

## Field Study

# Participatory Action Oriented Training for Hospital Nurses (PAOTHN) Program to Prevent Musculoskeletal Disorders

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**Abstract: Participatory Action Oriented Training for Hospital Nurses (PAOTHN) Program to Prevent Musculoskeletal Disorders: Jong-Eun LEE, et al. Johns Hopkins University, School of Nursing, USA—Objectives:** The purpose of this study was to construct and test the feasibility and potential utility of a Participatory Action Oriented Training for Hospital Nurses (PAOTHN) program to prevent work-related musculoskeletal disorders. The PAOTHN program emphasized the active participation of nurses, resulting in practical and low-cost solutions for improving their work environment by reducing risk factors of musculoskeletal disorders. **Methods:** The PAOTHN program was conducted in a hospital located in a suburb of Seoul, South Korea. Of the 24 units in the hospital, 16 units participated in the study. The main components of the intervention were a series of structured workshops, continuous technical assistance by the research team, and periodical forums for sharing “best practices” among the participants. **Results:** Through the workshops, head nurses of the participating units identified a total of 46 strategic (23 short-term and 23 long-term) plans for reducing musculoskeletal disorders risks across five dimensions: (1) patient care and treatment, (2) safe handling of drugs, medical devices, and equipment, (3) workstation design, (4) physical environment, and (5) welfare facilities and administration. Over the course of the year-long project, 18 of the suggested plans were completed, for an overall completion rate of 39.1%. **Conclusions:** The PAOTHN program was found to be feasible and potentially useful in reducing the musculoskeletal disorder risks faced by hospital nurses, and in identifying both risk factors and improvement

opportunities at the individual and organizational levels. (*J Occup Health 2009; 51: 370–376*)

**Key words:** Hospital, Musculoskeletal disorders, Nurse, Participatory approach

Hospital nursing tasks are generally complex and involve many physical activities that can lead to acute and chronic work-related musculoskeletal disorders<sup>1–4</sup>. A number of studies have indicated that many nurses report musculoskeletal symptoms resulting from tasks involving musculoskeletal loads<sup>5, 6</sup>. In 2005, according to the U.S. Bureau of Labor Statistics, nursing personnel suffered from the second highest rate of musculoskeletal disorders, along with manual laborers and heavy tractor-trailer truck drivers<sup>7</sup>. The high prevalence of musculoskeletal disorders among hospital nurses may have an even larger societal impact in the future as nursing shortages become a major health care delivery issue in many developed countries.

In light of this urgent need, we have developed and conducted a participatory approach-based program to prevent musculoskeletal disorders among hospital nurses. Based on the principles of the Participatory Action Oriented Training (PAOT) program, we designed a Participatory Action Oriented Training for Hospital Nurses (PAOTHN) program. In recent years, a number of PAOT programs have been conducted, including the Work Improvement in Small Enterprises (WISE) program reported in 1994<sup>8</sup>), the Work Improvement in Neighborhood Development (WIND) program in 1992<sup>9</sup>), and the Participatory Oriented Safety Improvement by Trade Union Initiative (POSITIVE) program in 1997<sup>10</sup>).

The PAOT program approach was originally developed by Thurman, Louzine, and Kogi (1988)<sup>11</sup>) and has been applied to various workplace settings, but not previously to nurses. The effectiveness of the PAOT program has been well documented through successful implementation

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of effective low-cost solutions to problems in various workplaces settings, such as small enterprises<sup>8,12</sup>, farm villages<sup>9</sup>, and workplaces<sup>10</sup>. The most innovative and vital aspect of the PAOT program is the participatory approach, which offers a reasonable alternative to traditional field-oriented training programs. Workers, supervisors, and managers have first-hand experience of their work, and they all constitute very important sources from which to develop practical ideas for ways to improve safety, health, and efficiency at work<sup>13</sup>. The approach taken in the present study was to encourage nurses to become voluntarily be involved in improvement activities, through the use of an organized system that featured active participation as well as cooperation between management and the work force.

We now describe the implementation and evaluation of the PAOTHN program in a hospital nursing setting.

## Subjects and Methods

### Subjects

We chose a medium-sized (698-bed) university hospital located in the suburbs of Seoul, the capital of South Korea, because this hospital was representative of the majority of suburban hospitals in Korea in terms of size and nursing care systems, including the nature of the nursing tasks and responsibilities.

Sixteen head nurses functioning as unit managers (of seven general wards, four intensive care units, one operating room, one emergency room, one hemodialysis room, one delivery room, and one outpatient center) participated in the formative phase of the study as facilitators. The staff nurses from their respective units also participated in the implementation phase of the study. Before recruitment began, the researchers met with the hospital board and union members to obtain their approval and support for the study.

### Procedure

The PAOTHN program, which was based on the components and theories of the PAOT approach<sup>11</sup>, was applied to the prevention of musculoskeletal disorders and was specifically developed to emphasize nurse participation. There were two phases to the study: a development phase, followed by an implementation and evaluation phase.

In order to successfully implement a series of participatory workshops, we formed a multidisciplinary research team comprised of two nursing professors, one nursing doctoral student, three physicians specializing in occupational health, one ergonomist, two industrial hygienists, six head nurses, and one occupational health nurse. The research team developed an intervention protocol that included a comprehensive tool kit. This tool kit consisted of an example of a related action checklist and successful examples of practical solutions

to local problems, and guidelines for group exercises and discussions based on the literature and on the findings from the formative phase of the study. In order to facilitate the participatory process with regard to reducing the risk factors for hospital nursing task-related musculoskeletal disorders, the research team developed an action checklist adapted from the list originally developed by Kogi and Kawakami<sup>14</sup>. The checklist focused on five types of nursing tasks and 43 items that were closely related to the musculoskeletal strain experienced by nurses: (1) patient care and treatment (8 items); (2) safe handling of drugs, medical devices, and equipment (7 items); (3) workstation design (11 items); (4) physical environment (6 items); and (5) welfare facilities and administration (11 items). Items in the patient care and treatment area included principles related to the proper position of the devices used (e.g. portable lifting device, sliding boards, and chair) or team lifting skills used while conducting patient care such as transferring, lifting, or injection. Items regarding the safe handling of drugs, medical devices, and equipment focused on avoiding musculoskeletal loads while handling medical advices and equipment on carts with a stepper, and proper wheels as well as on improving easy access to drugs. Items addressing workstation design included using adjustable tables and installing multi-level shelves or racks. Items addressing the physical environment for providing an adequate work environment included light, noise, temperature, and humidity. Items addressing welfare facilities and administration included improvement of facilities for resting and hygiene, and activities for musculoskeletal disorders prevention such as education, safety, and health policies.

The research team agreed upon the following steps in order to develop a comprehensive intervention to reduce musculoskeletal disorders risk: (1) an action checklist exercise, group discussion, and workshop presentation for participants; (2) implementation of improvements by the participants; (3) follow-up visits; (4) an interim presentation of achievements with regard to risk reduction for musculoskeletal disorders; and (5) an achievements contest.

### *Participatory workshop, follow-up visits, and achievements contest*

The participatory workshop was held with 16 head nurses and conducted as follows: First, the facilitators presented the principle and action checklist in the first session, and then participants visited the assigned unit to implement the action checklist. They could recognize good points and points to be improved through this exercise. After they came back to the conference room, the facilitators explained local good examples, such as photographs and principles to improvement according to the five areas: (1) patient care and treatment, (2) safe

**Table 1.** Improvements by action plans

| Areas  | Implementation of improvement |           |
|--|-------------------------------|-----------|
|  | Short term                    | Long term |
| Patient care and treatment   |                               |           |
| Use a chair/stool while conducting patient care                                | 3                             | 1         |
| Subtotal   | 3                             | 1         |
| Safe handling of drugs, medical devices, and equipment                         |                               |           |
| Use suitable chart boxes   | 1                             |           |
| Put labels on injection boxes at eye level                                     | 1                             |           |
| Store injections in a designated storage place                                 | 1                             |           |
| Place frequently used medicine at chest level                                  | 1                             |           |
| Halve the weight of salt packages  | 1                             |           |
| Use nippers to take out empty salt packages in the water purification facility | 1                             |           |
| Change the wheels of medical equipment   | 1                             |           |
| Place frequently used medicine within an easily accessible range               | 1                             |           |
| Store medical supplies in a designated place                                   | 1                             |           |
| Subtotal   | 9                             |           |
| Physical environment   |                               |           |
| Provide extra headsets   |                               | 1         |
| Subtotal   |                               | 1         |
| Welfare facilities and administration  |                               |           |
| Education on prevention of musculoskeletal disorders                           | 2                             |           |
| Provide a resting room for nurses  | 1                             |           |
| Provide washing facilities in the nurses' room                                 |                               | 1         |
| Subtotal   | 3                             | 1         |
| Total  | 15                            | 3         |

handling of drugs, medical devices, and equipment, (3) workstation design, (4) physical environment, and (5) welfare facilities and administration. In the final session, each participant presented a short-term (within 3 mo) and a long-term (within 6 mo–1 yr) action plan for preventing musculoskeletal disorders in their own unit. A closing ceremony was held in which the facilitator distributed certificates. The participants as facilitators went to their own units and played a role as agents of change in improving working conditions to reduce risk factors of musculoskeletal disorders.

After the participatory workshop, the researchers regularly visited the units. They collected evidence of risk-reduction achievement with photographs, recorded achievements on the observation sheet, and monitored the participants' progress. The observation sheet had the name of the head nurse and the unit as well as the cost, duration, and resulting effect of the improvements. Researchers also encouraged both the head nurse and the staff nurses to continue working toward improvement. The head nurses actively motivated the staff nurses to address risk factors for musculoskeletal disorders. All of the head nurses and their respective staff nurses met

in a conference room and presented their units' achievements. While all the participating units were commended for their efforts in improving their working environment, the three most creative and practical methods with the most significant impact were also given recognition as winners of the contest.

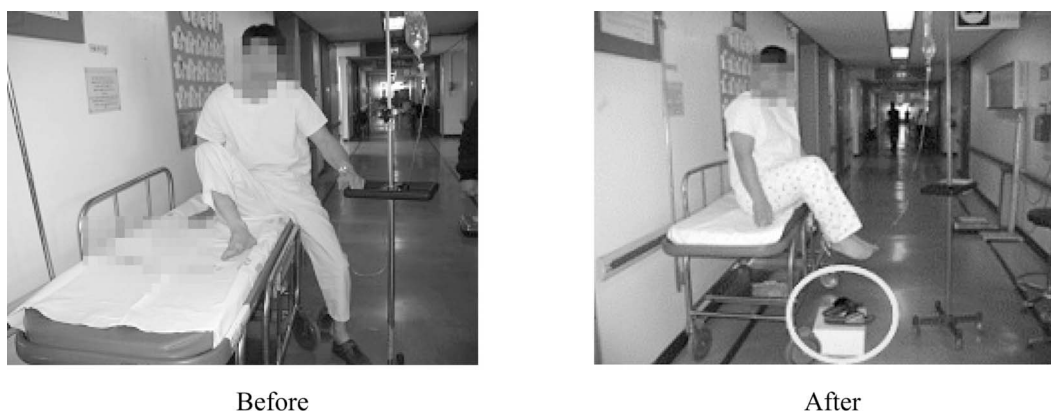
## Results

### *The number of plans for decreasing risk factors for musculoskeletal disorders*

At the participatory workshop, a total of 46 strategic improvement plans were presented (23 short-term and 23 long-term plans). Of the 46 plans, 18 (39.1%) were completed during the study period: 15 (65.2%) of the short-term plans and 3 (13.0%) of the long-term plans. In terms of the various types of tasks implemented, 9 (52.9%) involved the safe handling of drugs, medical devices, and equipment; 4 (50.0%) involved patient care and treatment; 4 (40.0%) involved welfare facilities and administration; one (33.3%) involved physical environments; and none involved workstation design (Table 1).



**Fig. 1.** Before and after using of a chair.



**Fig. 2.** Before and after using of stepper while supporting patient.

*Examples of improvements proposed in the action plans*

Many action plans that were suggested by head nurses were both practical and feasible. For example, in the area of patient care and treatment, one suggestion was a practice guideline that specified proper posture when nurses were performing certain types of patient care involving the use of a chair (Fig. 1). Another example of a low-cost solution was that nurses utilized a low-cost stepstool next to the patient’s stretcher to reduce discomfort while supporting the patient (Fig. 2).

In the area of safe handling of drugs, medical devices, and equipment, a simple organizer was designed by staff nurses and used to organize and separate nursing charts by unit. To avoid confusion, labels were made that had the injection codes on the front, injections were stored in a designated storage place (Fig. 3), and medicine was made accessible at chest level for easy access. Labels were also placed at eye level on each box. Another example of a simple and practical solution for reducing potential risks for staff nurses involved the hemodialysis

room. Staff nurses had previously ordered 30-kg bags of salt for water purification, and nurses who carried these packages often complained about backaches. During the study process, the unit collectively decided to order smaller 15-kg salt packages instead of the 30-kg ones (Fig. 4).

In addition, old treatment carts were replaced with new ones that could hold injections and other medical supplies separately, promoting efficiency by shortening the distance to be covered in reaching for the cart’s contents and preventing unnecessary physical exertion by the nursing staff.

There was no improvement in workstation design in either the short- or long-term plans. In the physical environment category, additional headsets were provided to the patients in the hemodialysis room for use while watching television during dialysis. The number of headsets had previously been insufficient, and noise from the television sets had caused problems. By increasing the number of headsets, the noise level was significantly



**Fig. 3.** Before and after labeling and storing injections in a designated place.



**Fig. 4.** Comparison of order procedure from 30 kg salt package to two, separate 15 kg.

reduced in the room.

An improvement related to welfare facilities and administration involved the installation of a sink in the nurses' room, so that they no longer had to use the unhygienic treatment room sink. Also, at the administration level, preventive education sessions that addressed musculoskeletal disorders were conducted, together with regular follow-up related to prevention activities.

In addition to the improvement plans for each unit, 16 additional improvements were made during the study period. These included the use of a chair while preparing oral medication (two cases), keeping all injection drugs in the same place (four cases), placing frequently used drugs at chest-level height (one case), attaching wheels

to the treatment table to make it easier to move (one case), replacing the wheels on medical equipment with low-resistance rolling wheels (one case), buying medication storage boxes (one case), keeping oral medications divided into sections (one case), expanding the space in a treatment room (one case), using recycled desks (one case), revising the process for garbage disposal to avoid uncomfortable positions such as bending down (one case), using height-adjustable tables (one case), and attaching wheels to a table (one case).

### Discussion

Because most of their tasks are multidimensional and require intense physical activity, many hospital nurses suffer from musculoskeletal disorders. In this report, we

described the formative research phase of the PAOTHN program as well as the intervention development and pilot implementation phases of this participatory intervention to reduce the risk of musculoskeletal disorders among hospital nurses. This PAOTHN program emphasized active participation by nurses and produced both practical and low-cost solutions for improving their work environment by reducing risk factors for musculoskeletal disorders.

The immediate outcomes and responses of the participants to this program were overwhelmingly positive. In particular, participants felt that they were empowered, since they were not only provided with diagnostic data but also with the opportunity to propose and implement potential solutions, allowing them to make substantial contributions to the intervention. The workshop approach was useful for this kind of group intervention because it offered an opportunity to provide a relatively intensive education on the subject as well as opportunities for the strategic planning of organizational changes. In addition, it required only a minimal time commitment on the part of the study participants. Furthermore, the central process of generating changes at the organizational level, involving group thinking, group learning, and group reflection, was compatible with the workshop model. The use of structured tools, including local good examples, action checklists, and group work, proved to be useful in creating a positive work dynamic and tangible outcomes. These results were consistent with the results of the WISE program<sup>12)</sup>, which reduced the risk of musculoskeletal disorders at small enterprises in the Philippines. As a part of that program, many simple, low-cost, and innovative improvements were undertaken by the managers and workers, and stepwise and participatory actions were encouraged as effective approaches.

Although the overall completion rate for the short- and long-term plans proposed by the participating subjects in our program (39.1%) was low when compared to those reported by Kogi *et al.*<sup>12)</sup> (83%) and Yoon *et al.*<sup>15)</sup> (53.2%), the present study was meaningful because, to our knowledge, it represents the first trial based on a participatory approach to be conducted in a hospital nursing setting. Nursing tasks and environments within an institution have their own unique features, and each unit has its own particular roles. In this study, the process of designing the intervention tools, such as examples of "best practices," action checklists, and educational materials, took into consideration both nursing tasks and the respective environments in which they were carried out. This developmental study has provided support for the assertion that this kind of participatory intervention can produce effective and sustainable changes because the solutions are offered by the workshop participants themselves, and they tend to be low-cost and practical.

This approach is useful for work site improvement programs, because group members not only acquire new knowledge but also put their knowledge into practice. With regard to the content of the improvements, our results resemble those of Kogi *et al.*<sup>12)</sup> in that many changes were made to improve posture, as a means of addressing continuous, intense pressure on the body.

In our study, several simple and low-cost action items were suggested and implemented. One example was changing the ordering procedure for salt packages in order to reduce the strain produced by lifting the heavier packages. Although the intervention was simple and straightforward, it was perceived by nurses as innovative and creative in terms of improving the work environment.

Because of the cost restraints inherent in this type of feasibility study, several major suggestions for structural changes, such as improving the nurses' work stations, could not be fully implemented. However, during the implementation phase following the workshops, a staff nurse identified an inadequate work specification in a narrow treatment room as a risk factor for injury, since the space did not allow nurses to maintain a proper posture while carrying out their task in the limited space. As a result, this nurse proposed a new design to improve the environment of the treatment room that was very low-cost and innovative. The hospital accepted the proposed design to expand the space of the treatment room and to minimize the working distance, and it was successfully implemented while reducing musculoskeletal load.

One of the unanticipated consequences of this study was the improved communication and respect engendered between hospital administrators and staff nurses. The outcome of our ongoing process evaluation also indicated that this participatory intervention approach, teaming the nurses up with the researchers, was very positively received. Because of their work experience, the nurses were able to identify potential risk factors for musculoskeletal disorders and then propose and implement reasonable solutions to the problems they identified. The fact that the risk reduction effort was shared with the researchers who assumed the responsibility for following the implementation process and conducting the evaluation, was appreciated by the nurse managers, many of whom felt overburdened by their daily tasks, including the management of staff nurses. The team approach in which nurse managers and researchers acted as partners produced mutually beneficial strategies for achieving the main aims of this study.

We believe that the PAOTHN program is potentially effective for reducing risk factors and providing a new and practical model for injury prevention efforts that are directed at staff nurses in a hospital setting. The participatory approach is particularly useful for staff nurses in hospital settings because it not only empowers individual nurses but also increases the effectiveness of

the entire nursing group as agents who can effect changes to improve their own working environments. We also believe that the findings of this pilot study have a high degree of applicability to other hospital settings, since the location and setting studied here are very typical of hospitals in South Korea.

In conclusion, this PAOTHN program for hospital nurses has potential significance for the wider nursing community. Future studies that focus on rigorous implementation and evaluation of the PAOTHN program, as well as other prevention studies using a participatory approach, are warranted to promote healthier working environments for hospital nurses.

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