

## (PAOT)

### Abstract

### Application of Participatory Action-Oriented Training (PAOT) to Small and Medium Sized Enterprises for Prevention of Work-related Musculoskeletal Disorders

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**Objectives:** The purpose of this study was firstly to introduce a Participatory Action-Oriented Training (PAOT) program for the prevention of work-related musculoskeletal diseases (WRMSDs) in Small and Medium sized Enterprises in the Gumi Industrial Zone, and secondly to assess its effect.

**Methods:** Two PAOT workshops to prevent WRMSDs were conducted with 39 volunteer participants from 10 companies selected (on a first-come, first-served basis) among 200 small- or medium-sized enterprises in Gumi. These companies had been provided with mandatory occupational health management agency services for Small and Medium sized Enterprises by an occupational medicine clinic. Each workshop consisted of 6 technical sessions and one closing ceremony. At the 1st session, the principles of each action checklist item were explained and an on-site checklist exercise was carried out. The 2nd to 5th sessions presented good example pictures on 4 subjects: material storage and handling, working environment, work organization and work-related welfare. Group discussions were carried out by the participants. In the final 6th session on the implementation of improvement, each participant was asked to present 6 action plans, 3 short-term and 3 long-term, for their own workplace improvement.

**Results:** Overall, the participants worked out 47 real action plans, 27 short-term and 20 long-term, for improvement of their own workplaces. Three to 6 months after the workshops, through in-person visits to each company, it was confirmed that more than half of these 47 plans had been completed; 25 plans (53.2%) had been completed as planned, 8 (17.0%) were in processing, and 14 (29.8%) had not yet been put into practice.

**Conclusions:** The study findings confirmed that the PAOT program holds strong potential as an intervention method to prevent WRMSDs in Small and Medium sized Enterprises, although the final results have not been fully assessed yet.

**Key Words:** Work-related musculoskeletal diseases (WRMSDs), Small and Medium sized Enterprises, PAOT (participatory action oriented Training)

(Kogi et al, 2003). PAOT

.(Rampal et al, 1996; Batino, 1997; Conferido, 1997; Kawakami et al, 1998; Khai et al, 2002; Kogi et al, 2003).

2001	5,653
가 1,634	28.9%(
2001), 2002	5,417 1,827 33.7%(
, 2002), 2003	9,130 4,532
49.6%(	, 2003), 2004
9,183 4,112	
44.8%(	, 2004)

PAOT가

300

(Ahn , 2002).

PAOT

PAOT

(Kim , 2004a; Kim , 2004b).

2003 2004  
PAOT

가

PAOT

(Participatory Action-Oriented Approach Program, PAOAP)

(ergonomics program) (participatory ergonomics) 가 , , , , , 가 , , ,

2

48

(Israel et al, 1989; Moore & Garg, 1996; Moir & Buchholz, 1996; Albers et al, 1997; Bohr et al, 1997; Zalk et al, 1997; Evanoff et al, 1999; Rosecrance & Cook, 2000; Zalk et al, 2000).

가  
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3가

3가

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(Buckle &

1. PAOT

Devereux, 1999; Jafry & O'Neill, 2000).

1994 1996

PAOT

(Participatory

Action-Oriented Training, PAOT)

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(Batino, 1997),

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5 48  
(Table 1, Fig. 2). 가 2~3

200

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3가

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3. PAOT

가 가

2003 10 23 , 24

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2004 2 20 가

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PAOT

Fig. 1

3가

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3~6

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근로자에게 정한 예방을 위한 PAOAP 워크샵 일정

□ 2월 20일(금) 08:40~18:00

08:40~09:00 등록  
09:00~09:20 PAOAP 워크샵에 대한 오리엔테이션 유국현 소장

1. 09:20~11:20 Session 1. Workplace Checklist(사업장 체크리스트 작성)

- 1) 09:20~09:40 체크리스트 작성에 관한 오리엔테이션 문 정용 선생
- 2) 09:40~10:00 개별요법(주) 회차 설명
- 3) 10:00~10:30 작업장 순시 및 체크리스트 작성 실습
- 4) 10:30~11:10 체크리스트 작성결과 3가지 좋은 점 및 개선할 점에 관하여 그룹토의 및 발표자로 경리
- 5) 11:30~11:30 그룹토의 결과 발표

11:30~12:30 점심식사

2. 12:10~13:10 Session 2. Material storage & handling (차재, 운반차 보관 및 이동)

- 1) 12:30~12:30 발표 및 사례발표 : 이 경희 (산업위생과)
- 2) 12:30~12:30 그룹토의
- 3) 12:30~13:10 그룹발표

3. 13:10~14:10 Session 3. Work station design(작업스테이션 설계)

- 1) 13:10~13:30 발표 및 사례발표 : 정 국희 (간호사)
- 2) 13:30~13:30 그룹토의
- 3) 13:30~14:10 그룹발표

14:10~14:20 Coffee break

4. 14:20~15:20 Session 4. Working Environment(작업환경)

- 1) 14:20~14:40 발표 및 사례발표 : 윤 영철 (간호사)
- 2) 14:40~15:00 그룹토의
- 3) 15:00~15:20 그룹발표

5. 15:20~16:20 Session 5. Work organization & Work-related Welfare facilities (업무조직 & 작업관련 복지시설)

- 1) 15:20~15:40 발표 및 사례발표 : 김 명숙 (간호사)
- 2) 15:40~16:00 그룹토의
- 3) 16:00~16:20 그룹발표

16:20~16:30 Coffee break

6. 16:30~17:30 Session 6. Implementation of improvement (개선책 실행)

- 1) 16:30~16:50 발표 및 사례발표 : 김 진서 (회사)
- 2) 16:50~17:10 그룹토의
- 3) 17:10~17:30 그룹발표

17:30~17:40 Coffee break

7. 17:40~18:00 Closing ceremony

- 1) 17:40~17:50 워크샵에 대한 평가
- 2) 17:50~18:30 +무음 +무어 +무노 감사회 운영
- 3) 18:00 퇴회

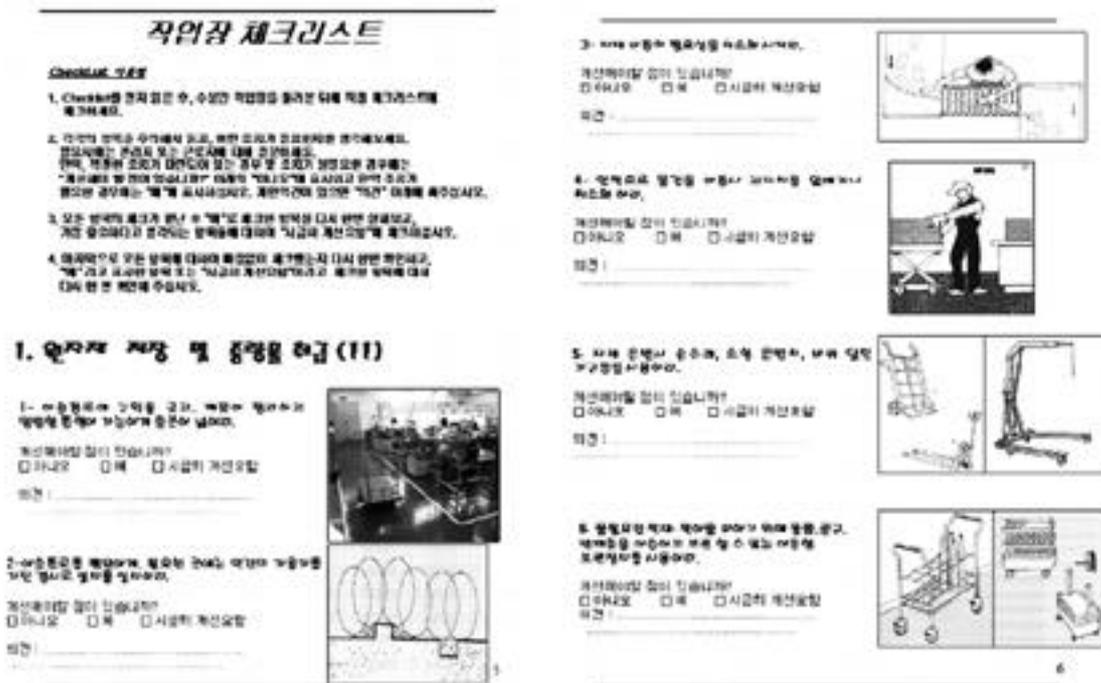
18:00 ~ 저녁식사 및 뒷풀이

Fig. 1. Schedule of second PAOT workshop.

. PAOT 가 가 가 가

**Table 1.** 48 items listed in the action checklist used in the Participatory Action-Oriented Training (PAOT) workshop

- I. Materials storage and handling  
 1. clear transport ways; 2. keep transport ways wide, even; 3. use carts, hand trucks; 4. provide multi-level shelves or storage racks; 5. use specially designed containers; 6. use mobile storage racks; 7. use hoists, conveyers; 8. provide good grips or holding points
- . Machine safety  
 9. attach proper guards; 10. Use safety devices; 11. use mechanical devices for machine feedings; 12. attach labels and signs with color easy to read; 13. make sure machines are well maintained and have no broken or unstable parts; 14. make emergency switches clearly visible and easy to reach.
- . Work station  
 15. adjust working height for each worker at elbow-height; 16. use platforms and work item holders; 17. put within easy reach of workers; 18. use jigs, clamps, vices; 19. use hanging tools ; 20. home for each tool; 21. alternate standing and sitting; 22. provide chairs or benches with a back rest.
- . Physical environment  
 23. add sky lights; 24. paint walls in light colors; 25. lighting adequate for the type of work; 26. provide local task-lights; 27. relocate light sources or provide shields; 28. move the sources of dust, hazardous chemicals; 29. install screens, partitions or barriers; 30. containers of hazardous chemicals have a labels; 31. all organic solvents, paints, glues, etc are in covered containers; 32. indicate the use of personal protective equipment must be observed; 33. local exhaust ventilation; 34. safe wiring connectors for supplying electricity; 35. improve heat protection; 36. increase natural ventilation; 37. enough fire extinguishers
- . Welfare facilities  
 38. cool and safe drinking water; 39. cleaned toilets and washing facilities; 40. resting corners and a separate hygienic place; 41. first-aid equipment and train a qualified first-aider; 42. personal protective equipments
- . Work organization  
 43. combine tasks to make the work more interesting and varied; 44. small stock of unfinished products (buffer stock); 45. provide short breaks; 46. establish safety and health policies; 47. keep accident and health records; 48. train workers to increase their initiative safety and health improvements.



**Fig. 2.** Examples from PAOT action checklist.

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PAOT 가 28  
(87.5%)  
가  
가 32 12 (37.5%) ,  
11 (34.4%)

**Table 2.** Self evaluation results of participants for PAOT workshop (N=32)

	Strongly agree (%)	agree (%)	disagree (%)	strongly disagree
Action checklist	11 (34.4)	20 (62.5)	1 ( 3.1)	0
Materials storage and handling	7 (21.9)	25 (78.1)	0	0
Machine safety*	3 ( 9.4)	9 (28.1)	1 ( 3.1)	0
Work station	5 (15.6)	25 (78.1)	2 ( 6.3)	0
Physical environment	7 (21.9)	21 (65.6)	4 (12.5)	0
Welfare facilities and work organisation	10 (31.3)	21 (65.6)	1 ( 3.1)	0
Implementation of improvement	8 (25.0)	21 (65.6)	3 ( 9.4)	0
Group discussion	12 (37.5)	20 (62.5)	0	0
Benefit of workshop for improvement	9 (28.1)	23 (71.9)	0	0
Recommend to colleague to participate	9 (28.1)	23 (71.9)	0	0

\* Skipped at second workshop

**Table 3.** Action plan which are presented at last technical session of workshop, implementation of improvement

Type of industry of participants	Short term action plan	Long term action plan
Ceramics	spring ballans for spray guns additional local illumination at packaging part improve work table height and make an height adjustable work-station	change color of workplace to more bright one make additional resting corner
Electronics manufacturing	stretching exercise before work begin safety cover for rotating part provide local ventilation for field office located in workplace	provide facility for heath promotion adjust all work station height to proper level
Electronics manufacturing	provide resting corner use rolling cart in cleaning process provide mat for standing workers	make sure of enough parking place
Electronics manufacturing	exchange dinning dish and adjust height of sink make small inclination way for moving	removal of old machine and improve of workplace line lay-out provide clean water and resting corner
Metal fabricating	improve local exhaust ventilation for hot press make place for organic solvent container	make new machine which can adjust work table height
Paper box manufacturing	local exhaust ventilation for printing machine additional welfare facility and maintenance provide booth for water supply	revise printing machine for ergonomically profit
Rubber fabricating	provide mat for standing worker additional safety warning label more periodic check and education for safety work	resting corner, shower room for woman, excercise room. automatic shutter for entrance minimize box and product



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(Table 3).

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47 (53.2%), 8 (17.0%), 25 가  
14 (29.8%)

3  
가 9 (19.1%)  
(Table 4). 가 Fig. 3

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PAOT 1982 ILO (International Labor Organization) . PAOT  
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WISE (Work Improvement in Small Enterprises) . PAOT  
2,000 가

Can Tho Hanoi , , , WISE 가

PAOT POSITIVE (Participatory Oriented Safety Improvement by Trade Union Initiative) 1994

PAOT 가가

가 가

(Khai et al, 2001).

6가 . PAOT

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가 (, 2001).

PAOT

가 가

(53.2%)

(Rosecrance & Cook, 2000), 가

(19.1%)

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1997) . Moore Garg (1996,

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(Bohr et al, 1997).

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(Evanoff et al, 1999).

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Albers (1997) 가

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가가

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(Buckle & Devereux, 1999; Jafry & O'Neil, 2000).

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가 (Rainbird & O'Neil, 1995; Tandhanskul et al, 1995; Koda et al, 1997; Kawakami et al, 1999; Jafry & O'Neil, 2000).

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(Kogi et al, 2003)가

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 47 25 (53.2%),  
 8 (17.0%),  
 14 (29.8%)

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