

The Effect of Using Knee Support on Reducing Knee Pain in Elderly Cyclists

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Abstract

Background: Knee pain during cycling can arise due to the repetitive movements involved in the activity. Overuse injuries, also termed repetitive strain injuries, denote damage and discomfort resulting from repetitive and excessive motions. Such injuries typically affect muscles, tendons, and bones. This pain may persist, particularly during strenuous activities like exercise. Knee support represents a common orthotic tool utilized to alleviate knee pain.

Aims: The aim of this study is to ascertain whether the use of knee support has an effect on reducing the degree of knee pain in elderly cyclists.

Methods: The research employs a quasi-experimental design with pre- and post-test assessments. Twenty-five subjects were selected using purposive sampling techniques based on predefined inclusion and exclusion criteria.

Results: The analysis employed the Wilcoxon test, yielding a p-value of (0.001). Since the p-value is ≤ 0.05 , it can be inferred that the utilization of knee support effectively diminishes the degree of knee pain in elderly cyclists.

Conclusion: This study demonstrates the efficacy of knee support in reducing knee pain among elderly cyclists. Hence, it is advisable for elderly cyclists to utilize knee braces while cycling.

Keywords: Knee support, knee pain, elderly cyclists

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Introduction

Cycling is included in the category of recreational sports, because it is done in spare time with the aim that the perpetrators can obtain emotional satisfaction, such as pleasure, joy, happiness, as well as physical and spiritual satisfaction, such as maintaining health and physical health, so as to obtain overall health status (Hidayat et al., 2020). Cycling is very popular with people from all walks of life, from children to adults to the elderly (Alfatiyano et al., 2021).

Elderly is someone who has reached the age of 60 years and over. According to the age limit, there are 3 old age groups, namely the initial age of 46-55 years, the end of the age of 56-65 years, and the age of 65-to older (Hakim, 2020).

One of the most common problems in the elderly is knee pain (Aisyah, 2017). Knee pain when cycling can occur because when cycling the human knee makes repetitive movements so that it is at risk of experiencing overuse injury. Overuse injuries can usually affect muscles, tendons and bones (Aicale et al., 2018).

Efforts that can be made to reduce pain experienced by the elderly, one of which is by using knee support. Knee support is one of the usual orthosis tools to deal with pain that attacks the knee. Knee support is usually used for athletes who do high-intensity sports, and can also be used by the elderly who often experience pain and discomfort in their knees. Apart from working with knee pain, these aids can also correct deformities or prevent further deformities (Robert-Lachaine et al., 2020).

This study aims to determine the effect of using knee support on reducing the degree of knee pain in elderly cyclists.

Methods

This study used a quantitative quasi-experimental one group pre-test and post-test. The study was conducted in one group without a comparison group. The location of the research was carried out in This research will be

conducted in the village of Manisrejo, Madiun City. The time of conducting this research was in January 2023. The research population was all elderly cyclists in Manisrejo village. Sample selected by purposive sampling technique. The classification criteria for inclusion in this study are; 1) elderly cyclists 2) age range 50-85 years 3) willing to be research subjects 4) willing to use a knee orthosis. The classification criteria for exclusion in this study were experiencing illness or injury. Data processing using SPSS, the normality test was carried out first then the bivariate test using the paired sample t-test.

Results

In this research, there are several characteristics created to provide an overview of the subjects studied in the research:

Table 1. Characteristics of Subjects Based on Age

Age	Frequency	Presentation
45-55	5	20 %
56-65	5	20 %
66-75	10	40 %
76-85	5	20 %
Total	25	100 %

Source: Primary Data 2023

Table 2. Characteristics by Gender

Gender	Frequency	Presentation
Male	6	28 %
Female	19	76 %
Total	25	100 %

Source: Primary Data 2023

Tabel 3. Characteristics by Body mass indeks

IMT	Frequency	Presentation
Underweight	1	4 %
Normal	19	76 %
Overweight	5	20%
Total	25	100 %

Source: Primary Data 2023

Table 4. Characteristics of Pre-test Knee Pain Scale data

Pain category	Frequency	Presentation
Mild Pain	17	68 %
Moderate Pain	8	32 %
Total	25	100 %

Source: Primary Data 2023

Table 5. Characteristics of Post-test Knee Pain Scale data

Kategori Nyeri	Frequency	Presentation
Tidak Ada Nyeri	4	16 %
Nyeri Ringan	21	84 %
Total	25	100 %

Source: Primary Data 2023

In this research, the Shapiro Wilk normality test will be used with the following results:

Table 6. Statistical Results of Shapiro Wilk Data

Variabel	P Value	Information
Pain (Pre)	0,000	abormal
Pain(Post)	0,000	abormal

Source: Primary Data 2023

Hypothesis testing in this research will use the Wilcoxon test with the following results:

Table 7. Statistical Results of Wilcoxon Data

Variabel	Mean	Z	P Value
Pain (Pretest)	2,76	-3,464	0,001
Pain (Post test)	1,32		

Source: Primary Data 2023

Discussion

This study was conducted to determine the reduction in the degree of knee pain by using knee support in elderly cyclists. From the population obtained, the researcher took 25 samples that met the predetermined inclusion and exclusion criteria. Researchers in this study used a quasi-experimental research design with pre and posttest designs. The data taken is primary data which has been divided into several criteria needed in this study. The subject will fill out a questionnaire as well as tests and interviews to determine that the subject is experiencing pain and fits the existing criteria. Furthermore, researchers will measure the degree of pain before using the tool (pretest) and record it using the Number Numeric Scale (NRS).

Subjects will be given a knee support device and after 3 weeks of use the degree of pain will be measured again after using the device (posttest). The data that has been collected will be processed using the SPSS program. This test uses Wilcoxon with results obtained with a p value of (0.001), where the p value is ≤ 0.05 so it can be concluded that the use of knee support can reduce the degree of knee pain in elderly cyclists.

The results of this research are also in accordance with research conducted by (Ningsih et al., 2018) entitled "The Effect of Using Knee Deckers on Knee Pain in Becak Peddlers at the Klewer Market". The results of the data analysis obtained in this study were $P: 0.00$ ($p < 0.05$). These results indicate that there is a reduction in the degree of pain between before and after being given treatment. These results are also supported by research conducted by (Rachmat & Putra, 2022) entitled "The Effect of Using Knee Support on Knee Pain in Skateboarders in Singaraja, Bali".

In this study, the results showed that $P: 0.001 < 0.05$, so it can be concluded that there was a reduction in the degree of knee pain in skateboarders. Another research conducted by (Suprayogi et al., 2023) entitled "The Effect of Using Knee Deckers on Knee Pain in Farmers in Mojopuro Village, Sragen Regency", obtained the results of $P: 0.000 < 0.05$ so it can be concluded that there is a significant effect on reducing degree of pain in farmers.

The way this neoprene knee orthosis works is that it will provide a warm feeling and pressure around the knee and a warm feeling on the knee. Providing support and stabilizers to the joints will relieve knee pain. This is in line with research conducted by (Ningsih et al., 2018) which explains that the way the knee orthosis works is to put pressure around the knee and keep the knee area warm. Serves to provide fixation to knees that have suffered sports injuries. As well as providing support and stabilizers to the joints, it will relieve knee pain. The elastic material has the ability to stretch and return to its original state quickly so that it functions as a fixation on the knee (Rachmat & Putra, 2022).

There are also several criteria that can cause risk factors for knee pain. The age factor can be one of the causes of pain. In this study the age range was from 45-85 years. The percentage aged 45-55 years was 5 respondents (20%), 56-65 years 5 respondents (20%), 66-75 10 people (40%) and 76-85 years 5 respondents (20%). This is supported in a study conducted by (Sitinjak et al., 2016) entitled "The Effect of Rheumatic Exercise

on Changes in the Pain Scale in Elderly with Knee Osteoarthritis". In this study, there were treatment and control groups consisting of groups aged 60-74 years experiencing severe pain (7-9) by 75% and moderate pain (4-6) by 25%.

From the results of the discussion in this study, it is also stated that the age range of 60-74 years proves the theory that knee OA can cause pain due to a degenerative process. This can also be strengthened by research conducted by (Berteau, 2022) entitled "Knee Pain from Osteoarthritis: Pathogenesis, Risk Factors, and Recent Evidence on Physical Therapy Interventions" There is an increased risk of OA in adults aged over 50 years, due to the inability of chondrocytes to produce proteoglycans to maintain the cartilage matrix that provides compressive strength to the cartilage and their failure to maintain homeostasis. Thus, the tissue tends not to heal when under pressure, causing articular cartilage degeneration disease that causes OA. However, this cannot be solely related to age.

Apart from age, gender can also influence the pain that occurs in the knee. Table 2 shows that 18 respondents (72%) of the research subjects were female and the remaining 7 respondents (28%) were male. It can be concluded that the largest number of respondents based on gender are women. This is also supported by research written in a scientific article entitled "Diagnosis and Treatment of Osteoarthritis" which states that the prevalence of osteoarthritis aged 49-60 years in Malang reached 21.7%, consisting of 6.2% men and 15, 5% women (Pratiwi, 2015). Research conducted by (Tiofunda Budiman & Friska Widjaja, 2020) with the title "Description of the Degree of Pain in Genu Osteoarthritis Patients at the Royal Taruma Hospital, West Jakarta". In this study, the sample obtained was 80 subjects and 63 subjects were women (78.8%) and the remaining 17 subjects (21.3%) were men. In elderly women, there are changes in hormonal status and bone damage. Menopause is often associated with increased interleukin-1 (IL-1) which is part of the cytokine response in OA. In postmenopausal women, as

estrogen levels decrease, there may be an increase in IL-1 leading to OA. Table 3 shows that 1 respondent (4%) has a light thin BMI, 19 respondents (76%) are normal, and 20% is mildly obese. Based on the information above, the criteria for weight and BMI have no effect in this study because the respondents are not obese or overweight. The BMI value is given based on five criteria, namely: heavy thin (<17 kg/m²), light thin (17-18.4 kg/m²), normal (18.5-25 kg/m²), light fat (25.1- 27 kg/m²), and heavy fat (>27 kg/m²) (Freigang et al., 2020).

Conclusion and Recommendation

In this study it was concluded that according to the results of statistical analysis the use of Knee Support can reduce knee pain in elderly cyclists. So that cyclists, especially the elderly and experiencing pain in their knees, are advised to use knee support to maintain the condition of their knee joints.

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