

# CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY CAUSES FALLS AND PHYSICAL DYSFUNCTION IN PATIENTS WITH CANCER: A SYSTEMATIC REVIEW AND META-ANALYSIS



Katsuyoshi Suzuki PT MSc<sup>1</sup>, Shinichiro Morishita PT PhD<sup>2</sup>, Jiro Nakano PT PhD<sup>3</sup>, Taro Okayama PT<sup>1</sup>, Junichiro Inoue PT PhD<sup>4</sup>, Takashi Tanaka PT PhD<sup>5</sup>, Takuya Fukushima PT PhD<sup>3</sup>

<sup>1</sup>Division of Rehabilitation Medicine, Shizuoka Cancer Center, Shizuoka, Japan <sup>2</sup>Department of Physical Therapy, School of Health Sciences, Fukushima Medical University, Fukushima, Japan <sup>3</sup>Faculty of Rehabilitation, Kansai Medical University, Osaka, Japan <sup>4</sup>Division of Rehabilitation Medicine, Kobe University Hospital International Clinical Cancer Research Center, Kobe, Japan <sup>5</sup>Department of Rehabilitation, Hyogo Medical University Hospital, Nishinomiya, Japan

Contact  
Katsuyoshi Suzuki  
katsu.suzuki@scchr.jp

## INTRODUCTION

### Chemotherapy-induced peripheral neuropathy (CIPN)

- One of the major concerns in patients with cancer
- Recovery of symptoms may require several years or may cause permanent neurological dysfunction

### CIPN affects the risk of falls and physical dysfunction

- Previous studies found inconsistent results regarding the association between CIPN and the risk of falls or deterioration of physical function in patients with cancer

## AIM

To determine whether CIPN affects the risk of falls and physical dysfunction in patients with cancer

## METHODS

### Search strategies

**Databases:** CINAHL, Scopus, and PubMed

**Language:** English

**Time:** January 1950 to April 2022

### Inclusion criteria

- Observation and cross-sectional studies
- Diagnosed with CIPN
- All ages and genders
- Assessing falls or physical function
- Diagnosed with any type of cancer
- Received chemotherapy
- Comparing outcomes among cancer patients with and without CIPN.

## RESULTS

### 1. Study selection and characteristics

- A total of 5394 titles and abstracts were screened; ultimately, nine studies were deemed suitable for meta-analysis (Fig1).

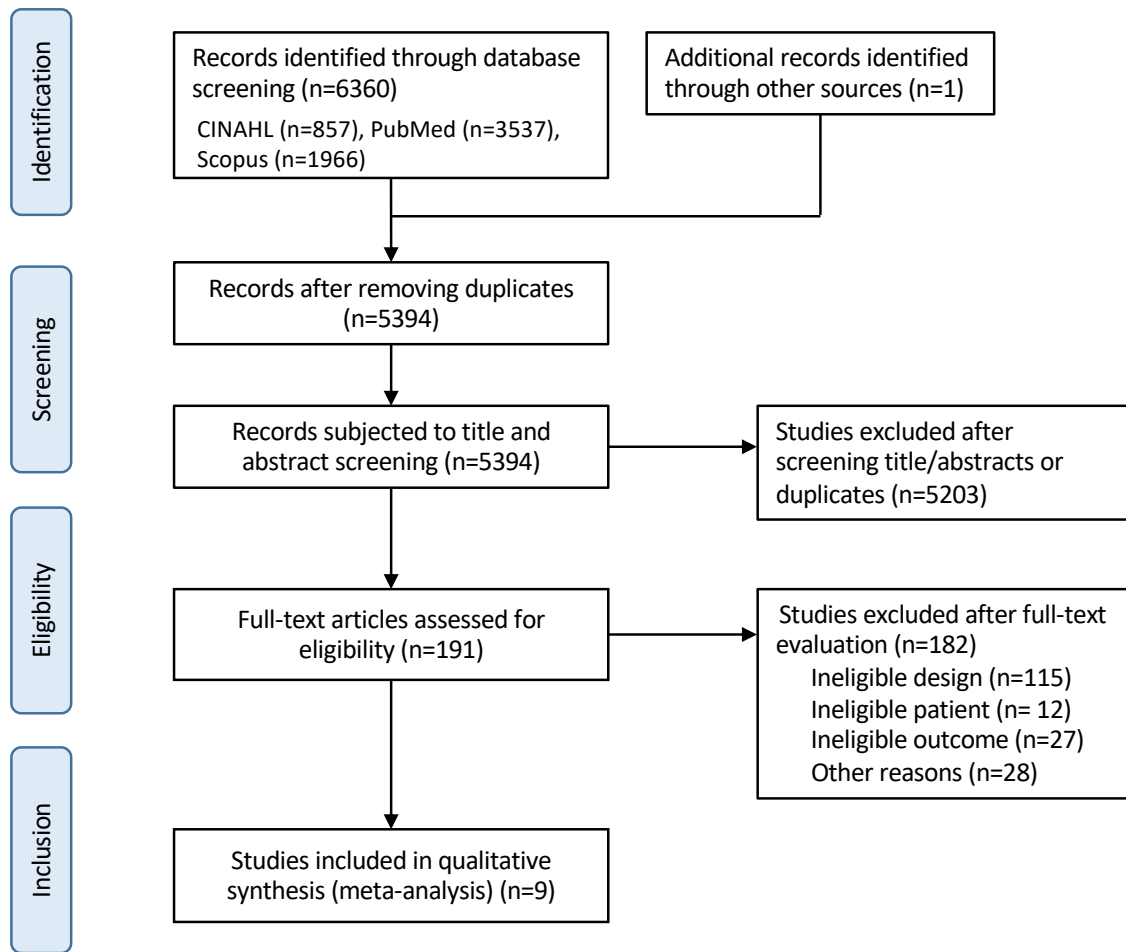


Fig 1. Flow chart of the article selection process

## RESULTS (cont'd)

### 2. Influence of CIPN on Falls

- Patients with CIPN had a significantly **higher risk of falls** than those without CIPN (risk ratio = 1.38, 95% confidence interval [CI] = 1.18 to 1.62) (Fig 2).

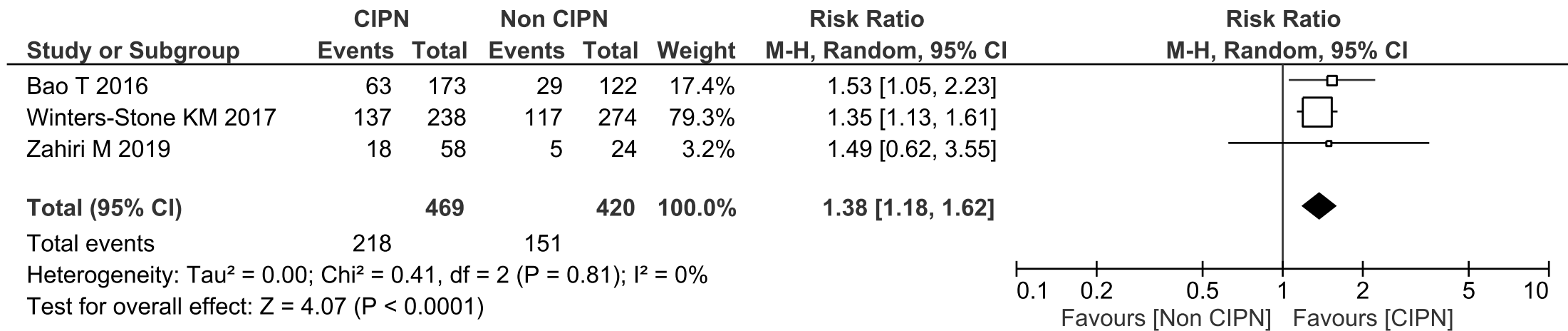
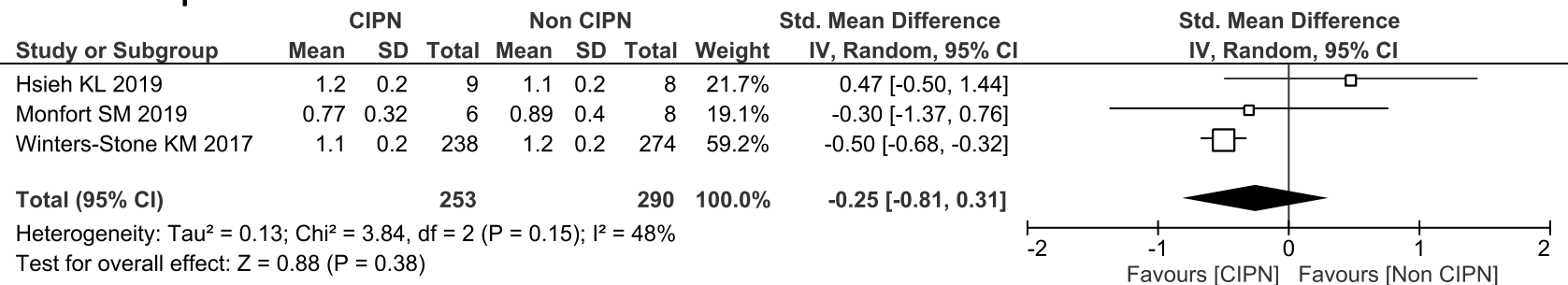


Fig 2. Risk ratio for falls associated with CIPN in patients with cancer

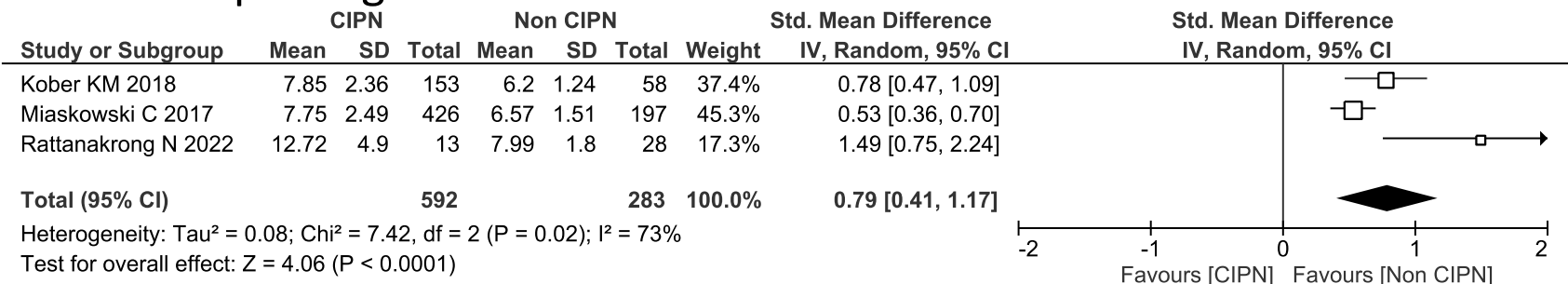
### 3. Influence of CIPN on physical function

- Patients with CIPN had **lower grip strength** (standardized mean difference [SMD] = -0.42, 95% CIs = -0.70 to -0.14, p = 0.003) (Fig 3C), **longer chair stand time** (SMD = 0.56, 95% CIs = -0.01 to 1.17, p = 0.05) (Fig 3B), **worse timed up and go test time** (SMD = 0.79, 95% CIs = 0.41 to 1.17, p < 0.0001) (Fig 3D), and **lower mean Fullerton Advanced Balance scale score** (SMD = -0.81, 95% CIs = -1.27 to -0.36, p = 0.005) than patients without CIPN (Fig 3F).
- There were no significant differences in gait speed (p = 0.38) or Activities-specific Balance Confidence score (p = 0.09) between patients with and without CIPN (Fig 3A, E).

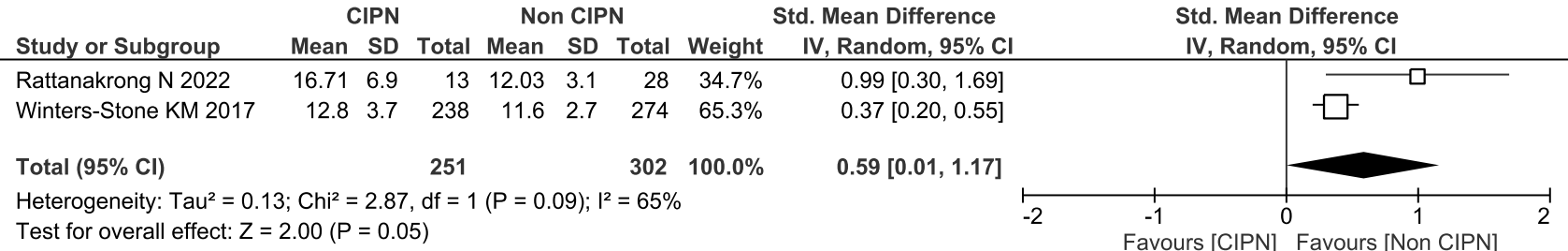
#### A. Gait speed



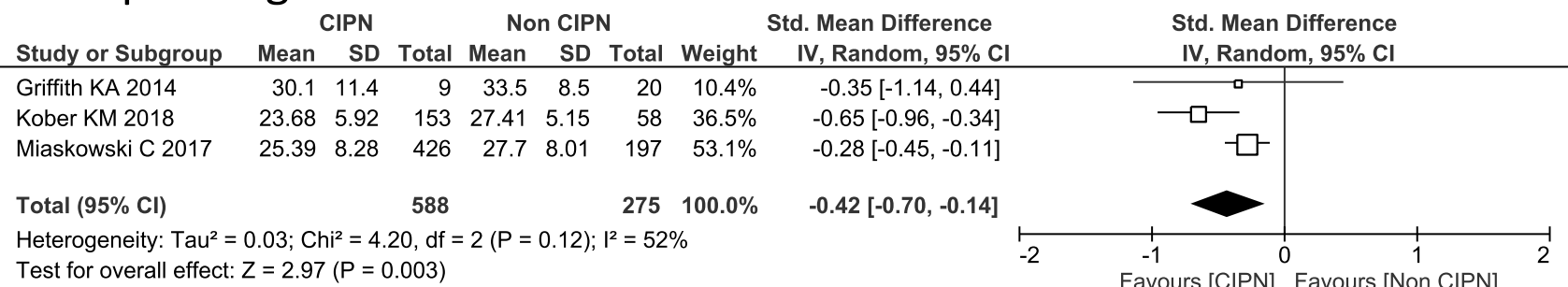
#### D. Timed up and go test



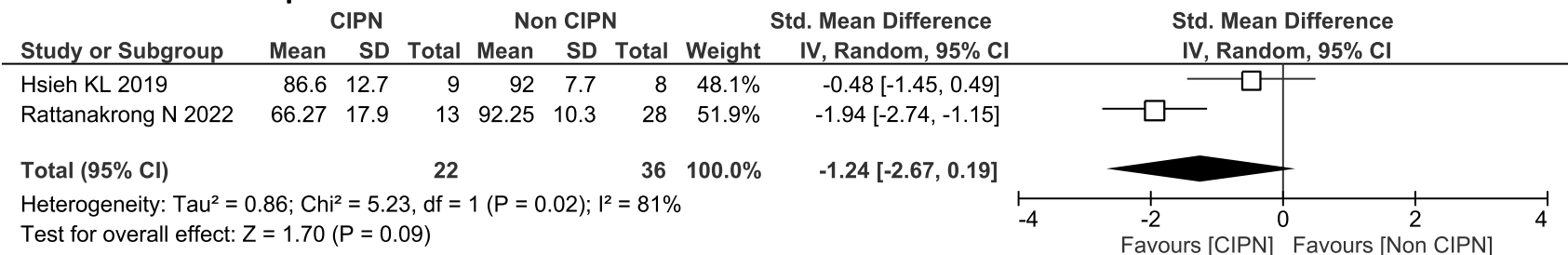
#### B. Chair stand



#### C. Grip strength



#### E. Activities-specific Balance Confidence Scale



#### F. Fullerton Advanced Balance scale

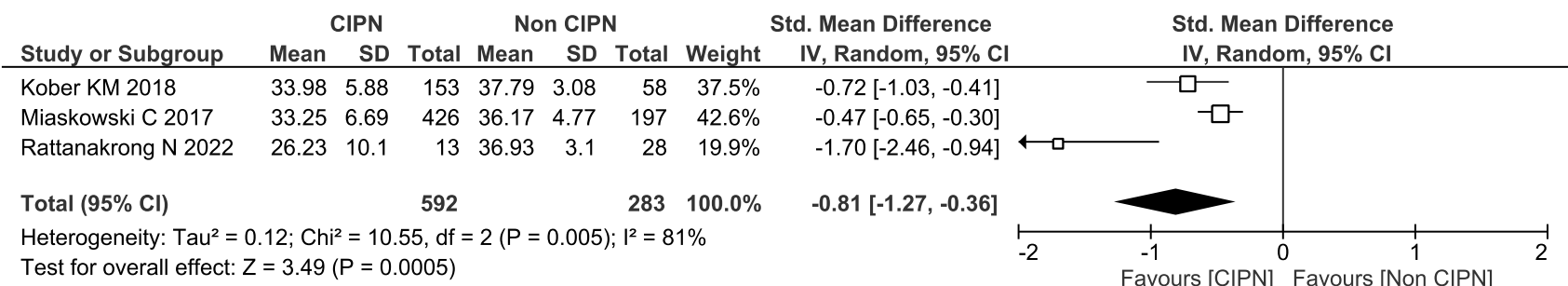


Fig 3. Influence of CIPN on physical function in patients with cancer

## CONCLUSION

- Our study demonstrated that patients with CIPN are prone to falls and impaired balance function and muscle strength.
- The impaired physical functions may increase the risk of falls in patients with cancer.