

Foot Reflexology for Secondary Sleep Disturbance and Daytime Sleepiness in Patients with Chronic Conditions: A Case Series

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Abstract

Background: Sleep disturbance is common among patients with chronic medical, psychological, and pain-related conditions and often presents as difficulty in initiating sleep, frequent awakenings, fragmented sleep, and daytime tiredness. Reflexology is a non-invasive intervention for sleep disturbance in adults, with meta-analytic evidence suggesting that foot reflexology may improve subjective sleep quality compared with control conditions.

Method: This descriptive case series was conducted in the inpatient department of Nature Cure and Yoga Hospital in Coimbatore, Tamil Nadu. Six female patients with disturbed sleep as a common secondary symptom were included. Daytime sleepiness was assessed using the Epworth Sleepiness Scale (ESS), nocturnal sleep disturbance was measured using the Pittsburgh Sleep Quality Index (PSQI), and sleep complaints were documented clinically. All patients received 10 sessions of foot reflexology, 20 minutes per session, administered at approximately 8:30 PM. The reflexology routine focused on the solar plexus reflex area, the brain/head reflex area below the great toe on the sole, and an insomnia-related heel reflex area. Baseline and post-treatment ESS and PSQI scores were compared descriptively, and patient-reported global improvement was recorded.

Results: The six patients presented with chronic conditions, including diabetes with hypertension, migraine, depression with bereavement history, sciatica, low back pain with scoliosis and gastric ulcer, and osteoarthritis of the knee. Baseline ESS scores ranged from 7 to 10, and post-treatment scores ranged from 1 to 4. Mean ESS decreased from 8.83 to 2.33, a mean reduction of 6.50. PSQI scores ranged from 6 to 9, with a mean baseline PSQI of 7.17 and a mean Post-treatment PSQI of 4.00. No adverse events were reported during the intervention period.

Conclusion: In this inpatient case series, foot reflexology was associated with reduced daytime sleepiness and improved subjective sleep disturbance. These observations support further controlled studies using validated sleep-specific outcomes such as the Insomnia Severity Index, where feasible, and objective measures such as actigraphy.

Keywords: Foot reflexology; sleep disturbance; sleep quality; daytime sleepiness

Introduction

Sleep disturbance commonly accompanies chronic pain, psychological stress, metabolic disease, cancer

treatment, musculoskeletal disorders, and it often affects daytime functioning as well as nighttime sleep [1]. Foot reflexology is a non-invasive complementary therapy in which pressure is applied to defined reflex areas on the feet, and multiple randomised trials and meta-analyses report improved subjective sleep quality in adults receiving reflexology compared with usual care or specific controls [2].

This evidence is strongest for subjective sleep scales, especially the Pittsburgh Sleep Quality Index (PSQI), which is the most commonly used sleep outcome in reflexology trials [3]. By contrast, objective evidence is more limited, as one actigraphy-based randomised study found improved sleep duration, efficiency, and awakenings after reflexology, whereas a small sleep-laboratory study found improved perceived sleep quality without changes in polygraph sleep architecture [4]. The Epworth sleepiness scale (ESS) is a validated measure of daytime sleepiness, while sleep questionnaires and pre-sleep questionnaires help document sleep onset, maintenance, awakenings, and bedtime behaviour [5].

Although randomised trials and systematic reviews have investigated foot reflexology for sleep quality, evidence describing its use among patients experiencing sleep disturbances in the context of multiple chronic and pain-related conditions remains limited. The present case series describes changes in subjective sleep quality and daytime sleepiness following a standardised course of foot reflexology in six inpatients receiving naturopathy care.

Methods

This was a descriptive case series conducted in the inpatient department of Nature Cure and Yoga Hospital, Coimbatore, Tamil Nadu. Six female patients aged 30-59 years with sleep disturbance as a secondary symptom during routine naturopathy care were included in the study.

Participants

Six female inpatients aged 30 to 59 years with Primary conditions including diabetes with hypertension, migraine, depression with bereavement history, sciatica, low back pain with scoliosis and gastric ulcer, and osteoarthritis of the knee; however, their common clinical feature was sleep disturbance as a secondary symptom [Table 1].

Outcome measures

Daytime sleepiness was assessed using the Epworth Sleepiness Scale (ESS) and subjective nocturnal sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI); both measures were recorded before the intervention and after completion of 10 reflexology sessions.

Intervention

All patients received 10 daily sessions of foot reflexology, each lasting 20 minutes, administered at night around 8:30 PM by experienced physicians, with each session documented daily. With the patient positioned supine, rhythmic thumb pressure was applied without lubricant to both feet across three targeted reflex areas for 5 minutes per area, beginning at the brain reflex area (located on the plantar surface and tip of the hallux), moving to the solar plexus reflex area (located in the central depression between the upper and middle third of the sole, just below the ball of the foot), and concluding at the lower back area/insomnia area (located in the calcaneum)

Results

ESS outcomes

Baseline ESS Scores were 8,8,10,10,7, and 10, with a mean baseline ESS of 8.83. Post-treatment ESS scores were 2,1,4,4,1, and 2, with a mean post-treatment ESS of 2.33. The mean reduction in ESS was 6.50 points [Figure 2]

The patient with migraine reported the greatest reduction in ESS Score, from 8 at baseline to 1 after treatment. Improvement was observed across sleep onset, sleep continuity, awakenings, daytime tiredness, and morning sleepiness [Table 2]. No serious adverse events were reported.

PSQI outcomes

Baseline PSQI scores were 6,6,8,6,9, and 8, with a mean baseline PSQI of 7.17. Post-treatment PSQI scores were 4,5,4,3,4, and 4, with a mean post-treatment PSQI of 4.00. [Figure 3] The mean reduction in PSQI was 3.17 points. All patients scored above the standard good sleeper threshold of 5 on the PSQI, indicating poor sleep quality. All six patients had post-treatment PSQI scores of ≤ 5 , which is below the conventional threshold for poor sleep quality [Table 2].

Discussion

In this case series, foot reflexology was associated with a notable reduction in daytime sleepiness on the ESS alongside a decrease in PSQI scores across six female patients. Baseline evaluation revealed that all patients met the recognised threshold for poor sleep, which normalised post-intervention to a mean PSQI score of 4.00. These results align with two recent meta-analyses showing that foot reflexology significantly improves subjective sleep quality in adults across clinical settings [2][6]. The PSQI and the Epworth Sleepiness Scale assess complementary aspects of sleep-related health, with the PSQI evaluating subjective sleep quality and the ESS assessing daytime sleepiness [1]. Foot reflexology suggests relief of nocturnal wakefulness and sleep onset latency, and reduced daytime drowsiness and fatigue [7]. Similar multidomain benefits spanning sleep, fatigue, and affective distress have been documented across randomised controlled designs in postmenopausal and postpartum women [8]. Reflexology in the solar plexus area and in the head area improves sleep, reduces pain and fatigue in children undergoing chemotherapy [9]. A systematic review conducted on reflexology includes the lower back area/ insomnia area used in pain reduction [10]. Recent research has suggested that reflexology may influence autonomic nervous system activity, including measures of heart rate variability time-domain metrics and reduction in sympathetic low-frequency ratios [1], however, autonomic parameters were not assessed in the present case series. Incorporating gentle touch, massage routines, or aromatic oils during application amplifies central sensory relaxation, reducing pain perception and hyperarousal before sleep [2]. These findings remain constrained by an uncontrolled case series design, small sample size, lack of comparison and absence of polysomnography.

Conclusion

Foot reflexology was associated with improved subjective sleep quality and reduced daytime sleepiness in these six patients. The observed reduction in ESS and PSQI scores supports the potential role of foot reflexology as an adjunctive intervention for sleep disturbance related to chronic illness.

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FIGURE 1
Reflexology area used in treatment course

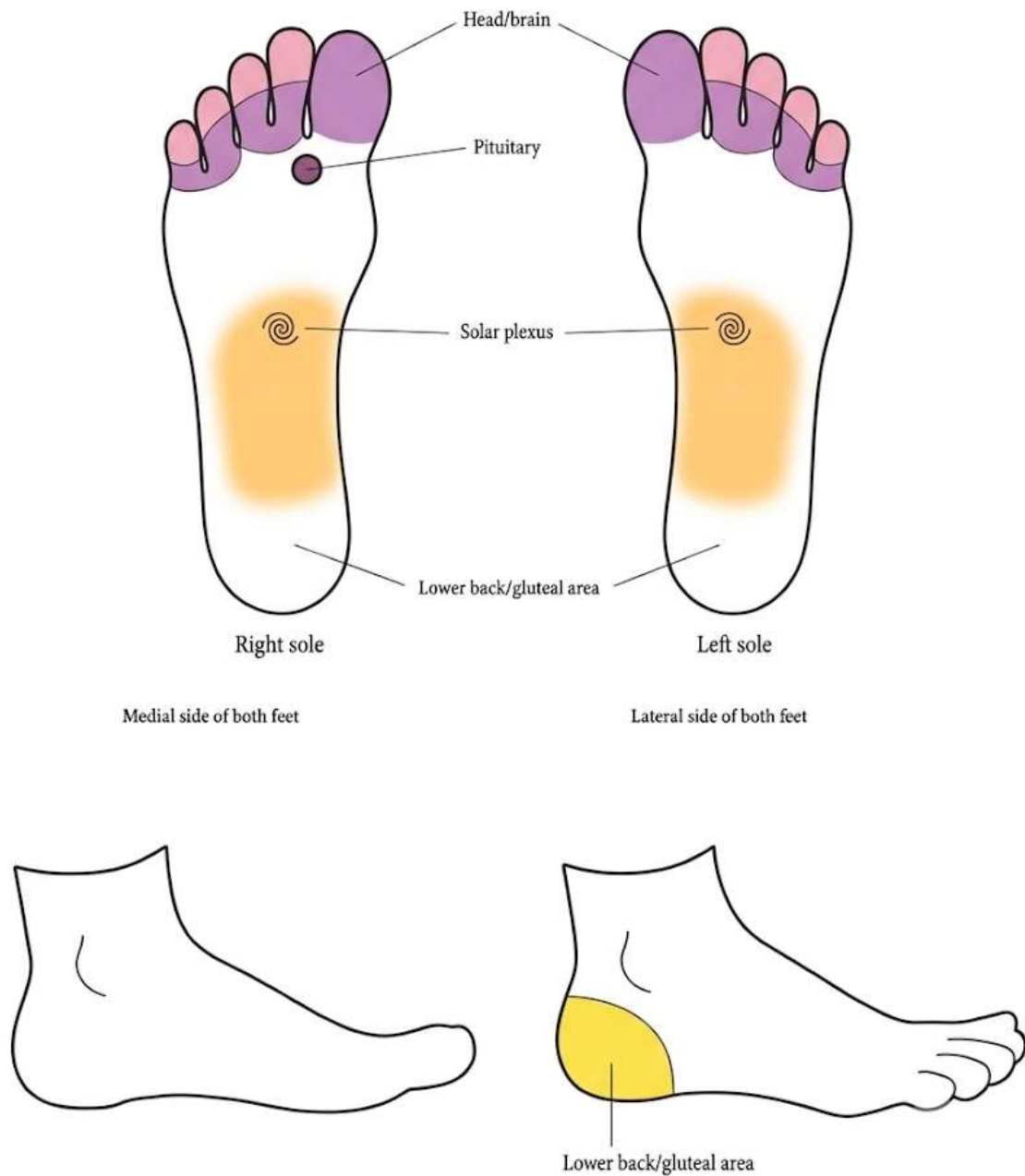


FIGURE 2
Pre- and post-treatment Epworth Sleepiness Scale (ESS) scores.

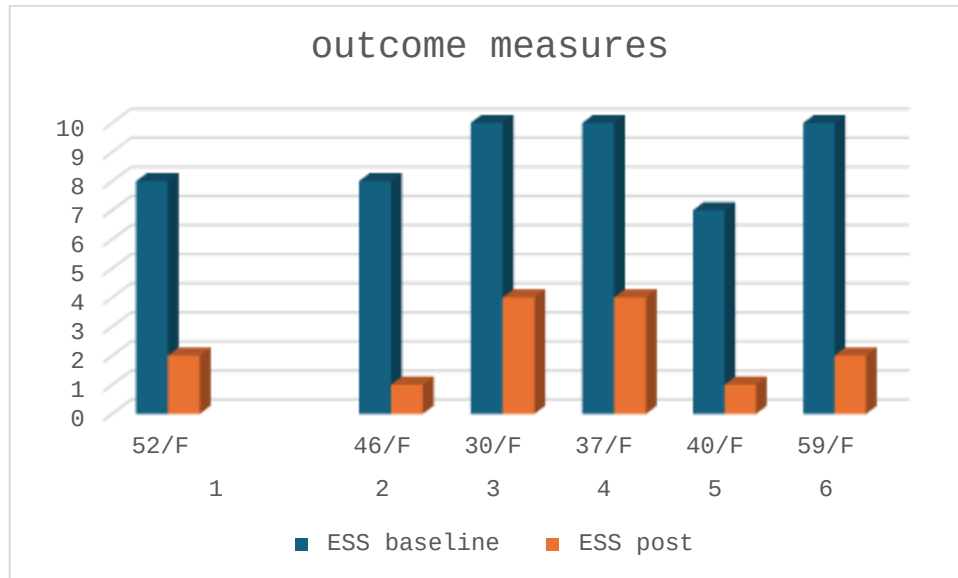


FIGURE 3
Pre- and post-treatment Pittsburgh Sleep Quality Index (PSQI) Scores.

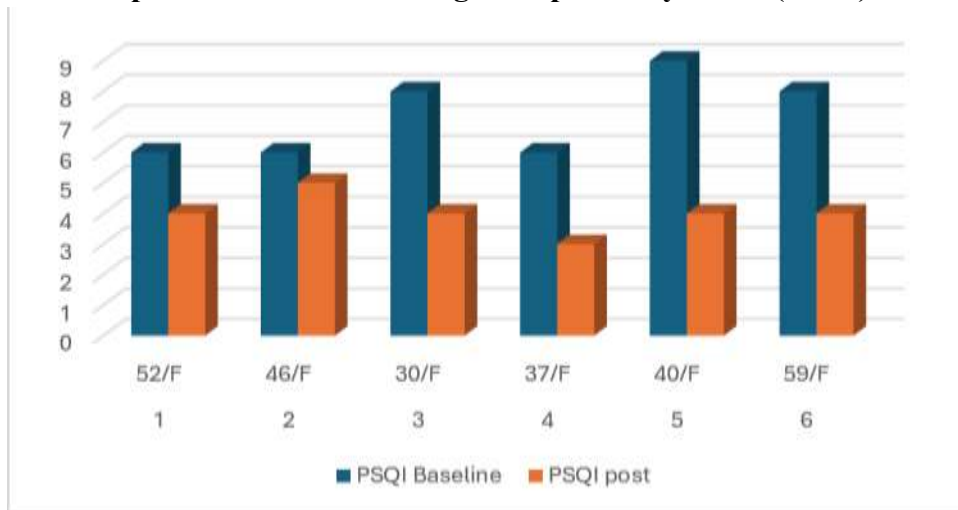


TABLE 1
Baseline case summary including primary complaints and sleep patterns

Case ID	age/sex	primary complaint	sleep pattern	duration	ESS baseline	PSQI baseline
1	52/F	Diabetes, hypertension	Sleep onset delay, snoring, nocturia, morning sleepiness	1 year	8	6
2	46/F	Migraine	Frequent awakenings, trouble initiating sleep	1 year	8	6

3	30/F	Depression, bereavement history	Trouble sleeping, frequent awakenings, short sleep, tiredness	1 year	10	8
4	37/F	Sciatica	Fragmented sleep, frequent awakenings	1 year	10	6
5	40/F	Low back pain, scoliosis, gastric ulcer	Trouble initiating sleep, disturbed sleep due to pain	1 year	7	9
6	59/F	Osteoarthritis of the knee	Short duration of sleep, daytime tiredness, frequent awakenings	1 year	10	8

Note: ESS - Epworth Sleepiness Scale; PSQI - the Pittsburgh Sleep Quality Index

TABLE 2
Comparison between baseline and post of ESS and PSQI

Case ID	ESS baseline	ESS post	PSQI Baseline	PSQI post
1	8	2	6	4
2	8	1	6	5
3	10	4	8	4
4	10	4	6	3
5	7	1	9	4
6	10	2	8	4

Note: ESS - Epworth Sleepiness Scale; PSQI - the Pittsburgh Sleep Quality Index