

Low back pain in people aged 65-70 years and its relationship with different mattresses

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Abstract: Objective: To determine the prevalence of low back discomfort in adults aged 65 to 70 years old, as well as the association between the mattresses they use.

Method: Adults aged 65-70 years who had been using the same type of mattress for more than 3 months were included in the cross-sectional study, which took place in Greece from June to September 2021. The Numeric Pain Rating Scale and a self-structured questionnaire were used to collect data. SPSS 25 was used to analyze the data.

Results: Of the 122 subjects, 85 (69.7%) were women; 37 (30.3%) were men. The overall mean age was 67.4±1.70 years. 65 (53.3%) subjects were using foam mattresses; 37 (30.3%) spring mattress; 20 (16.4%) firm mattresses. There was a significant effect of the mattress type on the level of back pain ($p < 0.001$). Spring mattress was significantly different than the firm mattress ($p < 0.001$) and the foam mattress ($p < 0.001$). However, the firm mattress did not significantly differ foam mattress ($p = 0.069$).

Conclusion: Low back discomfort was shown to be common in persons aged 65-70, and it was more common in those who had been sleeping on firm or foam mattresses.

Keywords: Back pain, Mattresses.

1. INTRODUCTION

Low back pain (LBP) is not an illness in and of itself; it is a symptom of a variety of conditions, including discomfort in the midline, which can be localized at times and resides between the costal edge and the inferior gluteal folds with or without referred leg pain [1, 2]. LBP can result in a variety of disabilities, including substantial limits, inactivity in daily life routines, loss of social functioning, and psychological disturbance, all of which can have a financial impact on individuals, society, and quality of life (QOL) [3, 4]. The prevalence of LBP has been rising around the world [5].

LBP is divided into two types: non-mechanical and mechanical back pain. Inflammatory diseases, tumors or infiltrative lesions, metabolic and acquired disorders are all examples of pathophysiological mechanisms that can produce non-mechanical back pain [6, 7]. Mechanical back pain, also known as non-specific LBP, is pain that originates in the spine, intervertebral discs, or surrounding soft tissues and is caused by a variety of factors rather than a specific disease.

Mechanical back pain is caused by a variety of circumstances, including aberrant lifting actions, unsuitable back tension, and maintaining incorrect posture while sleeping on inappropriate beds [8]. Standard mattresses are made up of a collection of soft or firm material or metal springs that are wrapped in a strapping material and sewn into a cover [9]. The

primary goal of utilizing a mattress is to support body posture so that the normal and neutral postural position may be maintained by adapting normal spinal alignment and modifying it according to body curvature to uniformly distribute weight [10].

Depending on the mattress material, different mattresses have varied impacts on the biomechanics of the body, such as the pressure suggested on the body lying on the mattress, which increases in proportion to the mattress hardness [11]. As the pressure on the body increases, skin deformation occurs. The activation of mechanoreceptors nociceptors occurs as a result of high loading, resulting in mechanical discomfort [12]. As a result, it's thought that pain perception is linked to pressure [10].

According to recent research, the mattress should either remain flat or have a good spring action that supports body curvature [13], allowing for increased bed movement, comfortable sleep, and the avoidance of undesired compressive pressures [14]. The lumbar support distributes gravity more evenly throughout the pelvic, lumbar, and thoracic areas while keeping the lumbar lordosis in a supine posture, implying that uniform body support minimizes muscle activity when sleeping [15].

Sleeping positions, in addition to mattresses, have an important role in the onset of LBP. When compared to a calm standing position, the pressure on the spine and interdiscs is reduced by 20% in the supine sleeping position. However, psoas muscle tension promotes hyperlordosis in the lumbar region by increasing pressure on the lumbar spine [15, 16]. The use of an appropriate mattress for one's posture has long been a point of contention, with most doctors advocating a normal hard or extra firm mattress to preserve lumbar lordosis despite the lack of scientific evidence [17].

The current study was planned to determine the prevalence of low back discomfort in adults aged 65 to 70 years old, as well as the association between the mattresses they use.

2. SUBJECTS AND METHODS

The cross-sectional survey took place in Greece from June 2019 to September 2021. The sample was drawn from people aged 65 to 70 who had been sleeping on the same mattress for more than a year, using a non-probability convenience sampling approach. Individuals with any type of spine injury or deformity, documented lumbar pathology and post-surgery patients, and BMI outside of the normal range were also eliminated. Data was obtained using a self-structured questionnaire and a numeric pain rating scale after each patient gave written informed consent. The survey inquired about the individuals' demographics as well as the kind of mattresses they used. They were also questioned about the pain's onset and character. The NPRS is an 11-point scale that measures pain severity, with 0 indicating no pain and 10 indicating the greatest agony ever experienced. SPSS 25 was used to analyze the data.

3. RESULTS

Of the 122 subjects, 85 (69.7%) were women; 37 (30.3%) were men. The overall mean age was 67.4±1.70 years. 65 (53.3%) subjects were using foam mattresses; 37 (30.3%) spring mattress; 20 (16.4%) firm mattresses (Table 1).

Table 1: Type of mattresses the subjects were using

		N	N %
Type of Mattress	Firm	20	16,4%
	Spring	37	30,3%
	Foam	65	53,3%

An ANOVA test was performed to investigate the effect of the mattress type on the level of back pain. There was a significant effect of the mattress type on the level of back pain at the p<.05 level for the three conditions [F(2, 119) = 22.756, p < 0.001]. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the spring mattress (M = 5.03, SD = 1.42) was significantly different than the firm mattress (M = 7.15, SD = 1.22, p < 0.001) and the foam mattress (M = 6.43, SD = 1.16, p < 0.001). However, the firm mattress (M = 7.15, SD = 1.22) did not significantly differ foam mattress (M = 6.43, SD = 1.16), p = 0.069. (Figure 1)

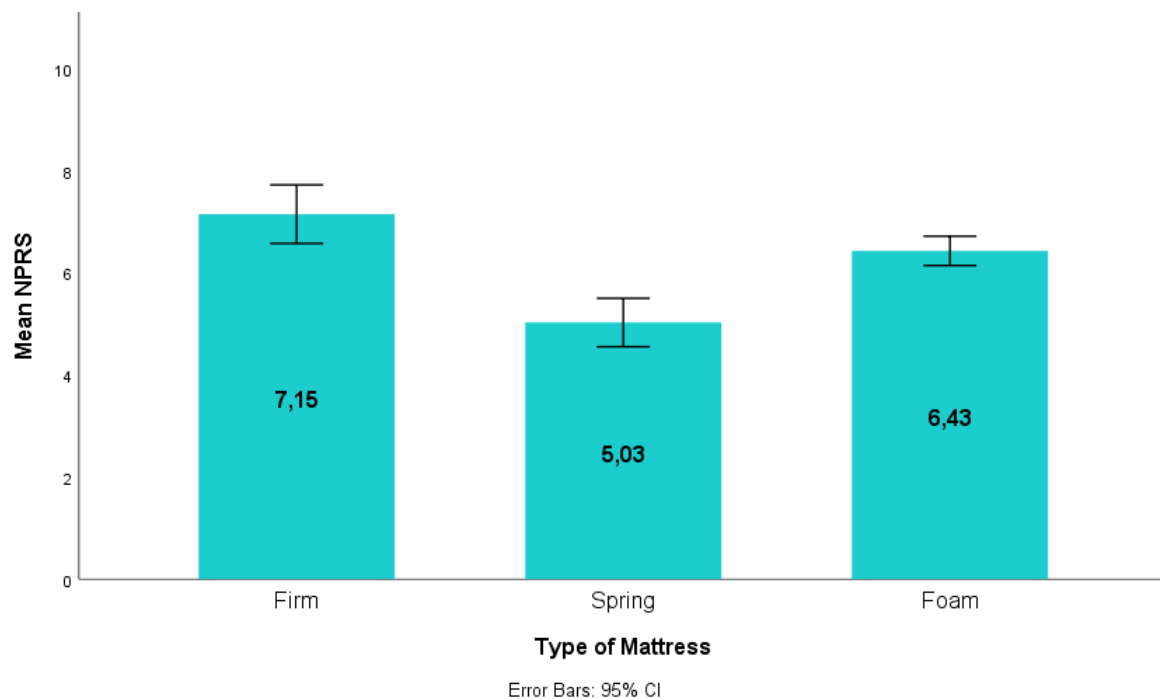


Figure 1: Relationship between Low back pain and different mattresses.

4. DISCUSSION

The study discovered that people who slept on firm beds have more pain. The effect of different mattress firmness on the clinical course of patients with chronic non-specific LBP was studied in a randomised, double-blind, controlled, multicentre trial, and it was found that patients who usually used medium firm mattresses had less pain-related disability, while those who used firm mattresses had more disability [7]. The increased strain on bony prominences such as the hips and shoulders could be the cause [14]. Firm mattresses are not usually harmful to the lower back, although they do provide overall comfort and ease of rolling in older people [10].

In the current study, LBP was also more common among foam mattress users. A 2017 study used peak body pressure and pressure distribution as outcome measures to assess the effect of different types of bed material on body contact pressure profiles in various sleeping postures. It was discovered that a foam mattress does not diminish peak body contact pressure on the torso and buttocks, which causes LBP [20]. Patients with non-specific LBP, according to a study, do not benefit from soft or foam mattresses because they do not preserve good body posture, particularly in the side-lying position [20]. Cotton mattresses, rather than foam mattresses, were found to provide comfort to LBP sufferers in a study [21-22].

LBP is linked to firm and foam mattresses because they do not respond to the curvature of the spine and so alter the body's biomechanics. Because the shoulder and pelvic areas are in more contact in the supine position, the weight is not evenly distributed and there is less support at the lumbar region. The shoulder and hip drop into the foam mattress in the side-lying position, generating lateral bending of the spine in the opposite direction [15]. Due to strong and concentrated pressure, users of firm mattresses experience impaired blood circulation and an unpleasant sensation [10].

A 2014 study employing electromyography (EMG) to assess human-mattress compatibility backed up the findings of the current investigation, indicating that there is a lower relationship of LBP with spring mattresses that generate less muscular stress while conducting bed movement exercises [23]. A study employing a neural network approach to anticipate human body indentation when sleeping on a spring mattress found that if the springs in the mattresses were positioned appropriately to preserve stiffness, they gave higher comfort. It was also discovered that spring mattresses are superior to other types of mattresses because they do not sag and conform to the body's curvature, ensuring appropriate spinal alignment since springs adjust naturally with body locations with high pressure and noticeable curves [24].

5. CONCLUSION

Adults aged 65 to 70 were found to have greater LBP when they slept on hard or foam mattresses consisting of high-density sponge and rebound sponge, respectively. Spring mattresses, which are commonly made of springy steel coils, were found to be a superior option, as LBP was considerably less common in individuals who used them.

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