

# The Impact of Wool in the Patients with Chronic Non-Specific Low Back Pain

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## ABSTRACT

*The aim was to assess the effect of wool underwear use in patients with chronic non specific low back pain. The study employed two-group, experimental design. A total of 48 patients with chronic non specific low back pain were selected for the study. They were distributed into two groups: a control group and a treatment group. The 24 patients in each group were randomly selected and the compositions of the two groups. The patients in the treatment group wore woolen underwear during the experimental period of 2 month. All patients were assessed at the beginning the trial (pre-test) and the end of 8th (post-test) week. Data were collected using the visual analogue pain scale, Oswestry Disability Index and Schober test measurements. Patients in the treatment group reported significant improvements in their conditions including a reduction in pain levels and Oswestry Disability Index, and Schober test measurements increased ( $p < 0.001$ ). Patients with chronic non-specific low back pain who wore wool underwear experienced significant improvements in pain intensity, disability, and lower back flexibility.*

**Key words:** chronic non specific low back pain, wool underwear, pain

## Introduction

Low back pain has a lifetime prevalence of 60–85%. Low back pain poses an economic burden to society, mainly in terms of the large number of work days lost (indirect costs) and less so by direct treatment<sup>1</sup>. Low back pain is usually defined as pain, muscle tension, or stiffness located below the costal margin and above the inferior gluteal folds, with or without leg pain (sciatica)<sup>2</sup>. Non-specific low back pain is defined as symptoms without a clear specific cause that is, low back pain of unknown origin. About 90% of all patients with low back pain will have non-specific low back pain, which, in essence, is a diagnosis based on exclusion of specific pathology<sup>1–3</sup>. Non-specific low back pain is characterised by pain, muscle tension or stiffness. These result in functional limitations<sup>1</sup>. The most important symptoms of non-specific low back pain are pain and disability<sup>4</sup>. Chronic nonspecific low-back pain refers to pain associated with the soft tissue (ligaments, tendons, skeletal muscle) of the low-back area. Treatment targets are reduction of pain and better activity/participation, including prevention of disability as well as maintainance of work capacity<sup>1,5</sup>. Drug therapies can control pain and may reduce

muscle tension. For most effective treatments, the effects are usually only small and short term. Unfortunately, many commonly used interventions lack sufficient evidence for clinically relevant long term effects<sup>3</sup>. There is still no consensus on the best way to manage chronic low back pain, and clinical guidelines are scarce<sup>2,5,6</sup>. Several epidemiologic studies have shown that cold may be a risk factor for occurrence or aggravation of disorders of the low back pain<sup>7–10</sup>. St. John Dixon et al. describe a »cold-sensitive« type of non-specific low-back pain, characterized by symptoms that are sensitive to cold and in particular at night<sup>11</sup>. Clothes fulfill a basic human need to maintain body temperature by protecting the body against temperature changes and other external effects<sup>12–14</sup>. The heat-keeping capacity of animal wool is higher than that of plant or synthetic fibers. In addition, wool fiber, particularly knitted wool, forms sites of isolation where air is stored, especially if the wool fiber is knitted from wool threads<sup>15–17</sup>. This study was carried out with the aim of evaluating the impact of the wool underwear in the patients with chronic non-specific low-back pain.

## Materials and Methods

The study randomized controlled trial was conducted. Forty-eight (48) persons who participated in this study were patients with chronic non-specific low back pain, who had applied to an outpatient clinic specializing in physical therapy and rehabilitation in Erzurum Turkey and who had volunteered for the study. The patients selected from this study were distributed into two blocks, Group I (treatment) and Group II (control). Each block (group) consisted of 24 patients. Participants were randomly selected and assigned to a treatment or control group. Patients in Group I received the woolen underwear, while those in Group II acted as the placebo group, receiving nonwool underwear.

### Study inclusion and exclusion criteria

The inclusion criteria were all patients were 18 years of age or older and living in the municipality of Erzurum. None of the patients had a history of using wool, nor had they received regular physical therapy for the 3 months prior to the start of the study. The exclusion criteria were the presence of the herniated lumbar disc, the presence of the vertebral fracture, inflammatory, infectious or malignant disease of the vertebra, the presence of severe structural deformity. Data were collected during the months of March through June 2009, which are the spring months in Eastern of Turkey.

### Intervention

Questionnaire form, pain scale and Oswestry Disability Index were applied to all participants, and the Schober test measurement were applied by the physical treatment and a rehabilitation expert (pre-test). Woolen underwear were given to all patients, pre-test measurement of whom were done in treatment group, woolen underwear given to treatment group are made of 75% of merinos wool and 25% of acrylic. Cotton under wear, the col-

ors of which are similar to woolen ones were given to the patients in control groups as placebo. The underwears worn by the patients in control group are made of 100% cotton. Those who are in treatment group wore woolen underwear and the patients in the control group wore placebo underwears for two months. Daily check-list were given to all the patients in both groups in order to mark the medications they used. The patients marked the drugs they used for two months (analgesics, non-steroidal anti-inflammatory and muscle relaxant). Post-test measurement were applied to all the patients in both groups at the end of two months. Pain scale, Oswestry Disability Index and Schober test were applied to the patients were done (post-test).

### Assessments

Data were collected through the pain scale, Oswestry Disability Index and Schober test measurements. All the patients were assessed both at the onset (pre-test) and the end of 2 months (post-test) of the study. In addition, the patients in both groups were provided with checklists with which they maintained a daily record of the drugs they used during the study. The Schober test measurements were determined through an examination given by a physical therapy and rehabilitation specialist blinded as to whether the patient was in the treatment or control group.

### Measurements

The low back pain intensity was assessed by visual analogue pain scale. The visual analogue pain scale has been shown to be a reliable and valid measure of pain and consists of a standard 10-cm line with verbal anchors indicating »no pain« at 0-cm and »severe pain« at 10-cm. Disability was measured using the 10-item Oswestry Disability Index. Oswestry Disability Index was originally described in 1980. The higher the percentage, the greater the perceived level of disability by the patient<sup>18</sup>. The

TABLE 1  
DEMOGRAPHIC AND BASELINE CLINICAL CHARACTERISTICS OF PARTICIPANTS

Variable	Treatment Group (N=24)	Control Group (N=24)
Age, years, $\bar{X}$ (SD)	38.3 (11.5)	40.3 (10.4)
Female (%)	19 (79.2)	21 (87.5)
Male (%)	5 (20.8)	3 (12.5)
Married (%)	16 (66.7)	18 (75.0)
Single (%)	8 (33.3)	6 (25.0)
adjustrightElementary school (%)	9 (37.5)	11(45.8)
Secondary school (%)	5 (20.8)	3 (12.5)
High school (%)	7 (29.2)	6 (25.0)
University (%)	3 (12.5)	4 (16.7)
Employed (%)	7 (29.2)	5 (20.8)
Unemployed (%)	17 (70.8)	19 (79.2)
Disease duration, years, $\bar{X}$ (SD)	4.9 (4.1)	5.6 (4.1)
Body mass index (kg/cm), $\bar{X}$ (SD)	29.4 (4.8)	28.4 (2.8)

(SD=Standard deviations).

Turkish version of the Oswestry Disability Questionnaire was validated by Yakut et al.<sup>19</sup>.

Range of motion was assessed by Schober test. A line is drawn that connects the »dimples of venus«. Then, two marks are made along a line that perpendicularly bisects the first line. One mark is 5 cm below and the other 10 cm above the point of bisection, with the distance between these two marks 15 cm. The patient is then asked to bend forward maximally. The measured distance beyond the original 15 cm gives an estimate of the degree of spinal flexion<sup>20</sup>.

### Statistical analysis

Demographic and baseline clinical characteristics were described using the mean and standard deviation of the mean (Table 1). In order to compare the treatment group with the control group with respect to pre-test data and post-test data, the independent samples t-test was used. To make a comparison of pre- and post-test results within the treatment group alone, however, the paired samples t-test was used (Table 2). A statistical analysis, based on two tailed t-test of 0.05 with a power of 0.95 was applied to the data to compare the use of wool in the treatment group with its nonuse in the control group.

### Ethical Considerations

Before each participant was entered in the study informed consent was obtained. The study was approved by the Atatürk University, Nursing Application Ethic Board, Erzurum, Turkey.

## Results

There was no statistically significant difference between treatment and control group demographic and baseline clinical characteristics such as age, gender, educational level, employed, disease duration and body mass index (Table 1). There were no significant pre-test differences between two groups in pain level, Oswestry Disability Index and Schober test ( $p > 0.05$ , Table 2). It was found that post-test scores for the treatment group were significantly better than those of the control group using the pain level, Oswestry Disability Index and Schober test measurements ( $p < 0.001$ , Table 2). It was found out that the number of days the patients in control group used analgesics, non-steroidal anti-inflammatory, and muscle relaxants medications was higher than that of the treatment group ( $p < 0.001$ , Table 2). Patients in the treatment group experienced significant reduction in the determined by the pain level, Oswestry Disability Index ( $p < 0.001$ , Table 2). Patients in the treatment group experienced significant increase in the determined by the Schober test ( $p < 0.001$ , Table 2).

## Discussion

This study indicated that there was significant improvement in pain, flexibility and disability levels of the patients with chronic non-specific low-back pain wearing wool underwear (Table 2). In the literature studies, while we could not run into any study dealing with the use of woolen underwear in the patients with chronic non-spe-

TABLE 2  
COMPARISONS OF PAIN, OSWESTRY DISABILITY INDEX, SCHOBBER TEST AND USED MEDICATION IN CONTROL AND TREATMENT GROUPS

Measures (score range)	Treatment (N=24) $\bar{X} \pm SD$	Control (N=24) $\bar{X} \pm SD$	Significant	
Pain, VAS, (0–10)				
Pre-test	6.7±1.7	7.1±1.5	t=-0.800	p>0.05
Post-test	0.7±0.7	6.6±1.0	t=-23.931	p<0.001
	t= 15.636	t=1.589		
	p<0.001	p>0.05		
Oswestry Disability Index (0–100)				
Pre-test	29.7±9.8	28.2±10.4	t=0.528	p>0.05
Post-test	9.5±2.4	27.6±9.4	t=-9.216	p<0.001
	t=10.169	t=0.630		
	p<0.001	p>0.05		
Schober test (15 cm +)				
Pre-test	19.4±0.7	19.1±0.8	t=1.308	p>0.05
Post-test	22.3±1.1	19.4±0.6	t=11.556	p<0.001
	t=-12.107	t=-1.556		
	p<0.001	p>0.05		
Number of day use of medication (0–60)				
Used medications	4.2±2.5	35.5±11.6	t=-12.913	p<0.001

SD=standard deviations, VAS=Visual Analogue Scale.

cific low-back pain. Non-specific low back pain is characterised by pain, muscle tension or stiffness. These result in functional limitations<sup>1</sup>. The most important symptoms of non-specific low back pain are pain and disability<sup>4</sup>. Chronic nonspecific low-back pain refers to pain associated with the soft tissue (ligaments, tendons, skeletal muscle) of the low-back area<sup>1,5</sup>. Clothes fulfill a basic human need to maintain body temperature (homeostasis) by protecting the body against temperature changes and other external effects<sup>12–14</sup>. The heat-keeping capacity of animal wool is higher than that of plant or synthetic fibers. In addition, wool fiber, particularly knitted wool, forms sites of isolation where air is stored, especially if the wool fiber is knitted from wool threads<sup>15–17</sup>. In this study, we think that woolen underwear used by the patients increased heat in the muscle with the impact of the heat and this reduced muscle tension and stiffness, and so it reduced the level of pain, disability and in conclusion it increased the level of Schober test (flexion of the lumbar spine). The patient using wool underwear also

reported using analgesics, non-steroidal anti-inflammatory, and muscle relaxants less frequently than their counterparts in the control group (Table 2).

## Conclusions

Patients with chronic non-specific low back pain who wore wool underwear experienced significant improvements in pain intensity, disability, and lower back flexibility. The use of wool underwear in the patients with chronic non-specific low back pain should be recommended as an inexpensive and easy way to mitigate and reduce the pain of the disease.

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## UTJECAJ VUNE KOD PACIJENATA S KRONIČNOM NESPECIFIČNOM BOLI U DONJEM DIJELU LEĐA

### SAŽETAK

Cilj je bio procijeniti utjecaj nošenja vunenog donjeg rublja kod pacijenata s kroničnom nespecifičnom boli u donjem dijelu leđa. Studija je bila eksperimentalna i obuhvatila je dvije skupine. Ukupno 48 pacijenata s kroničnom nespecifičnom boli u donjem dijelu leđa je izabrano i podijeljeno u dvije skupine: kontrolna i eksperimentalna skupina. Podijela u skupine bila je potpuno nasumična. Pacijenti u eksperimentalnoj skupini su nosili vuneno donje rublje u eksperimentalnom razdoblju od dva mjeseca. Svi pacijenti su bili procijenjeni na početku i na kraju (u osmom tjednu). Podaci su prikupljeni korištenjem vizualne analogne skale boli, Oswestry indeksa i Schober testnih mjerenja. Pacijenti u eksperimentalnoj skupini prijavili su znatna poboljšanja zdravstvenog stanja, smanjenje razine boli te povišene vrijednosti Oswestry indeksa i Schober testnih mjerenja ( $p=0,001$ ). Pacijenti s kroničnom nespecifičnom boli u donjem dijelu leđa koji su nosili vuneno donje rublje doživili su značajno poboljšanje u intenzitetu boli, nemogućnosti normalnog kretanja te fleksibilnosti donjeg dijela leđa.