

# INPLASY PROTOCOL

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**Review Stage at time of this submission:** Data analysis.

**Conflicts of interest:**  
None declared.

## The effects of footbath on improving sleep quality in the older adults – A Systematic Review and Meta-Analysis

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**Review question / Objective:** P: Elder\*, Elder's, Elders, Elderly, old men, old women, old people, old patient, old population, old people, Aged, Elderly, Elderlies, geriatric\*, Geriatric Nursing, Gerontology\*, senior\*, senium MeSH term: Aged, very elderly, Aged, 80 and over, Frail Elderly, gerontology, elderly care, Geriatric Nursing, Geriatrics I: Footbath\*, Bath\*, Foot bathwarm, foot bath, hot spring\*, geothermal spring, hydrotherap\*, balneo therap\*, spa treatment, balneology, sauna MeSH term: Bath, Thermal spring, Balneotherapy, balneotherapy, hot springs, hydrotherapy. O: improve sleeping, dyssomnia\*, sleep\*, sleep patten, sleep time, sleep parameters, Sleep quality, Sleep hygiene, Sleep disorder, Insomni\*(Insomnia), Agrypni\*(Agrypnia), Sleep initiation and maintenance disorders, Hyposomni\* (hyposomnia), sleeplessness, sopor, parasomni\* (parasomnia), REM sleep, sleeplessness/sleep stage\*, sleep depriv\*, sleep latency, sleep habit MeSH term: Sleep disorder, Sleep, sleep deprivation, Sleep hygiene, sleep latency, sleep stage, Sleep hygiene, Sleep, Sleep Hygiene, Sleep Wake Disorders.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 06 September 2022 and was last updated on 06 September 2022 (registration number INPLASY202290025).

### INTRODUCTION

**Review question / Objective:** P: Elder\*, Elder's, Elders, Elderly, old men, old women, old people, old patient, old population, old people, Aged, Elderly, Elderlies, geriatric\*, Geriatric Nursing, Gerontology\*, senior\*, senium

MeSH term: Aged, very elderly, Aged, 80 and over, Frail Elderly, gerontology, elderly care, Geriatric Nursing, Geriatrics I: Footbath\*, Bath\*, Foot bathwarm, foot bath, hot spring\*, geothermal spring, hydrotherap\*, balneo therap\*, spa treatment, balneology, sauna MeSH term: Bath, Thermal spring, Balneotherapy,

balneotherapy, hot springs, hydrotherapy. O: improve sleeping, dyssomnia\*, sleep\*, sleep patten, sleep time, sleep parameters, Sleep quality, Sleep hygiene, Sleep disorder, Insomni\* (Insomnia), Agrypni\* (Agrypnia), Sleep initiation and maintenance disorders, Hyposomni\* (hyposomnia), sleeplessness, sopor, parasomni\* (parasomnia), REM sleep, sleeplessness/sleep stage\*, sleep depriv\*, sleep latency, sleep habit MeSH term: Sleep disorder, Sleep, sleep deprivation, Sleep hygiene, sleep latency, sleep stage, Sleep hygiene, Sleep, Sleep Hygiene, Sleep Wake Disorders.

**Condition being studied:** Studies have shown that thermoregulation exhibits powerful interactions with sleep, increased distal (foot)-proximal (abdominal) skin temperature gradient (DPG) has been associated with better sleep initiation. This study explored the effects of footbath at difference water temperatures, respectively, on DPG and sleep quality in elders. 10 research measurement tools including DPG, sleep quality, Sleep time, PSQI, GSQS or KMLSEQ.

## METHODS

**Search strategy:** In this descriptive study, 10 articles that were published in English with Korean and allowed full text access were taken into consideration without time limitation by using the key words of “footbath”, “sleep”, “sleep quality” and “elder” on MEDLINE OVID, Cochrane, Science Direction, Google Scholar, and Airiti Library databases. These articles were reviewed in terms of the effect of footbath on sleep quality of elderly individuals and Meta-Analysis.

**Participant or population:** Seniors over 60 years old.

**Intervention:** Footbath.

**Comparator:** No Footbath.

**Study designs to be included:** A Quasi-experimental study design, crossover, RCT.

**Eligibility criteria:** P: Seniors over 60 years old, I: Footbath, C: No Footbath, O: Sleep quality/Included: People over 60 years old; Excluded: Diabetes, peripheral sensory disturbances, acute illness or infection, vascular disease, communication difficulties or mental illness, use of sleeping drugs.

**Information sources:** MEDLINE OVID, Cochrane, Science Direction, Google Scholar, and Airiti Library databases.

**Main outcome(s):** Sleep quality: (1) Total sleep amount (min) (2) Sleep efficiency (%) (3) Sleep latency (min) (4) SDI frequency, Sleep disorder, PQSI, Groningen Sleep Quality Scale (GSQS), Distal-proximal skin temperature gradient (DPG), Korean Modified Leeds Sleep Evaluation Questionnaire (KMLSEQ).

**Quality assessment / Risk of bias analysis:** We used the Joanna Briggs Institute (JBI) for studies to assess the risk of bias of included papers. The JBI checklist is composed of questions 9-13, Overall appraisal have Include and Exclude, Seek further info. Two authors (SY and YC) independently assessed the risk of bias and disagreements between the two judges were resolved by with third author discussion.

**Strategy of data synthesis:** Random-effects models were implemented to estimate the pooled raw means of subjective sleep alterations during footbath. Meta-analyses and meta-regression were performed to calculate the sleep quality of footbath within an time length and within temperature to identify reasons for across-study heterogeneity. If the publication bias was statistically significant, the trim-and-fill method to adjust for funnel plot asymmetry was applied.

**Subgroup analysis:** The temperature, time and frequency of the foot bath will be analyzed.

**Sensitivity analysis:** Because of the different national ethnic groups, the fixed

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effect model is more suitable for the study group.

**Country(ies) involved:** Taiwan/National Cheng Kung University Hospital.

**Keywords:** Elder, Footbath, Sleep quality.

**Contributions of each author:**

**Author 1 - Shih-yu Chang** - Literature data collection, research structure formulation, research process and monitoring, data statistics and analysis, result writing and writing of closing report.

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