Southeastern Coastal Center for Agricultural Health and Safety

Chronic low back pain in seafood workers – a pilot intervention study to identify work and movement solutions

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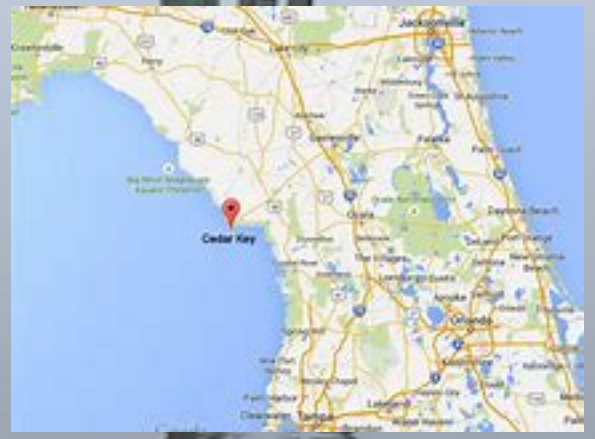
Background

- Limited research of musculoskeletal disorders and pain in seafood workers - focus on incidence. [1-6]
- Chronic low back pain impacts health, productivity, and retention in the seafood industry[1-6] and is a risk factor for substance misuse.
- Rigorous lifting and sustained positions are necessary components of clam worker industry,[6] increasing risk for LBP.

Low back pain in seafood workers



Low back pain identified as a major problem for clam workers in Cedar Key FL

Factors contributing to LBP in seafood workers

- High lifting loads
- Repetitive movement
- Variable external environment

- Prolonged static positions (sitting & standing)
- Unstable, slippery surfaces requiring fixed leg positions
- Culture of regarding pain as “part of the job”

Self-management for low back pain

- Pain management tailored to each person's experience - promoting and enabling self-management of pain.[7]
- Active involvement in managing pain improves outcomes and reduces costs.[7-14]
- There is limited information of efficacy of self-management for specific groups.[9,10]
- The clam worker industry requires interventions that are applicable in their work settings.
- Potential for self-management options such as modification of movement, but no information of feasibility for seafood workers.

Participatory ergonomic approaches

"Participation of those performing work activities using a problem solving approach to address risk factors."[15]

- Alternate work flow or processes, equipment modifications and team approaches are identified through input and active participation. [15-19]

- Goal is to minimize accumulation of concentrated stress in specific areas.[20]

Purpose

1. Identify modifiable, sector-specific work and movement solutions with potential to reduce the burden of chronic lower back pain

2. Determine the extent that participants adopt identified solutions, and impact on functional difficulty

Phase I (Feasibility Participatory Ergonomic Approach) - Methods

Task analysis

- Observation & video
- Video clips review from surveillance study*
- Focus groups
- Surveys

Prioritization of tasks & pilot intervention

- 9 participants, 3 teams
- Feasibility of solutions
- Self-selection of options developed from initial observations using video clips collected from task analysis for discussion
- Outcomes – Oswestry Disability Index, Patient Specific Functional Scale, adoption of solutions

*Kane A. Occupational health and safety surveillance of gulf seafood workers. http://www.sccahs.org/index.php/about/research-projects/

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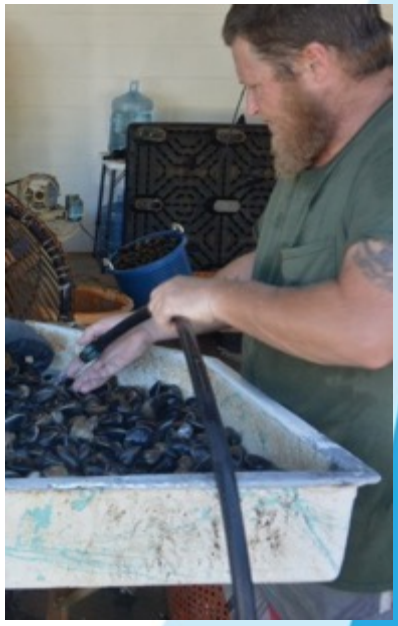
Major Problematic Tasks

- Lifting boxes, baskets 7/9
- Standing at grader/tumbler/raceways 6/9
- Dumping baskets into tumbler or bags into baskets 4/9
- Picking up bags from grader 2/9
- Pulling bags from ocean 2/9
- Sitting at grader 1/9

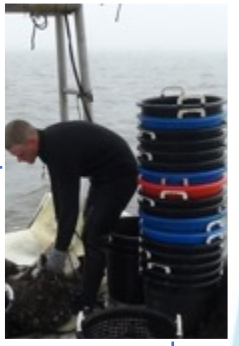


Participant characteristics (n=9, 3 teams)

	Mean (SD)	Range
Age	42 (8)	26-54
Time seafood worker	20 (11)	0.6-40
Age LBP onset	26 (10)	12-40
Length of LBP (months)	127 (73)	48-240
Disability (ODI)	24.4/100 (4.8)	18-32
Work-related difficulty (PSFS)	65.9 /100 (16.9)	36.7-90
Work-related pain (PSFS),	55.2/100 (9.4)	43.3-70

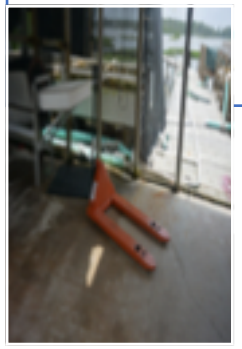
Initial solutions

Work process

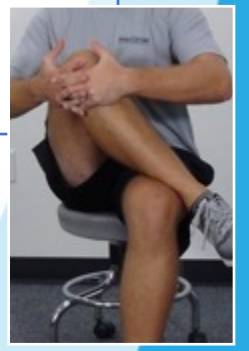


Movement adjustment

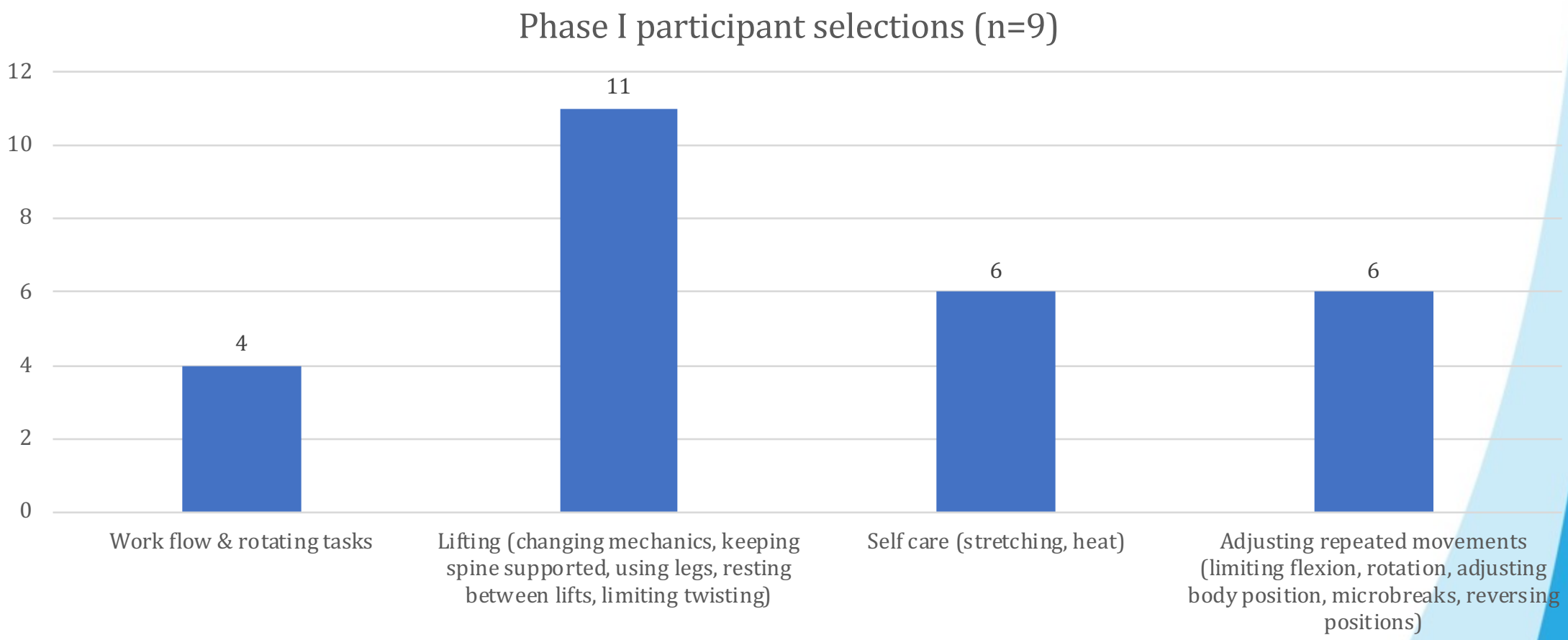
Equipment



Self-care pain



Self-management choices (3 per participant)

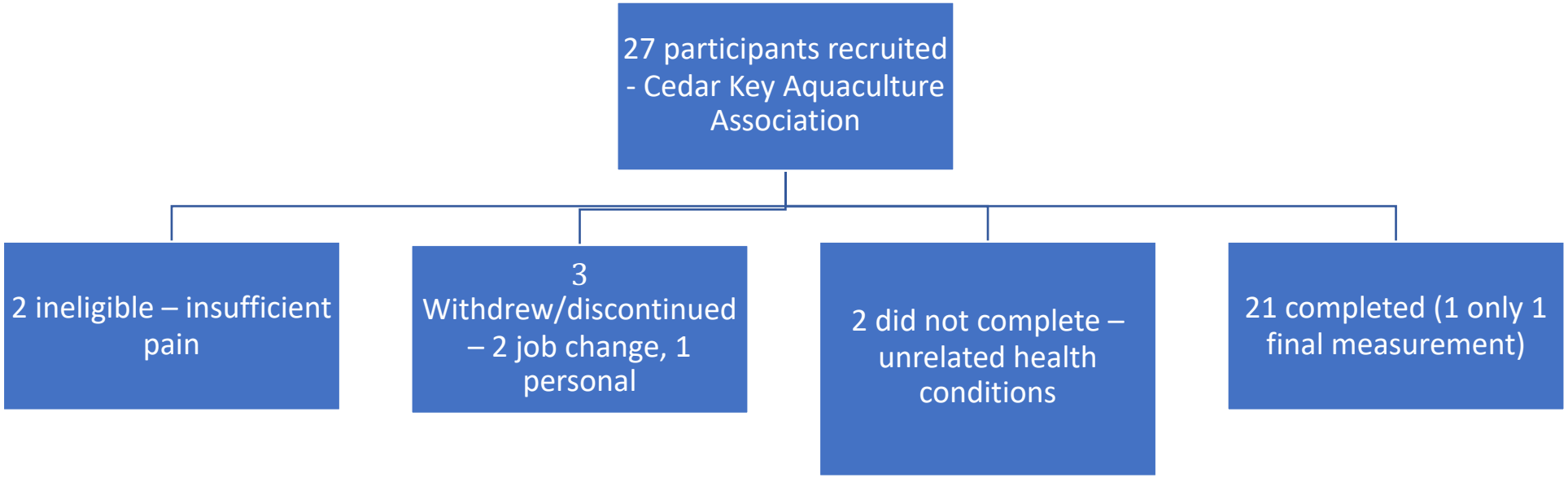


Outcomes & Modified Methods

- Prioritized and trimmed number of selection possibilities for self-management choices
  - Focus on team and individual work modifications
  - Integrated self-care into work or individual options
- Developed video demonstration clips
- Added measurements (baseline 4 weeks, final 2 weeks) due to variability of workload
- Added visual analogue scale (0-100) for average, most, least pain
- Added weekly text or phone reminder system
- Added individual video feedback choice for participants

Methods– Phase II

Aim: Determine the extent that participants adopt identified solution(s), and impact on functional difficulty



Methods Phase II:

Focus group - Introduction principles (videotapes, demo) Selection strategies

Individual videotape feedback

Focus group – feasibility, impact, suggestions

Baseline (4 wks)

Surveys

Self –management

3 strategies 8 weeks

Weekly text/phone follow up

Post

Surveys (2 weeks)

Phase 2 Participant characteristics (n = 21)

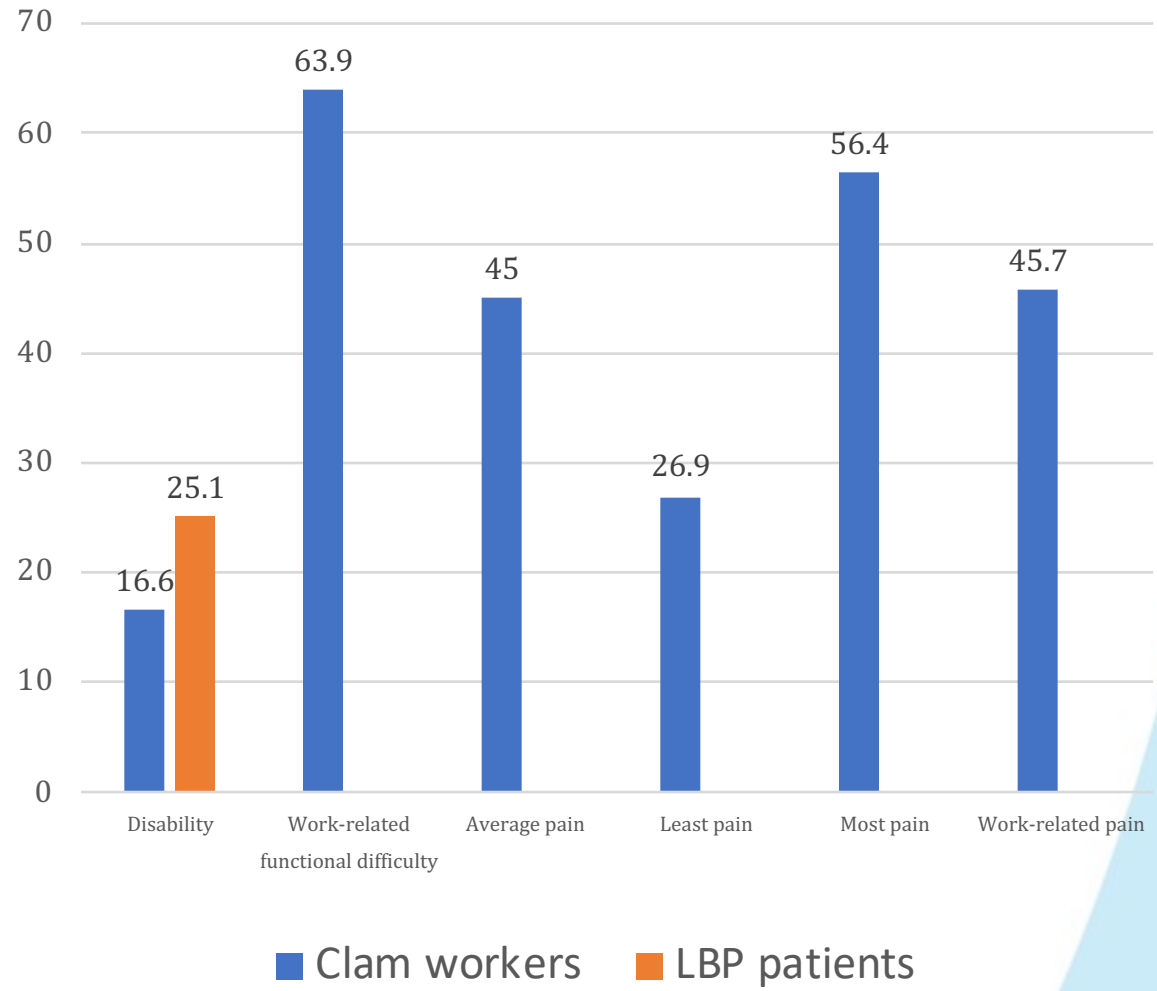
	Mean (SD)	Range
Age	35 (13)	18-65
Time in industry (yrs)	11 (10)	0.3-43
Age LBP onset (yrs)	24 (7)	16-40
Length of LBP (months)	60 (60)	3-240
Days pain past week	6 (1)	4-7

Disability & Pain

Participants reported relatively:

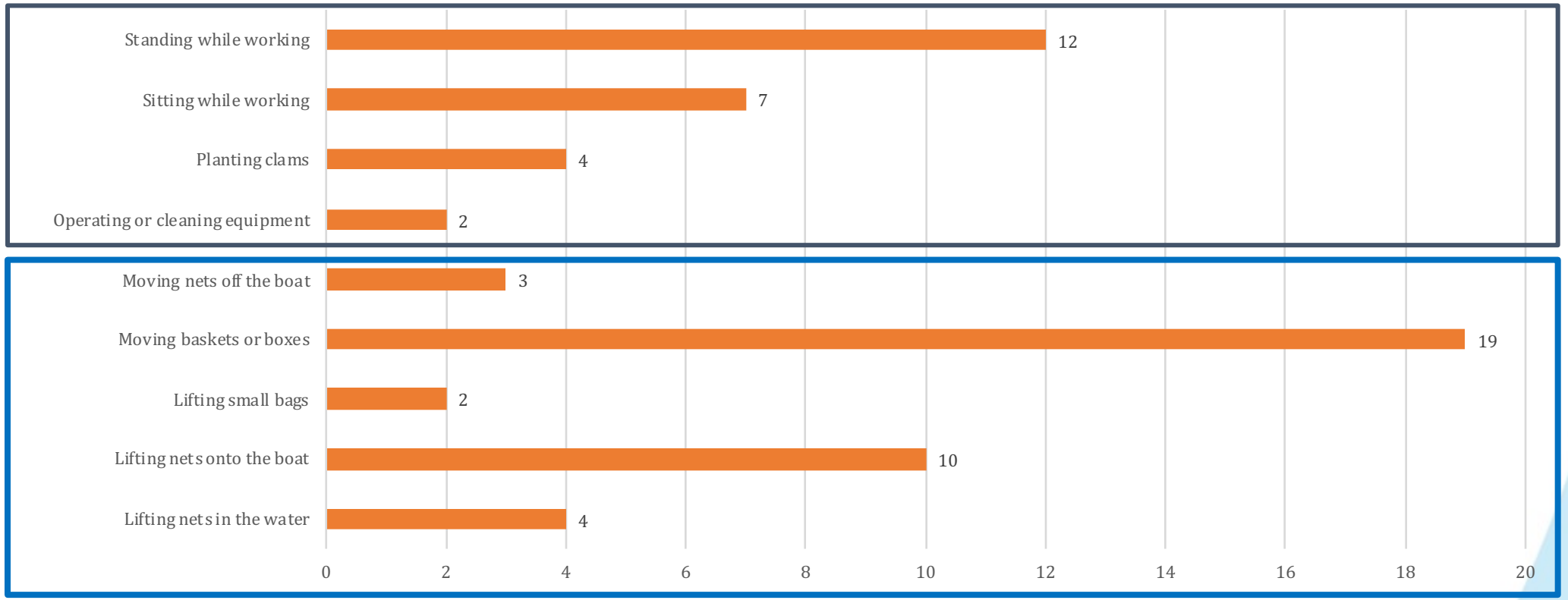
- Low disability, moderate work-related difficulty
- Moderate average/work-related pain

(Baseline 4 week average)



Comparison to data from Chiarotto [4]

Most difficult work activities



Frequency of tasks reported in top 3 most difficult (n=21, total 63)

Repetitive Movement/Prolonged positions

Sitting or bending

Lifting


NeoSport

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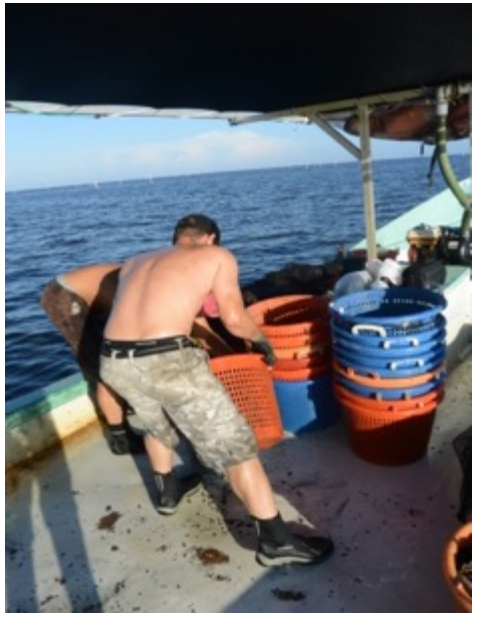
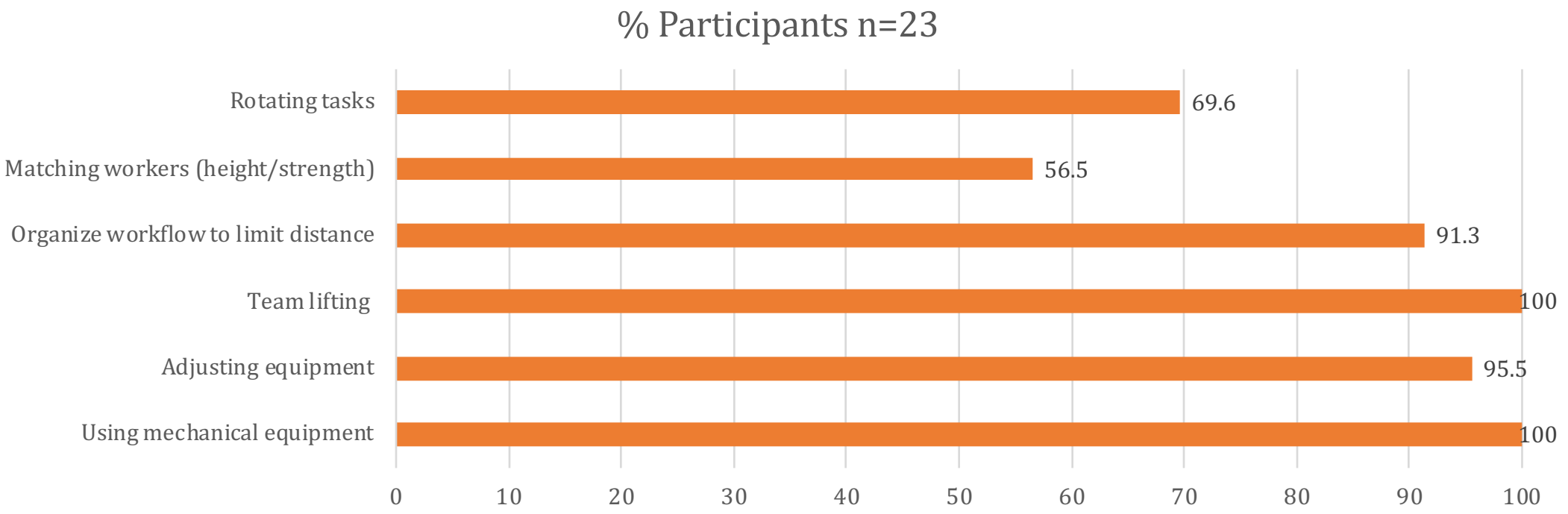


RESULTS

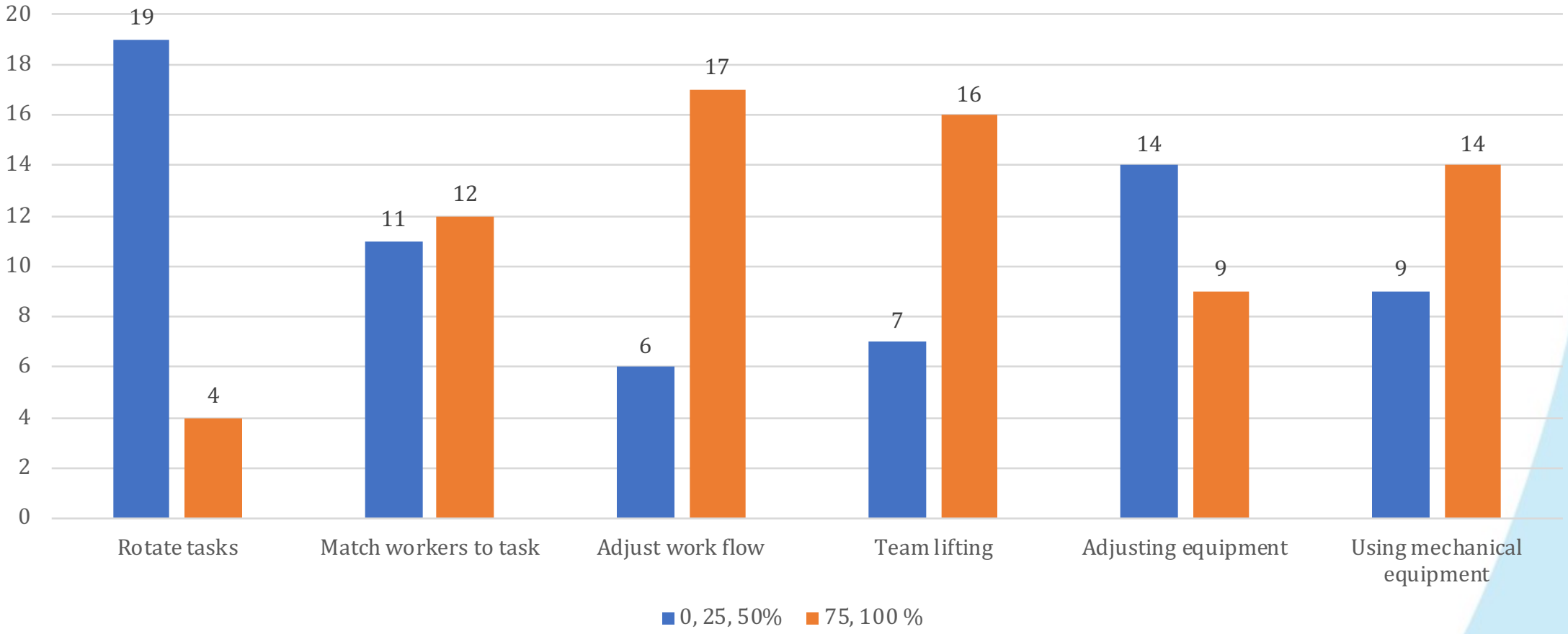
Work adjustments (team)

Work approaches impacting team		n=23
Work task/process adjustments	1. Rotate work tasks in team 2. Match tasks to worker (height/strength) 3. Organize work flow or process to limit distance load is moved	7 4 1
Team lifting	1. Lifting (more than one person lifting boxes, nets, baskets)	13
Equipment adjustment or use 	1. Adjust or organize equipment to decrease stress on workers (eg. Height of sorter, distances on boat, platforms, position equipment to decrease distance loads are moved) 2. Use mechanical equipment (forklifts, hoists, pulleys, mobile platforms)	3 10



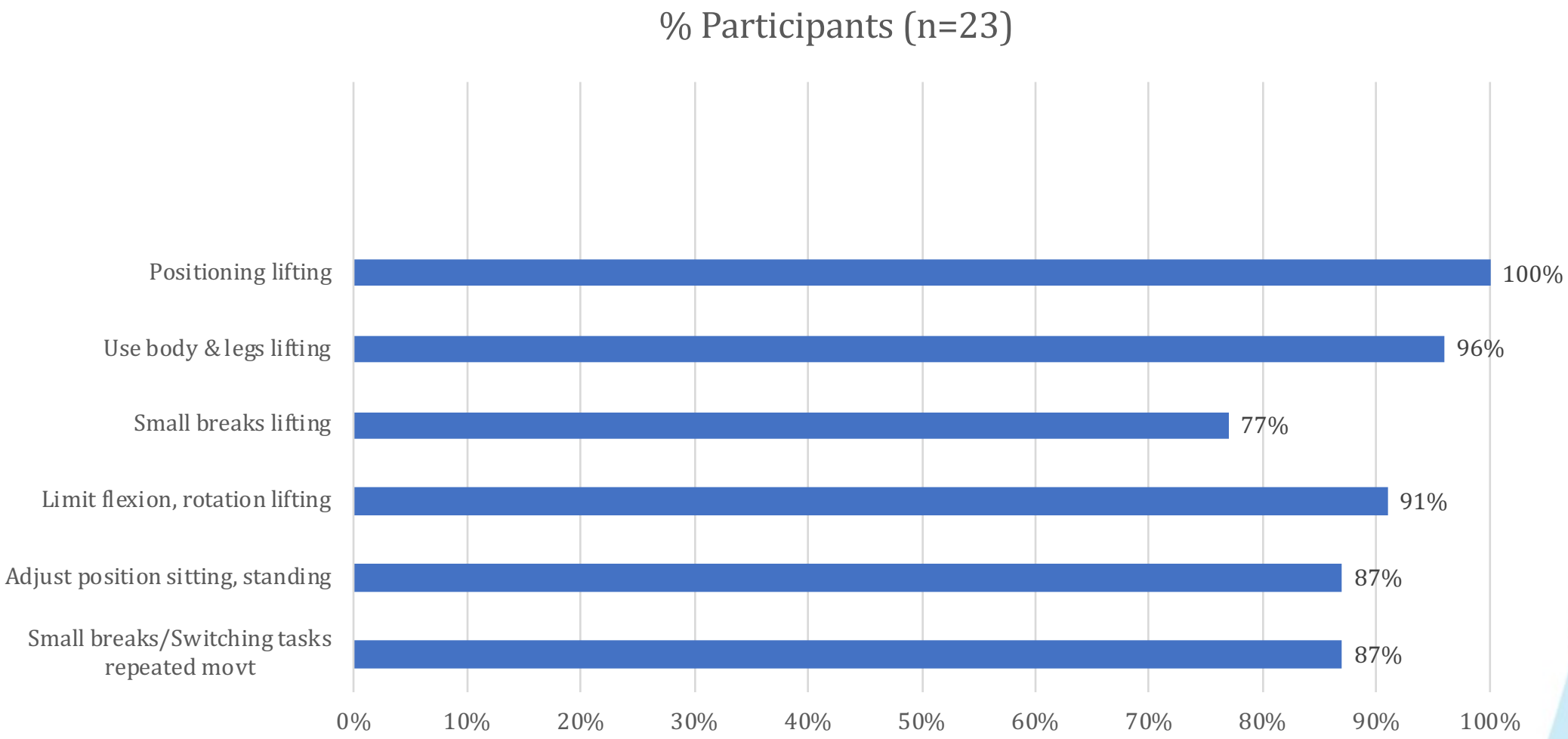
Baseline belief that work task adjustment solutions will assist back pain

Baseline use of team options



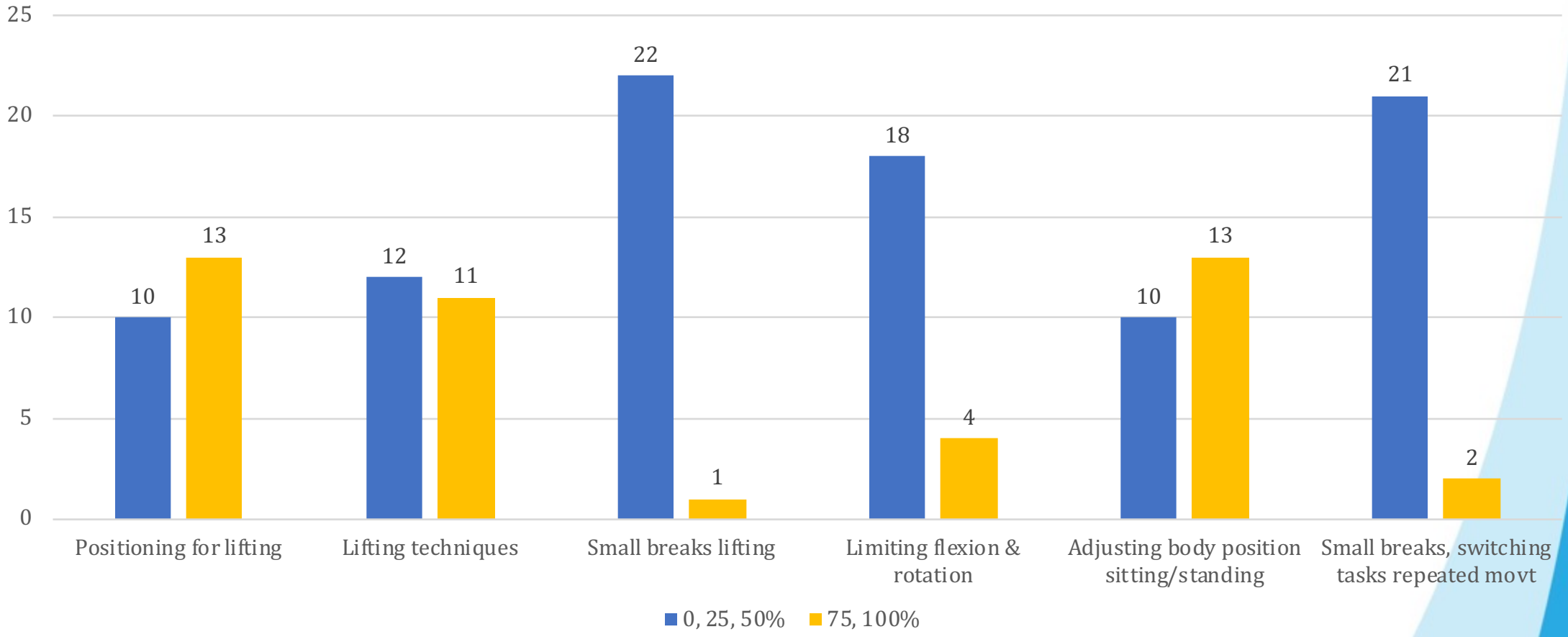
Individual self-management choices

Individual movement/positioning/pacing		
Lifting	1. Change positioning for lifting (eg. Using wide base of support, placing body close to loads, avoiding positions require twisting)	7
	2. Use body and legs for lifting (eg. Progressive steps rather than twisting, using legs to produce lift power, setting core/trunk muscles before the lift)	3
	3. Take small breaks when lifting	6
	4. Limit flexing or flexing & twisting when lifting	3
Adjusting body position for longer times	1. Adjust body position when sitting or standing for long periods	2
	2. Take small breaks, switch or break up tasks when doing repeated movements	9



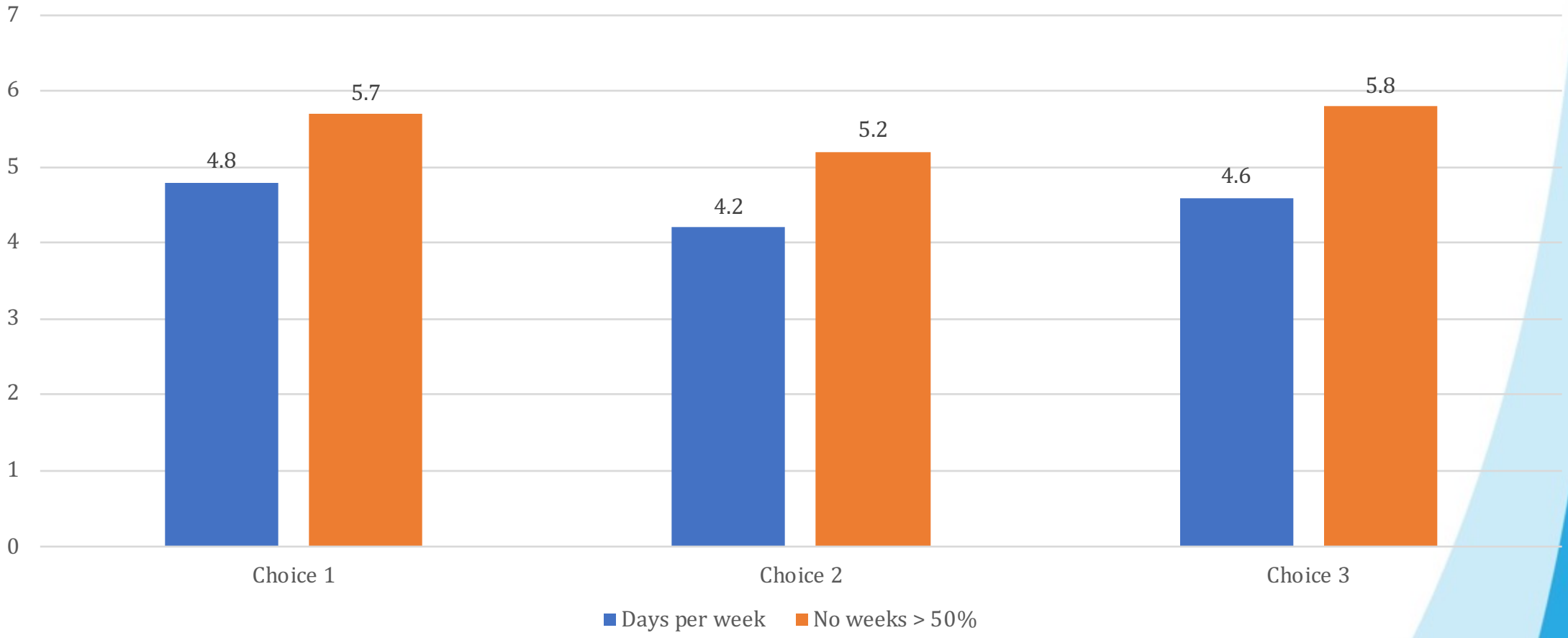
Baseline belief that individual movement and positioning adjustments would assist back pain

Baseline use of individual strategies



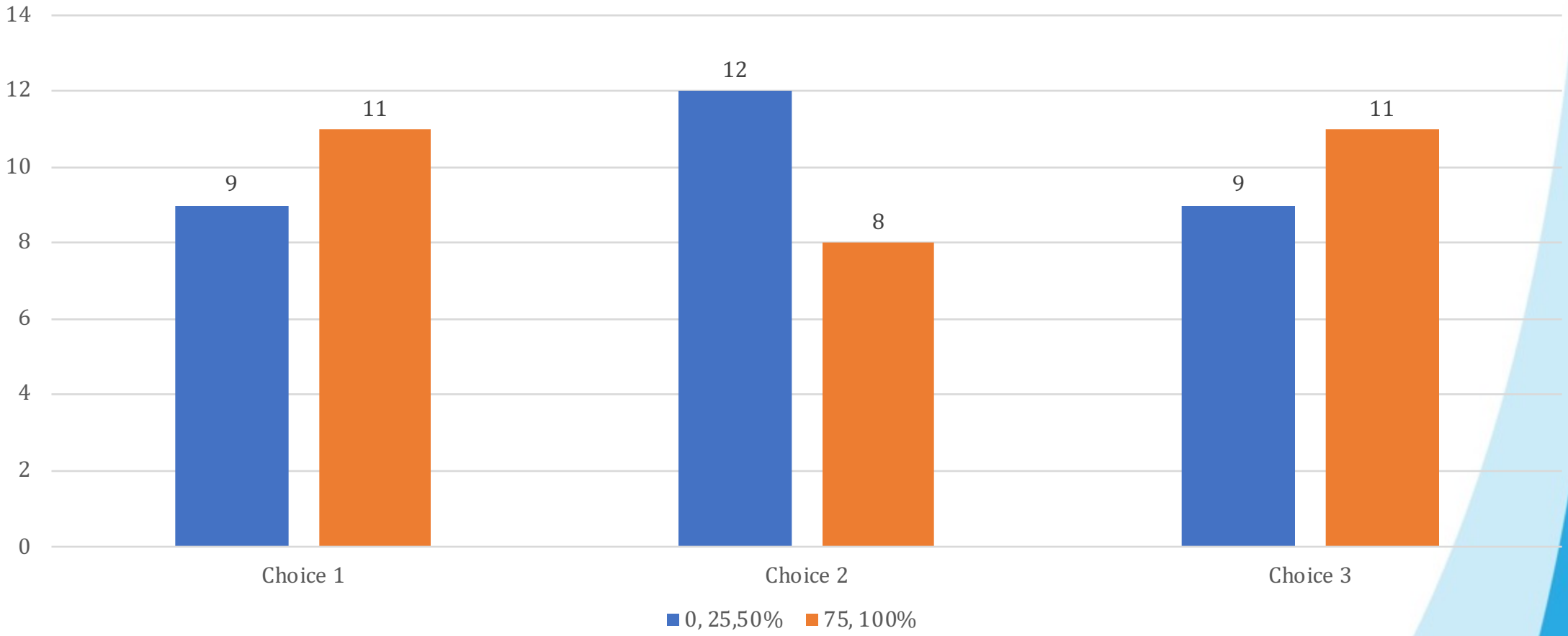
CHOICE	n (23)	Baseline use 75 or 100%	Belief
Team approaches			
Team approaches lifting	**13**	**16**	**100%**
Use mechanical equipment	**9**	**14**	**100%**
Rotate tasks	**7**	**4**	**69.6%**
Match workers to height/strength	3	12	56.5%
Adjust equipment	3	9	95.5%
Organize workflow	1	17	91.3%
Individual movement, positioning, pacing modifications			
Break up/switch tasks repeated activities	**9**	**2**	**87%**
Positioning lifting	**7**	**13**	**100%**
Small breaks lifting	**6**	**1**	**77%**
Using body and legs for lifting	3	11	96%
Limit flexion/rotation	3	4	91%
Adjust body position sitting/standing	2	13	87%

Adoption – Frequency of use (days/week, no. weeks > 50%)



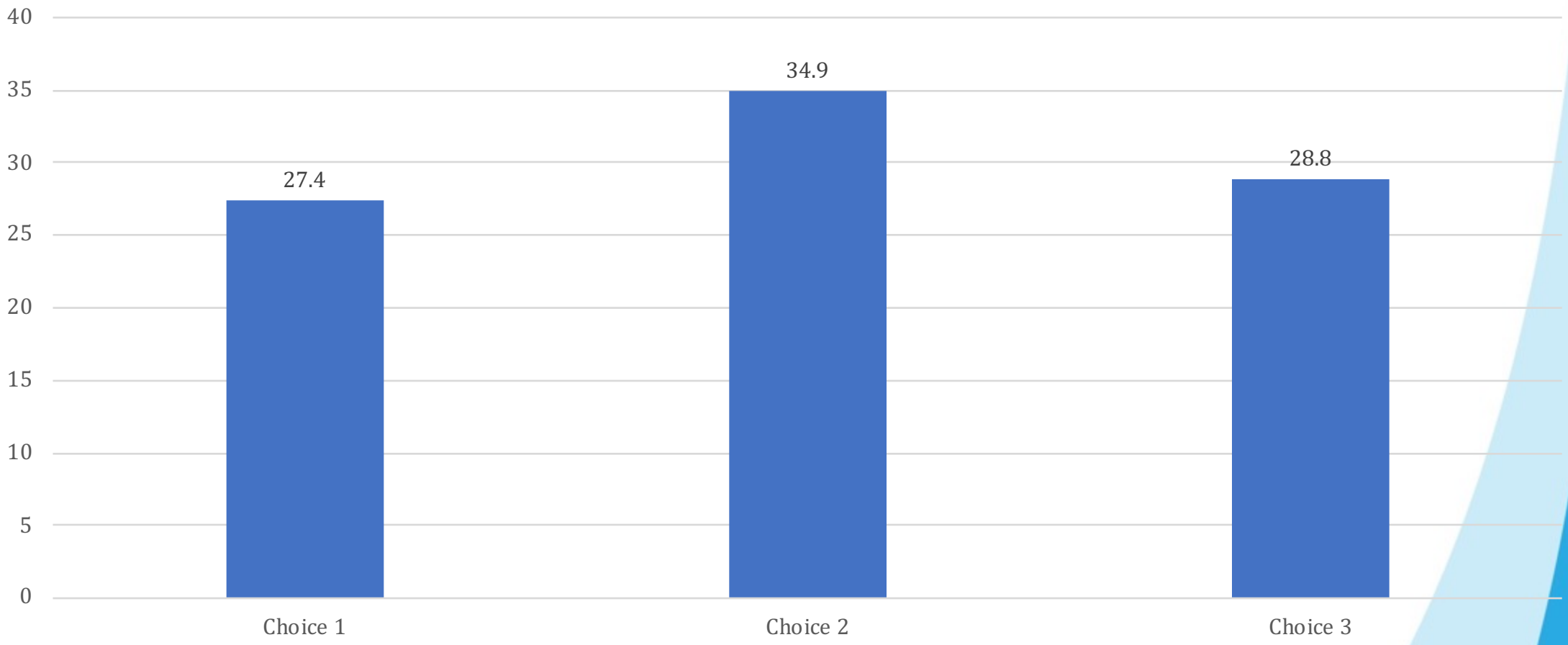
Average 4.5 days/week, 5.5/8 weeks > 50%,

Adoption – Frequency of use in past week

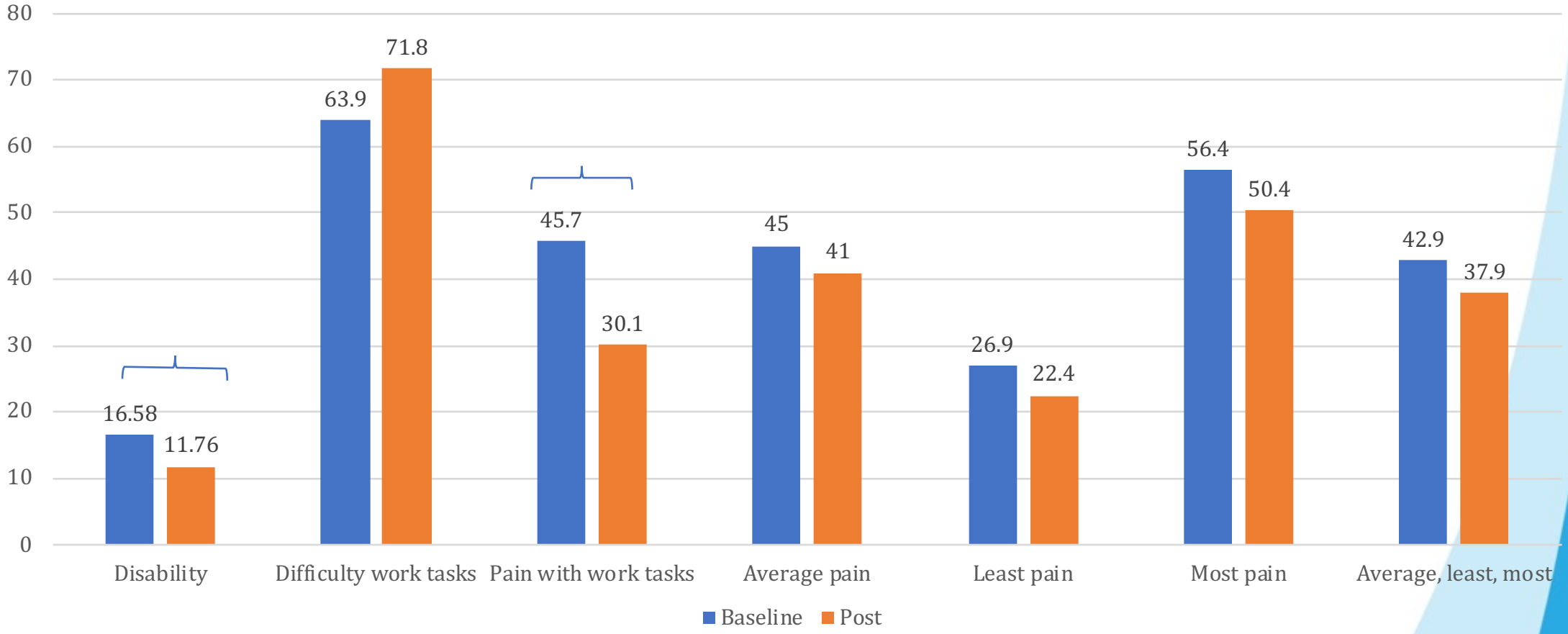


57% used at least 1 intervention > 75%

Ease of use (Mean %, 0= very easy, 100= very difficult)



Pre-post comparisons Disability, Pain (preliminary analysis)



Paired t-test averages $p < 0.05$

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DISCUSSION & CONCLUSIONS

Selection of team and individual modifications

- Some selections were familiar, reportedly being used and workers believed in the impact on pain (team lifting, mechanical equipment, positioning lifting)
- Others were used less and with lower belief in potential to reduce pain (rotating tasks, breaking up repeated activities or changing tasks and small breaks from lifting)
- Workers did select both familiar and less used options, within the framework of work productivity & time constraints
- Favorable qualitative comments overall –some restrictions on team tasks related to number of workers as well as team dynamics

Self-management

- Individualized choice using participatory ergonomic principles and self-management appropriate for high functioning workers with high self efficacy

    1) applicable in workplace context
    2) relatively easy to implement
    3) impacted disability, pain with work activities

- Results are consistent with moderate quality evidence supporting self-management techniques.
- Du et al [12] reductions in pain intensity, and small to moderate effect on disability reported for individuals with chronic low back pain.

Adoption

- Degree of adoption was satisfactory
- Impacted by habit as well as productivity
- Team based selections were dependent on all members being willing to adapt
- Team support – both for assistance and reminders was often mentioned as the most important element
- While productivity and time was a concern initially, there was progressive buy-in of the importance and utility

Delivery

- Education using video examples and demonstration provided context and visual demonstration
- Delivery in the workplace and around time constraints was essential
- Video feedback for individual modification was effective and could be implemented easily
- Group focus for educational delivery and reminders were important

Limitations

- Relatively small sample in single community – further study of generalizability and options for scaling up for larger size groups or regions is need
- Preliminary analysis of findings, further statistical analysis is being conducted
- Only short-term results

Implications for seafood and agricultural communities

- Workers in the clam and other industries with small teams may not receive job training, options for educational interventions are needed in the community.
- The participatory methods could be used in other seafood and agricultural settings with similar staged task analysis and development of video materials.
- There is a need for early introduction to concepts.
- Culture of pushing through and acceptance of pain as part of the job changes approaches to addressing pain management.
- Need to develop community buy-in for overall change.

Conclusions

- Participatory approach provided a feasible method to provide context-specific interventions and may be useful for other agricultural and seafood sectors.
- Approach built from an established platform of community relationships with workplace delivery was essential
- Individuals selected both team and individual strategies – individual strategies were not used as frequently prior to onset.
- Team involvement facilitated involvement and support
- Combination of focus group using relevant and work-sector specific tasks and team support, as well as individual follow up (text) and feedback (video) were key to buy-in and adoption
- Individual choice of solutions and self-management resulted in satisfactory adoption and was effective for decreasing impact of low back pain on function and pain during work activities in this small sample

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