fact that only lumbar support showed a significant effect. Female caregivers are always on a tight schedule in the workplace, which may be the main reason they are often not able to use the techniques that they learned. Therefore, we assume that even if an intervention program produces a lasting effect, continuous reinforcement is necessary. Initially, based on a transtheoretical model, identification of the stage of the participant is necessary. Then, prior to the main interventions, researchers should perform a thorough orientation to promote understanding of the program. Contents of the program should include loss and profit for oneself by participating and protecting one's body, and success and failure samples that are easy to understand.

In various intervention methods, re-inspection of the effect from an appropriate study design is necessary. It is essential to scientifically explain the mechanism of the effect at the same time.

6. Acknowledgments

We would like to express our appreciation to Ms. Makishi M. and Ms. Higashino R. for their cooperation in this study.

7. Appendix

References to studies excluded in this review

Excusi-on no.	Author. Journal (Year)	Title	Reason of exclusion
1	Rossignol M, et al. Spine (2000)	Coordination of primary health care for back pain	Not nurse or caregivers
2	Dahl JC, et al. Eur J Pain (2001)	Evaluation of a randomized preventive behavioural medicine work site intervention for public health workers at risk for developing chronic pain	Pain of neck, shoulder, and back
3	Maul I, et al. Eur Spine J (2005)	Long-term effects of supervised physical training in secondary prevention of low back pain	All employees of a large hospital
4	Pedersen MT, et al. Spine (2007)	Back muscle response to sudden trunk loading can be modified by training among healthcare workers	Nonrandomized controlled trial
5	Porru S, et al. Med Lav (2009)	Prevenzione dei disturbi del rachide nei lavoratori di un ospedale: intervento multidisciplinare e valutazione di efficacia	Nonrandomized controlled trial

8. References

Ahlberg-Hulten, G.K.; Theorell, T. and Sigala, F. (1995). Social support, job strain and musculoskeltal pain among female health care personnel. Scand J Work Environ Health, Vol. 21, pp.435-439

Atkins, D.; Best, D.; Briss, P.A.; Eccles, M. et al. (2004). Grading quality of evidence and strength of recommendations. BMJ, Vol. 328, pp.1490-1497

Boutron, I.; Moher, D.; Tugwell, P. et al. (2005). A checklist to evaluate a report of a nonpharmacological trial (CLEAR NPT) was developed using consensus. J Clin Epidemiol, Vol. 58, pp.1233-1240

Boutron, I.; Moher, D.; Altman, D. et al. (2008). Methods and processes of the CONSORT group: example of an extension for trials assessing nonpharmacologic treatments. Ann Inter Med, Vol.148, pp.W60-66

Bowen, D.J.; Kreuter, M.; Spring, B. et al. (2009). How we design feasibility studies. Am J Prev Med, Vol. 36, pp. 452-457

Cherkin, D.C.; Deyo, R.A.; Street J.H. et al.(1996). Pitfalls of patient education: limited success of a program for back pain in primary care. Spine, Vol.21, pp. 345-355

Dehlin, O.; Hedenrud, B. and Horal, J. (1976). Back symptoms in nursing aides in a geriatric hospital. Scand J Rehab Med, Vol.8, pp. 47-53

Failde, I.; Gonzalez, J.L.; Novalbos, J.P. et al. (2000). Physical and occupational predictive factors for back pain among employees of a university hospital in southern Spain. Occup Med, Vol.50, pp.591-596

Frost, H.; Lamb, S.E.; Moffett, J.A.K.; et al. (1998). A fitness programme for patients with chronic low back pain: 2-year follow-up of a randomized controlled trial. Pain, Vol.75, pp.273-279

Fujimura, T.; Yasuda, N. and Ohara, H. (1995). Work-related factors of low back pain among nursing aides in nursing homes for the elderly. J Occup Health, Vol.37, pp.89-98

Health & Welfare Statistics Association of Japan. (2006). Annual Statistical Report of National Health Conditions. pp.8-24 (in Japanese)

Hoshino, J.; Hori, Y.; Kondo, T. et al. (2009). Physical and mental health characteristics of female caregivers. Jpn J Public Health, Vol.56, pp.75-86 (in Japanese with English abstract)

Jensen, L.D.; Gonge, H.; Jors, E. et al. (2006). Prevention of low back pain in female eldercare workers: randomized controlled work site trial. Spine, Vol.31, pp.1761-1769

Jorgensen, S.; Hein, H.O. and Gyntelberg, F. (1994). Heavy lifting at work and risk of genital prolapse and herniated lumbar disk in assistant nurses. Occup Med,Vol. 44, pp.47-49

Josephson, M. and Vingard, E. (1998). Workplace factors and care seeking for low-back pain among female nursing personnel: MUSIC-Norrtalje Study Group. Scand J Work Environ Health,Vol.24, pp.465-472

Kamioka, H.; Okuizumi, H.; Okada, S. et al. (2011). Effectiveness of intervention for low back pain in female caregivers in nursing homes: a pilot trial based on multicenter randomization. Environ Health Prev Med, Vol.16, pp.97-105

Kinugasa, T.; Nagasaki, H.; Ito, H. et al. (1995). Effect of physical fitness, sports activities, and aging on low back pain for women working in nursing home. Jpn J Phys Educ, Vol.40, pp. 151-160 (in Japanese with English abstract)

Kuukkanen, T. and Malkia, E. (1998). Effects of a three-month active rehabilitation program on psychomotor performance of lower limbs in subjects with low back pain: a controlled study with a nine-month follow-up. Perceptual Motor Skills, Vol.87, pp. 739-753

Lee, S.; Colditz, G.A.; Berkman, L.F. and Kawachi, I. (2003). Caregiving and risk of coronary heart disease in U.S. women. Am J Prev Med, Vol.24, pp.113-119

Liberati, A.; Altman, D.G.; Tetzlaff, J. et al. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. Ann Intern Med, Vol.151, pp.W65-94

Menzel, N.N. and Robinson, M.E. (2006). Back pain in direct patient care providers: early intervention with cognitive behavioral therapy. Pain Manag Nurs, Vol.7, pp.53-63

Miyamoto, M.; Shirai, Y.; Takeuti, T. et al. (1998). Prospective study for the occurrence of low-back pain in newly-employed nurses educated at the back school. Orthop Surg Traumatol, Vol.41, pp.223-230 (in Japanese with English abstract)

Moher, D.; Hopewell, S.; Schulz, K.F.; et al. (2010). CONSORT 2010 explanation and elaboration: updated guidelines for reporting parallel group randomized trials. BMJ, Vol.340, c869

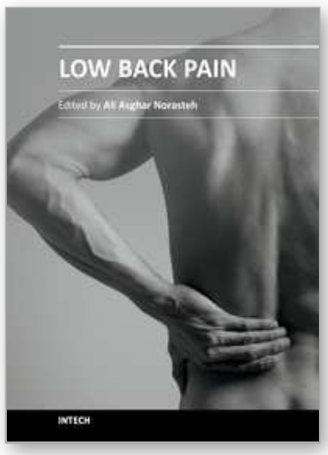
Nicholson, P.J. and D'Auria D.A.P. (1999). Shift work, health, the working time regulations and health assessments. Occup Med, Vol.49, pp. 127-137

Pinquart, M. and Sorensen, S. (2006). Gender differences in caregiver stressors, social resources, and health: an updated meta-analysis. J Gerontol Psych Sci, Vol.61B, pp. P33-45

Roelofs, P.D.; Bierma-Zeinstra, S.M.; van Poppel, M.N. et al. (2007). Lumbar supports to prevent recurrent low back pain among home care workers: a randomized trial. Ann Intern Med, Vol.147, pp.685-692

Stensson, A.L.; Stroyer, J.; Ebbehoj, N.E. et al. (2009). Multidimensional intervention and sickness absence in assistant nuring students. Occup Med, Vol.59, pp.563-569

Tsukasaki, K.; Kido, T.; Makimoto, K. et al. (2006). Naganuma R, Ohno M, Sunaga K. The impact of sleep interruptions on vital measurements and chronic fatigue of female caregivers providing home care in Japan. Nurs Health Sciences, Vol.8, pp.2-9



Low Back Pain

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This book includes two sections. Section one is about basic science, epidemiology, risk factors and evaluation, section two is about clinical science especially different approach in exercise therapy. I envisage that this book will provide helpful information and guidance for all those practitioners involved with managing people with back pain-physiotherapists, osteopaths, chiropractors and doctors of orthopedics, rheumatology, rehabilitation and manual medicine. Likewise for students of movement and those who are involved in re-educating movement-exercise physiologists, Pilates and yoga teachers etc.

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