

# A Fatigue Countermeasures Program for Hospital Staff Nurses: An Interventional Approach for Patient and Nurse Safety

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## Introduction

Recent studies have shown that extended shifts worked by hospital staff nurses are associated with significantly higher risk of errors. Long work hours coupled with insufficient sleep are even riskier. Inadequate sleep contributes to decreased alertness on duty, further jeopardizing patient safety. Although other industries have developed programs to reduce fatigue-related errors and injury, fatigue countermeasures program for nurses (FCMPN) is lacking. The purpose of this pilot study is to evaluate the potential of a FCMPN for reducing fatigue among hospital staff nurses.

**Specific Aim 1** Evaluate hospital staff nurse sleep/wake patterns and vigilance (sleep quality, sleep duration, alertness at work, daytime sleepiness) before and after a FCMPN.

**Specific Aim 2** Compare frequency and type of errors and near errors reported before and after a FCMPN.

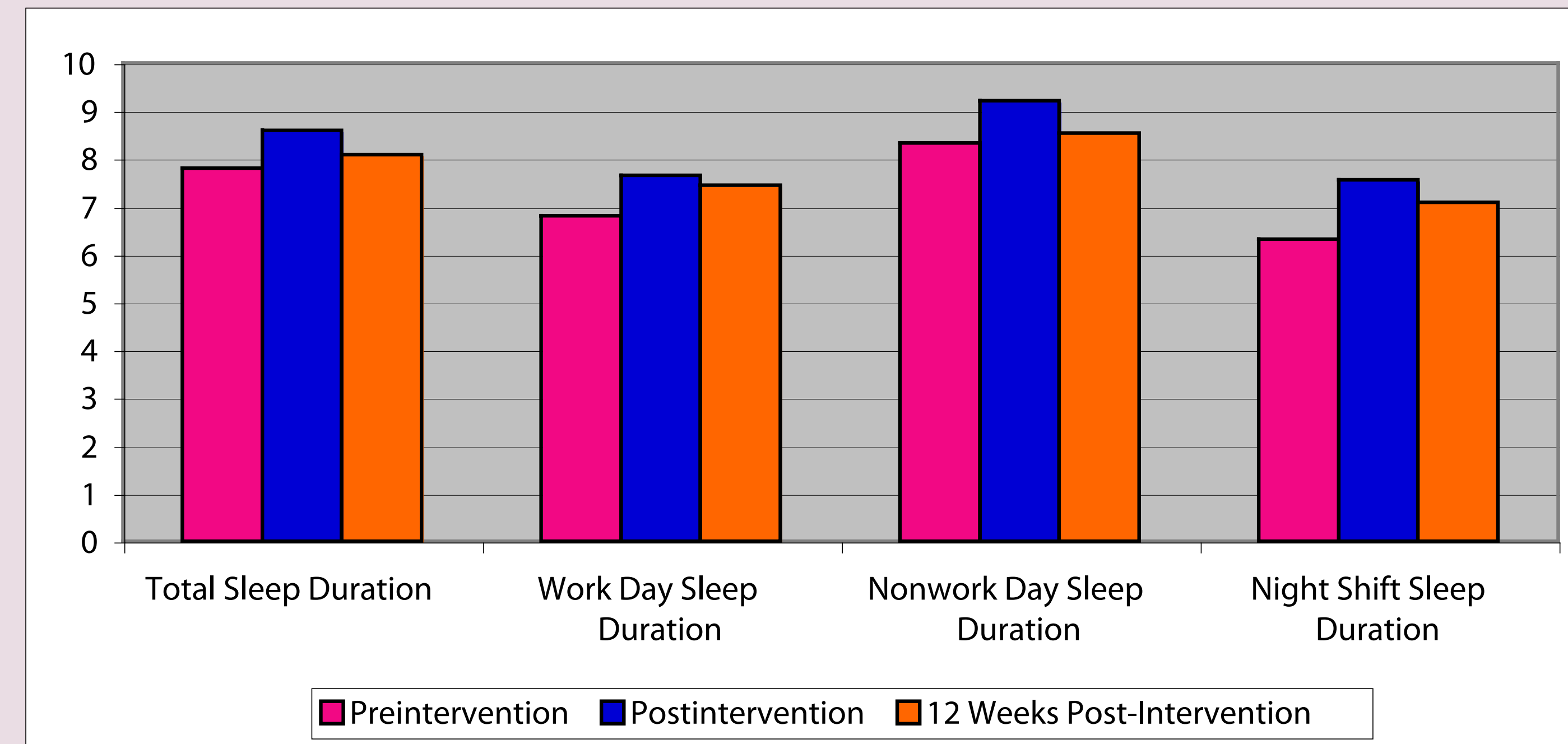
## Methods

A one-group pretest-posttest approach is used, with participants serving as their own control. Data were collected using a demographic questionnaire, the Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS) and a daily logbook to assess sleep and work variables and health care errors. Participants completed the instruments during the two weeks period to the FCMPN, four weeks after receiving the intervention, and again at three months.

## Participants

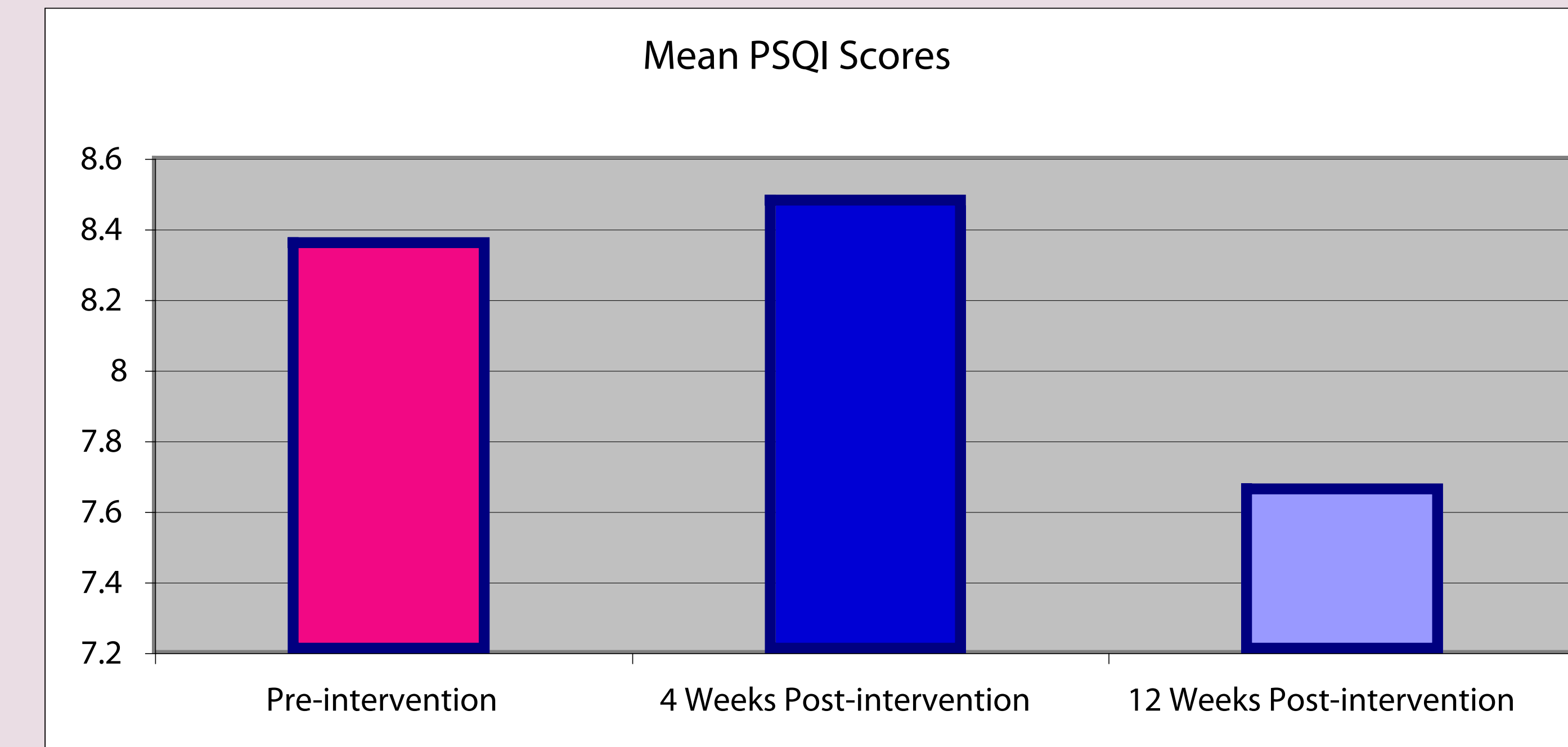
Attribute	Initial Respondents (n = 62)	Intervention Respondents (n = 47)
Age	37.74 ± 11.70	38.98 ± 12.21
RN Years	9.82 ± 10.95	10.95 ± 11.87
Shift Length		
8 Hours	9	7
12 Hours	52	40
Shift Pattern		
Days	25	17
Evenings	4	2
Nights	29	25
Rotating	58	0
Single	15	12
Spouse/SO	47	35
Additional Employment	4 (6.5%)	3 (6.4%)

## Sleep Duration



Sleep Duration	Pre-intervention Mean SD	4 Weeks Post-intervention Mean SD	12 Weeks Post-intervention Mean SD	F p
Total Sleep Duration	7.80 ± 0.95	8.59 ± 1.23	8.08 ± 1.18	14.65 <.0001
Work Day Sleep Duration	6.81 ± 1.54	7.65 ± 1.66	7.44 ± 1.41	8.92 .0003
Nonwork Day Sleep Duration	8.32 ± 1.32	9.21 ± 1.75	8.54 ± 1.48	10.21 <.0001
Night Shift Sleep Duration	6.32 ± 1.83	7.55 ± 1.95	7.08 ± 1.69	6.92 <.003

## Sleep Quality

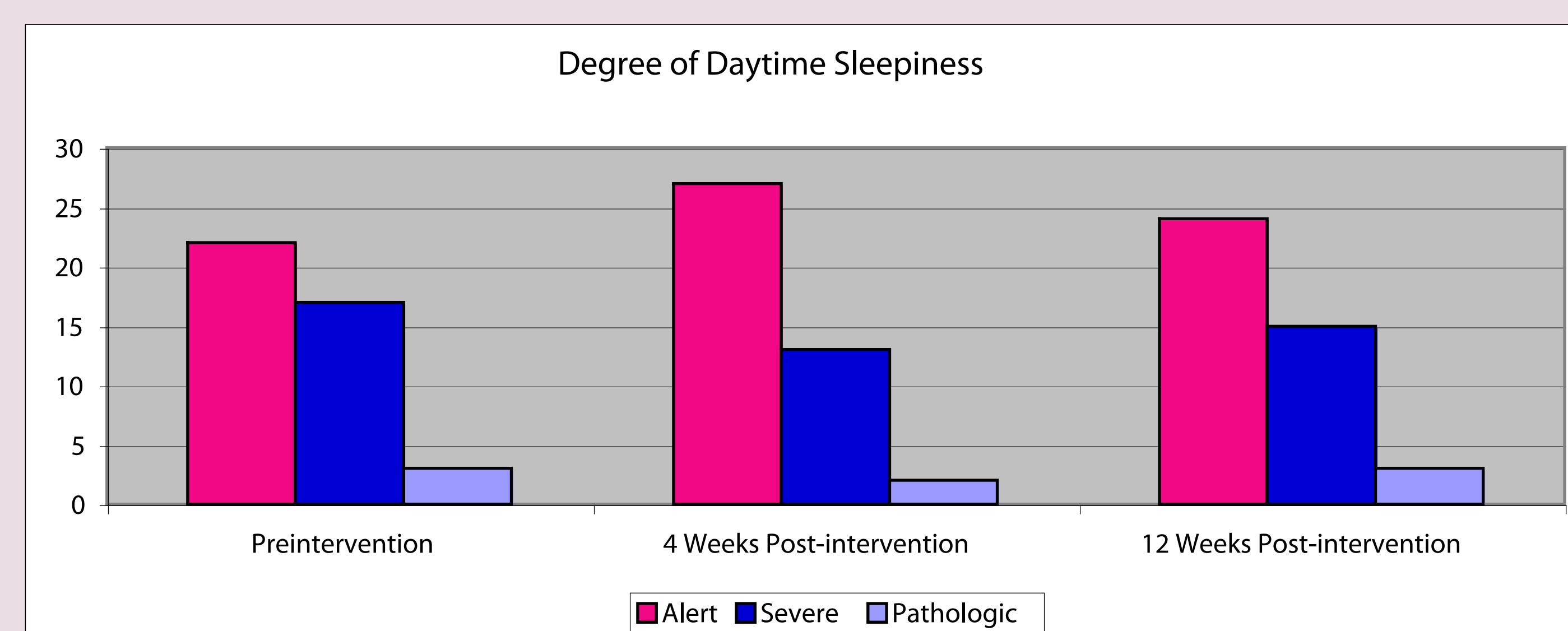
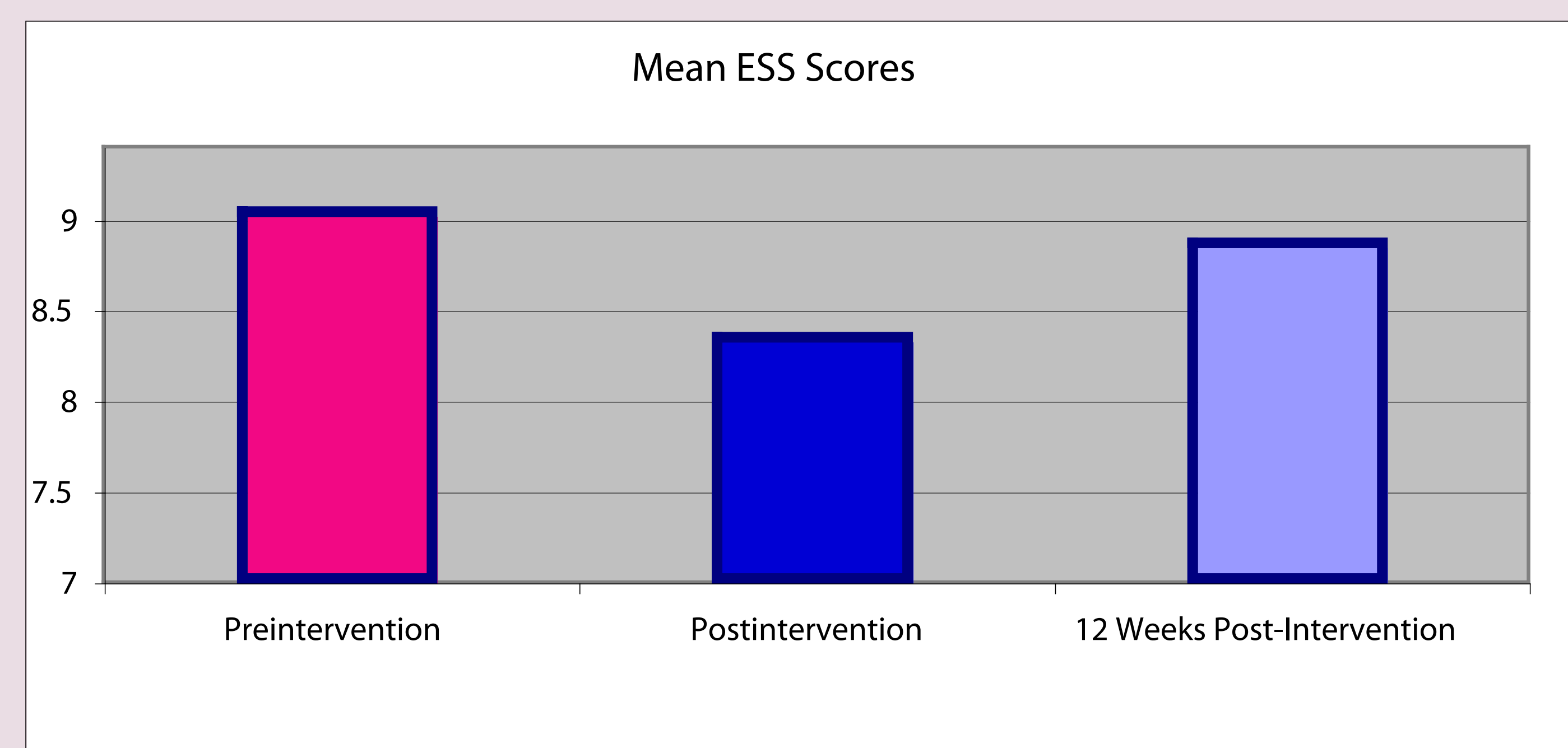


Intervention Period	Mean SD	Mean SD	t p
Pre-Intervention to 4 Weeks Post-Intervention	8.35 ± 2.70	8.47 ± 2.57	-0.42 0.67
Pre-Intervention to 12 Weeks Post-Intervention	8.35 ± 2.70	7.65 ± 2.57	2.24 .003
4 Weeks Post-Intervention to 12 Weeks Post-Intervention	8.47 ± 2.57	7.65 ± 2.57	2.34 .002

## Conclusions

- The pilot study results suggest that the majority of the nurses experienced poor sleep quality, severe daytime sleepiness, and decreased vigilance at work and while operating a motor vehicle.
- Following the FCMPN, significant improvements were noted in sleep duration, sleep quality, and vigilance.
- Errors and near errors decreased while the number of intercepted errors increased.
- Although significant improvements were not found in daytime sleepiness scores, severity of daytime sleepiness appeared to decrease.
- A number of other trends were noted with use of the FCMPN:
  - Total average sleep duration increased among night shift nurses by 45 to 74 minutes across the study.
  - Even though sleep quality significantly improved, overall sleep quality is consistently poor among hospital staff nurses.
  - The use of strategic naps decreased over time, however the prevalence of drowsiness at work continued to decrease.
  - In addition to the decrease in reported drowsy driving episodes, reported motor vehicle accidents and near MVAs also decreased.
- Nurses reported an increase awareness of sleep needs and fatigue, yet also had feelings of guilt when engaging in FCMPN activities, especially strategic naps and completed relieved breaks. This may account for the decrease in strategic naps at work.

## Daytime Sleepiness



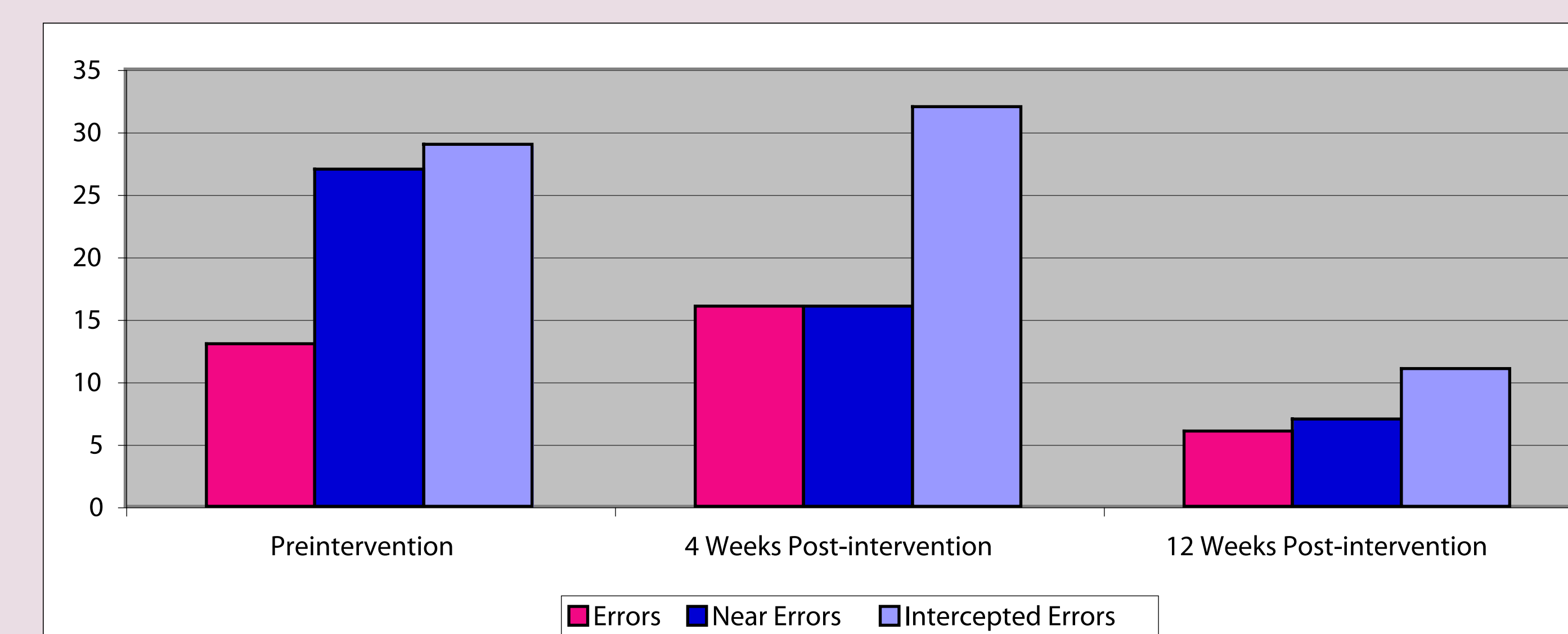
## Drowsiness/Sleep Episodes

Measure	Pre-Intervention Frequency	4 Weeks Post-Intervention Frequency	12 Weeks Post-Intervention Frequency
Drowsiness at Work	88	31	15
Sleep Episodes	5	31	15
Planned Sleep Episodes (Strategic Naps)	0	57	13
Drowsy Driving Episodes	92	74	67
MVA or Near-MVA	5	3	1

## Implications

- The results of this study concerning the use of a FCMPN are promising in its ability to improve nurse alertness and patient safety.
- The study demonstrates the transferability of an industrial fatigue countermeasures program to the health care sector.
- Further testing with a larger sample is needed to assess its effect on nurse and patient safety, as well as sustainability of the FCMPN components.
- The study also demonstrates that a paradigm shift among nurses may be needed in order for FCMPNs to be successful in health care.

## Reported Errors



## Acknowledgement

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