

# Changes in Care Workers' Health and Work-related Outcomes Following Implementation Support for No-lifting Care: A Single-facility Pre-post Study

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## Abstract

**Background:** Manual resident handling is a major occupational health concern in long-term care settings. No-lifting care (NLC) aims to reduce physical burden by limiting manual lifting and promoting the appropriate use of assistive devices. This preliminary study examined changes in care workers' health, work-related outcomes, and quality of life during a 1-year NLC implementation program at a geriatric health services facility. **Methods:** This single-facility pre-post study included 33 eligible care workers. Questionnaire surveys, including the WHOQOL-26, were conducted at baseline, 6 months, and 12 months (post-intervention follow-up). Valid responses were obtained from 25, 19, and 19 participants, respectively. Sixteen participants completed the WHOQOL-26 at all three time points and were included in the complete-case longitudinal analysis. WHOQOL-26 scores were analyzed using one-way repeated-measures analysis of variance or the Friedman test, as appropriate. **Results:** The frequency of physical discomfort, intention to leave, and perceived difficulty in providing care showed positive descriptive changes following NLC implementation. Among complete cases, psychological domain scores decreased from  $17.0 \pm 2.1$  at baseline to  $14.1 \pm 2.8$  at 6 months and increasing to  $16.6 \pm 2.8$  in the post-intervention follow-up ( $p < 0.01$ ). Environment domain scores showed a similar pattern, decreasing from  $22.2 \pm 3.7$  to  $14.1 \pm 2.8$  and subsequently increasing to  $23.1 \pm 3.5$  ( $p < 0.01$ ), respectively. **Conclusions:** NLC implementation support was associated with favorable descriptive changes in selected work-related outcomes. The temporary decline and subsequent recovery in psychological and environment domain scores may reflect an adjustment process during implementation. Our findings support the use of NLC as an organizational change requiring sustained practical and on-site support.

**Keywords:** no-lifting care, occupational health, care workers, long-term care, intention to leave, quality of life

## 1. Introduction

Care workers in long-term care settings are exposed to substantial physical demands during resident transfers and repositioning, making musculoskeletal health an important occupational safety concern [1,2]. Such demands may contribute to low back pain and fatigue and may also affect care workers' willingness to remain employed in care [3,4]. No-lifting care (NLC) is an approach that seeks to reduce physical burden by avoiding manual lifting and promoting the appropriate use of assistive devices [2,5]. It has been positioned as an occupational safety and health strategy in care settings [6,7]. This preliminary study examined changes in physical discomfort, intention to leave, perceived difficulty in providing care, and quality of life (QOL) among care workers during a 1-year program of implementation support for NLC.

## 2. Methods

### 2.1 Study Design, Participants, and Survey Period

This single-facility pre-post study was conducted at a geriatric health services facility (Facility A) with a capacity

of 100 residents. All 33 care workers employed at the facility were invited to participate. Self-administered questionnaires were distributed at baseline, 6 months after the start of implementation support, and 12 months after the start of support (post-intervention follow-up). Completed questionnaires were returned by mail.

**Survey periods**

Baseline: April 21-May 10, 2025

Six-month follow-up: October 22-November 10, 2025

Post-intervention follow-up: March 30-April 20, 2026

### 2.2 Outcome Measures

The survey assessed participant characteristics, work-related fatigue, the frequency and location of physical discomfort and related coping or consultation, intention to leave, and perceived difficulty in providing care. Furthermore, the survey included free-text comments concerning the period after NLC implementation and the 26-item World Health Organization QOL questionnaire (WHOQOL-26). The WHOQOL-26 comprises 24 items covering four domains (physical, psychological, social

relationships, and environment) and two items assessing overall QOL [8].

**Table 1** Survey Measures

| Measure                                | Description                                                         |
|----------------------------------------|---------------------------------------------------------------------|
| Participant characteristics            | Sex, age, and years of care work                                    |
| Work-related fatigue                   | Degree of fatigue related to work                                   |
| Physical discomfort                    | Frequency and location of pain, coping strategies, and consultation |
| Intention to leave                     | Frequency of considering leaving because of pain or fatigue         |
| Perceived difficulty in providing care | Frequency of dissatisfaction with one's own care provision          |

### 2.3 Statistical Analysis

Data from all valid respondents to the general survey items at each time point were summarized descriptively. The matched WHOQOL-26 dataset was analyzed separately, and longitudinal analyses were restricted to the 16 participants with complete WHOQOL-26 data at all three time points. One-way repeated-measures analysis of variance was used when the assumption of normality was satisfied, followed by Bonferroni-adjusted pairwise comparisons if the omnibus test was significant. Friedman test was used for non-normally distributed outcomes. Statistical significance was set at  $p < 0.05$ .

### 2.4 Ethical Considerations

The facility administrator approved the study, and all participating care workers provided consent. The study purpose and procedures were explained verbally and in writing, and participants were informed that their identities would not be disclosed. Consent was documented by checking a consent box and completing the questionnaire.

### 2.5 Implementation Support

Implementation support was provided once per month from April 2025 through March 2026 (12 sessions over 1 year). The program comprised 16 hours of lectures (introduction to NLC, occupational safety and health, assistive-device management, and NLC care planning), 12 hours of practical care-skills training, and 20 hours of direct on-site instruction.

## 3. Results

At each time point, questionnaires were distributed to all 33 care workers. Response characteristics were as follows:

- Baseline

Twenty-six questionnaires were returned, of which 25 were valid (valid response rate, 75.8%). Respondents consisted of 21 women and 4 men; mean age was  $46.6 \pm 10.6$  years, and mean duration of care work was  $15.6 \pm 6.6$  years.

- Six-month follow-up

Twenty-one questionnaires were returned, of which 19 were valid (valid response rate, 57.6%). Respondents consisted of 16 women and 3 men; mean age was  $45.2 \pm$

9.6 years, and mean duration of care work was  $16.6 \pm 6.2$  years.

- Post-intervention follow-up

Seventeen questionnaires were returned, of which 15 were valid (valid response rate, 45.5%). Respondents consisted of 12 women and 3 men; mean age was  $42.6 \pm 8.2$  years, and mean duration of care work was  $14.2 \pm 4.2$  years.

- Sixteen care workers completed the WHOQOL-26 at all three time points. These care workers were included in the complete-case longitudinal analysis.

### 3.1 Work-related Fatigue

All respondents reported work-related fatigue throughout the 1-year study period (Table 2). Approximately half selected "3: somewhat fatigued" at each time point.

**Table 2** Changes in Work-Related Fatigue

| Work-related fatigue   | Baseline | Six months | Post-intervention |
|------------------------|----------|------------|-------------------|
| N                      | 25       | 19         | 15                |
| 4: Very fatigued       | 36.0     | 27.7       | 40.0              |
| 3: Somewhat fatigued   | 52.0     | 55.6       | 46.7              |
| 2: Not very fatigued   | 12.0     | 16.7       | 13.3              |
| 1: Not at all fatigued | 0        | 0          | 0                 |

### 3.2 Frequency of Physical Discomfort

Physical discomfort was reported throughout the 1-year study period (Table 3). At baseline, 24.0% reported discomfort almost every day and 36.0% several times per week. At the post-intervention follow-up, 33.3% reported discomfort several times per month and 26.7% reported almost none, suggesting a shift toward less frequent discomfort.

**Table 3** Changes in the Frequency of Physical Discomfort

| Frequency of discomfort       | Baseline | Six months | Post-intervention |
|-------------------------------|----------|------------|-------------------|
| N                             | 25       | 19         | 15                |
| 4: Almost every day, %        | 24.0     | 33.3       | 13.3              |
| 3: Several times per week, %  | 36.0     | 11.1       | 26.7              |
| 2: Several times per month, % | 20.0     | 22.3       | 33.3              |
| 1: Almost never, %            | 20.0     | 33.3       | 26.7              |

### 3.3 Location of Pain

Multiple responses were permitted for pain location. Pain was reported by 20 respondents (80.0%) at baseline, 12 (63.2%) at 6 months, and 11 (73.3%) at post-intervention

follow-up (Table 4). Low back pain was reported by more than 80% of respondents with pain at each time point.

**Table 4**Changes in Pain Location

| Pain location                 | Baseline | Six months | Post-intervention |
|-------------------------------|----------|------------|-------------------|
| Respondents reporting pain, n | 20.0     | 12.0       | 11.0              |
| Neck/shoulder, %              | 65.0     | 41.7       | 45.5              |
| Elbow, %                      | 5.0      | 16.7       | 9.1               |
| Wrist/fingers, %              | 20.0     | 8.3        | 9.1               |
| Low back, %                   | 85.0     | 91.7       | 81.8              |
| Knee, %                       | 35.0     | 16.7       | 18.2              |
| Other, %                      | 5.0      | 0.0        | 9.1               |

### 3.4 Responses to Physical Discomfort

The proportions of respondents taking measures to manage physical discomfort were 76.2% at baseline, 73.3% at 6 months, and 69.2% at post-intervention follow-up.

Common strategies included continued use of lumbar supports and exercises to prevent low back pain.

### 3.5 Intention to Leave

The proportion reporting that they "somewhat" considered leaving decreased from 36.0% at baseline to 20.0% at post-intervention follow-up (Table 5). Moreover, the proportion reporting no intention to leave increased from 24.0% to 46.7%.

**Table 5**Changes in Intention to Leave

| Intention to leave  | Baseline | Six months | Post-intervention |
|---------------------|----------|------------|-------------------|
| n                   | 25       | 19         | 15                |
| 4: Strongly, %      | 8        | 0          | 4.7               |
| 3: Somewhat, %      | 36       | 27.8       | 20                |
| 2: Not very much, % | 32       | 33.3       | 26.7              |
| 1: Not at all, %    | 24       | 38.9       | 46.7              |

### 3.6 Perceived Difficulty in Providing Care

At baseline, 24.0% of respondents reported perceived difficulty in providing care several times per week and 24.0% several times per month (Table 6). The proportion reporting almost no difficulty increased from 36.0% at baseline to 60.0% at post-intervention follow-up.

**Table 6**Changes in Perceived Difficulty in Providing Care

| Perceived difficulty in providing care | Baseline | Six months | Post-intervention |
|----------------------------------------|----------|------------|-------------------|
| N                                      | 25       | 19         | 15                |
| 4: Almost every day, %                 | 16.0     | 0.0        | 6.7               |

| Perceived difficulty in providing care | Baseline | Six months | Post-intervention |
|----------------------------------------|----------|------------|-------------------|
| 3: Several times per week, %           | 24.0     | 5.6        | 13.3              |
| 2: Several times per month, %          | 24.0     | 33.3       | 20.0              |
| 1: Almost never, %                     | 36.0     | 61.1       | 60.0              |

### 3.7 Free-text Responses

At the post-intervention follow-up, all 15 respondents provided free-text comments about changes observed in themselves or other care workers following NLC implementation. The comments described reduced low back strain through environmental adjustments and the increased use of assistive devices. Respondents also perceived benefits from low back pain exercises and instruction on body mechanics, and several noted improved collaboration among staff. The responses included the following:

- Adjusting bed height during diaper changes and actively using a sliding board for transfers helped prevent low back pain.
- Low back pain exercises before starting work helped reduce pain.
- Avoiding manual lifting and trunk twisting during assistance eliminated low back pain.
- Continued use of sliding sheets and gloves improved understanding of how to select and use assistive devices.
- Using a sliding board reduced residents' physical and psychological burden and the risk of injury.
- Use of sliding boards and other devices helped standardize assistance methods across staff.
- Sliding sheets made lateral repositioning easier for residents with larger body size.
- Collaboration among staff improved.
- Learning about NLC encouraged discussion among care workers.
- Staff began using sliding boards more actively.
- Staff became more attentive to reducing their own low back pain.

### 3.8 WHOQOL-26

Table 7 presents WHOQOL-26 scores for all respondents at baseline, 6 months and 12 months and for the 16 participants with complete data at all three time points. Data from all respondents are shown descriptively because the respondents differed across surveys. In the complete-case analysis, psychological and environment domain scores differed significantly over time (both  $p < 0.001$ ). Both scores decreased at 6 months and returned to approximately baseline levels at post-intervention

follow-up. Bonferroni-adjusted comparisons showed significant differences between baseline and 6 months and between 6 months and post-intervention follow-up (all  $p < 0.001$ ), but not between baseline and post-intervention. Overall QOL, physical domain, and social relationships domain scores did not differ significantly over time ( $p = 0.202$ ,  $p = 0.751$ , and  $p = 0.368$ , respectively).

**Table 7** Changes in WHOQOL-26 Domain Scores Among All Respondents and Complete Cases

| Domain                  | Baseline (n=25) | Six months (n=19) | Post-intervention (n=19) | P value |
|-------------------------|-----------------|-------------------|--------------------------|---------|
| Overall quality of life | 5.2 ± 1.2       | 5.4 ± 1.3         | 5.4 ± 1.3                | 0.82    |
| Physical health         | 18.5 ± 2.5      | 18.1 ± 3.9        | 18.1 ± 3.9               | 0.89    |
| Psychological           | 17.0 ± 2.1      | 14.6 ± 3.4        | 17.2 ± 3.1               | 0.11    |
| Social relationships    | 9.0 ± 1.3       | 9.4 ± 1.4         | 9.4 ± 1.4                | 0.57    |
| Environment             | 22.2 ± 4.1      | 14.4 ± 3.0        | 23.6 ± 3.9               | <0.01   |
| Complete cases (n=16)   |                 |                   |                          |         |
| Overall quality of life | 5.0 ± 1.2       | 5.2 ± 1.3         | 5.2 ± 1.3                | 0.20    |
| Physical health         | 18.4 ± 2.4      | 18.1 ± 4.0        | 18.1 ± 4.0               | 0.75    |
| Psychological           | 17.0 ± 2.1      | 14.1 ± 2.8        | 16.6 ± 2.8               | <0.01   |
| Social relationships    | 9.1 ± 1.2       | 9.1 ± 1.3         | 9.1 ± 1.3                | 0.37    |
| Environment             | 22.2 ± 3.7      | 14.1 ± 2.8        | 23.1 ± 3.5               | <0.01   |

Values are presented as mean ± standard deviation. P values for the complete-case analysis were obtained using one-way repeated-measures analysis of variance or the Friedman test, as appropriate. Bonferroni-adjusted pairwise comparisons were performed following a significant omnibus test.

#### 4. Discussion

This study found positive trends in the frequency of physical discomfort, intention to leave, and perceived difficulty in providing care following implementation support for NLC. On the other hand, no clear improvements in work-related fatigue and the prevalence of low back pain were observed. These findings suggest that NLC implementation influences not only the physical demands of care work but also care workers' perceptions of their work and care practices.

Among the participants with complete data, overall QOL and the physical and social relationships domains did not

change significantly. In contrast, psychological and environment domain scores temporarily decreased at 6 months and subsequently returned to approximately baseline levels at post-intervention follow-up. These findings do not indicate sustained improvements in overall QOL but suggest fluctuations in certain domains during implementation.

Implementing NLC requires care workers to acquire new handling techniques, select and manage assistive devices, revise resident-specific care procedures, and coordinate assistance methods among staff. These additional demands may temporarily increase perceived workload, uncertainty, or psychological burden, even when the ultimate goal is to reduce physical strain. Thus, the recovery of psychological and environment domain scores at the post-intervention assessment may reflect gradual adaptation to the new care procedures and the effects of continued lectures, practical training, and direct workplace support. However, this interpretation remains tentative because the study did not include a control group.

The WHOQOL-26 assesses broad aspects of daily life rather than workplace conditions alone. The psychological domain includes emotional well-being, self-esteem, and cognitive functioning, whereas the environment domain encompasses personal safety, financial resources, access to health and social care, opportunities for leisure, the physical environment, and transportation [8]. This suggests that the temporary changes observed at 6 months cannot be attributed solely to NLC implementation. Furthermore, seasonal variation, staffing levels, workload, and participants' personal circumstances may also have influenced these scores.

The shift toward less frequent physical discomfort may reflect increased adoption of techniques that avoid manual lifting. During practical sessions, care workers considered specific ways to use assistive devices and reviewed assistance procedures for individual residents. Previous studies have reported that assistive-device use and safe resident-handling programs can improve musculoskeletal outcomes [6,7]. The present findings therefore support the importance of continued, practice-based training for embedding these techniques into routine care practices. Nevertheless, the continued high prevalence of low back pain indicates that NLC alone is insufficient to improve existing musculoskeletal symptoms.

The absence of improvement in work-related fatigue may be explained by factors not directly addressed by NLC, including workload, staffing, shift patterns, rest opportunities, and psychological demands. From an occupational safety and health perspective, NLC should therefore not be regarded simply as the introduction of assistive devices, instead it may be more effective when incorporated into a broader workplace strategy addressing work processes, staffing arrangements, rest periods, and work organization.

The descriptive reduction in intention to leave may be relevant to workforce retention [3]. The free-text responses suggest that NLC implementation promoted information sharing, staff collaboration, and standardization of assistance methods. These findings suggest that structured NLC implementation supports care workers' willingness and perceived ability to continue providing care by improving communication and shared practices. However, because these outcomes were evaluated descriptively, further studies are needed to investigate causal factors.

This study has several limitations. First, the valid response rate decreased from 75.8% at baseline to 57.6% at the post-intervention assessment, representing a reduction of 18.2 percentage points. This decrease may have introduced attrition and selection bias, particularly if workers who completed the final survey differed systematically from those who did not. Future studies should incorporate strategies to maintain participation and to orient and engage workers who join the facility after implementation has begun. Second, it used a single-facility pre-post design without a control group; therefore, the observed changes cannot be attributed solely to NLC implementation support. Third, the sample was small, limiting statistical power and generalizability. Fourth, most outcomes were based on self-administered questionnaires and may have been affected by recall and social desirability biases. Finally, other potentially relevant factors, such as workload, staffing levels, shift patterns, and actual frequency of assistive-device use, were not objectively measured. Future multicenter controlled studies should include objective outcomes such as musculoskeletal symptoms, frequency of assistive-device use, sickness absence, and staff turnover.

## 5. Conclusions

Following implementation support for NLC, favorable descriptive changes were observed in the frequency of physical discomfort, intention to leave, and perceived difficulty in providing care, whereas no clear improvement in work-related fatigue was observed. Psychological and environment domain scores temporarily decreased at 6 months but returned to approximately baseline levels at post-intervention follow-up. NLC may help prevent worsening physical discomfort and support care workers' willingness and perceived ability to continue providing care; however, it does not necessarily lead to an immediate or sustained improvement in overall QOL.

Our findings suggest that NLC should not be regarded as a one-time training program or simply as the introduction of assistive devices. Its implementation may involve a temporary adjustment burden, and sustained on-site support may be necessary for integrating new techniques into routine practice. A structured implementation strategy combining practical training, resident-specific problem solving, standardization of care procedures, staff communication, and attention to psychological well-being may help achieve sustainable occupational health benefits.

Larger controlled studies are needed to confirm these preliminary findings.

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