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The Effectiveness of Used Knee Decker to Knee Pain Complaints in Running Trail's Runner

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Abstract

Background: Running performance is influenced by environmental and geographical factors, particularly terrain variations like slopes in trail running. Such conditions increase injury risk, especially to the lower extremities, with the knee joint being highly vulnerable. Knee deckers—elastic supports available in multiple sizes—are designed to mitigate injury risks by enhancing joint flexibility, providing stabilization, and reducing pain during daily activities or sports.
Aim: To evaluate the effectiveness of knee deckers in alleviating knee pain among trail runners.
Methods: A quasi-experimental study with a one-group pretest-posttest design was conducted. From a population of 163 trail runners, 30 participants were selected via purposive sampling based on inclusion/exclusion criteria. Pain levels were assessed before and after knee decker use.
Results: Wilcoxon test analysis revealed a statistically significant reduction in knee pain ($p = 0.000$, $p < 0.05$), confirming the intervention's effectiveness.
Conclusion: Knee deckers significantly reduce knee pain in trail runners, supporting their utility for injury prevention and pain management.

Keywords: Knee decker; Knee pain; Trail running

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Introduction

Currently, sports are indirectly a necessity and an effort to improve the quality of human life. The impact of exercise is outstanding in supporting health and pleasure in humans and providing better body conditions than before (Prasetyo et al., 2023). One sport that can be used as an option is running.

Running is one of the most popular sports because it is easy to do anywhere and anytime without the need to learn beforehand (Praditasari et al., 2018). Apart from running, it has many benefits (Janssen et al., 2020). It is also a sport that does not require a lot of money; even some people prefer to run in an open field so they don't have to pay anything to do it (Maselli et al., 2019).

Many factors can affect running performance, and one of them is environmental and geographical factors. These geographical factors relate to geomorphology and the type of surface and terrain (Padulo et al., 2013). An example of a running sport is trail running. According to Siregar (2018), trail running is a running activity where the terrain doesn't have a flat surface or can be interpreted as the ground surface up and down.

In trail running, it can be interpreted as a running activity on a hill or incline with an angle of approximately 45 degrees to develop dynamic strength (Firmansyah, 2022). there are uphill running and downhill running movements. In short, uphill running is a movement on a sloping road or incline (Aliang et al., 2021). Meanwhile, downhill running is the opposite of uphill running, namely running on a downhill or downhill track (Nanang, 2020).

Downhill and uphill movements in trail running can provide a lot of load to the knee joint because the knee contributes importantly as the largest and most load-bearing joint of the human body during activities (Anom et al., 2022).

As with other sports, running also has a risk of injury that can occur, especially in the lower extremities (Zainab, 2021). Based on existing research, there is a risk of injury associated with running, especially in the lower extremities, which has a prevalence of around 24-85% (Charles & Rodgers, 2020). According to Fredericson & Mirsa in Artha & Ridia's research (2016), it was found that the most common injury in runners is injury to the knee area which has an incidence rate of 15-25% of all injuries.

Many factors result in these high numbers such as running distances that are too long, high running volumes, and lack of experience when running. The high resultant force imposed on the knee joint, especially in repetitive flexion and extension movements such as running, can cause an increased risk of injury to runners that can cause pain in the knee (Dwinagara, 2021). Efforts that can be made to reduce the pain experienced by runners include using a knee decker.

Knee decker is widely available and easy to find on the market. It is available in various sizes ranging from small, medium, large, and extra-large. Knee decker is suitable for use in daily activities because the material is elastic which serves to reduce the risk of new or recurrent injuries by creating greater flexibility in muscles, tendons, and ligaments to provide pressure support in the knee joint and can maintain its flexibility (Dani, 2017). The fixation as well as support and stabilizers in the joint area will be able to relieve knee pain, so it is expected to improve daily functional activities (Karma, 2013). The purpose of this study was to determine the effectiveness of the use of knee decker on knee pain complaints in trail running runners.

Methods

This study is a type of quasi experiment research using a one group pretest and posttest design which aims to determine whether there is an effectiveness of using knee decker on knee pain in trail running runners. With a research sample of 30 people who experience knee pain.

The instrument used in measuring knee pain is the Numeric Rating Scale (NRS). NRS is considered a simple and easy to understand method and in assessing acute pain is better than using VAS. However, the drawback is the limited selection of words to describe pain (Yudiyanta et al., 2015).

Numeric Rating Scale (NRS) Pain Classification as follows:

0: No pain
1-3: Mild pain
4-6: Moderate pain

7-9: Severe pain
10: Worst possible pain

This study begins by conducting a pre-test, namely measuring the knee pain level of the research subjects before being given a knee decker, then the knee decker is used at the time after taking the first measurement (pre-test). The last measurement (Post-test) was taken after a period of using the intervention in the form of a knee decker for 1 week (Bennett et al., 2021). The results of the pain measurements were then compared.



Figure 1. Knee Decker

Results

A total of 30 samples of trail running runners were found to have knee pain levels based on predetermined exclusion and inclusion criteria.

The inclusion criteria set include: 1) male students 2) members of Santri Pecinta Alam MATIQ Isy Karima 3) participating in running activities 4) complaining of pain while running with a mild to moderate scale 5) willing to be a research subject 6) willing to use knee decker. The exclusion criteria set include: 1) the research subject is injured or sick 2) the subject has a history of acute pain 3) the subject is undergoing tahfidz quarantine and has not reached the target of memorizing the Qur'an.

The research data was observed and measured twice at the time of the pre-test, which is before being given treatment in the form of wearing a knee decker, and at the time of the post-test, which is after being given treatment after using a knee decker to determine their fatigue level for 1 week.

Table 1. Frequency Distribution Based on Age

Age	Frequency	Percent (100%)
15	9	30%
16	12	40%
17	9	30%
Total	30	100%

(Source: Primary Data, 2024)

Based on the results of the table, it shows that of the total 30 research subjects, the age range of the research subjects ranged from 15-17 years. The percentage of 15 years of age is 9 respondents (30%), 16 years is 12 respondents (40%), and 17 years is 9 respondents (30%).

Table 2. Frequency Distribution Based on BMI

BMI	Frequency	Percent (100%)
Normal	22	73,3%
Overweignt	6	20%
Obese	2	6,7%
Total	30	100%

(Source: Primary Data, 2024)

Based on the results of the table, it shows that 22 respondents (73.3%) have normal BMI, 6 respondents (20%) are overweight, and 2 respondents (6.7%) are obese.

Table 3. Results Pretest Knee Pain Level

Pain Level	Frequency	Percent (100%)
No Pain	-	-
Mild	12	40%
Moderate	18	60%
Total	30	100%

(Source: Primary Data, 2024)

The results of a total of 30 research subjects experienced pain before the use of a knee decker for mild pain of 12 respondents (40%) and for moderate pain of 18 respondents (60%). Results Pretest knee pain level.

Table 4. Results Posttest Knee Pain Level

Pain Level	Frequency	Percent (100%)
No Pain	7	23,3%
Mild	16	53,3%
Moderate	7	23,3%
Total	30	100%

(Source: Primary Data, 2024)

The results of a total of 30 research subjects experienced pain after using a knee decker for no pain for 7 respondents (23.3%), mild pain for 16 respondents (53.3%), and moderate pain for 7 respondents (23.3%).

Table 5. Shapiro-Wilk Data Normality

	N	Sig. Shapiro-Wilk	
Pretest	30	0,004	Abnormal
Posttest	30	0,012	Abnormal

(Source: Primary Data, 2024)

The results of the normality test with Shapiro-Wilk on the pain variable before and after the intervention showed that the pain measurement data on the pretest and posttest obtained the results of P <0.05, so the data was not normally distributed. So, the hypothesis test used uses Wilcoxon.

Table 6. Wilcoxon Hypothesis Test Results

	Mean	Z	P Value
Pretest	4,06		
Posttest	2,10	-4,919	0,000

(Source: Primary Data, 2024)

Based on the table shows the results of the calculation with the Wilcoxon test Z value of (-4,919) with a P value of (0.000) where the P value <0.05 so it can be concluded that the use of knee decker there is a significant effectiveness on reducing the degree of knee pain in trail running runners.

Discussion

This study was conducted to determine the effectiveness of using a knee decker on complaints of knee pain in trail running runners. From the total population, researchers took 30 samples that met the inclusion and exclusion criteria. This study uses quasi-experiment research with a one-group pretest and posttest design.

Researchers measured the degree of pain before using a knee decker (pre-test) with the NRS (Numeric Rating Scale) measuring instrument. After that, the subject was given an intervention in the form of a knee decker and then measured the degree of pain again using the NRS (Numeric Rating Scale) measuring instrument after 1 week of use (post-test).

The data that has been collected is processed using the SPSS program with the Wilcoxon test. The results obtained a P value of (0.000), where a P value ≤0.05 it can be concluded that there is a significant effect on the use of knee deckers on knee pain complaints in trail running runners by 48%. These results are obtained from the difference in the average results of pre and post data which are then divided by the average pre-data and multiplied by 100%.

The use of a knee decker can affect daily activities and the redistribution of pressure on the knee joint. This study highlights the mechanism by which the device applies pressure around the knee and keeps the area warm, which contributes to pain reduction (Suprayogi et al., 2023).

The results of this study are supported by research (Suprayogi et al., 2023) entitled 'The Effect of Using a Knee Decker to Reduce Knee Pain in Farmers' obtained the results of P = 0.000 (p <0.05). Statistically, these results show that there is a significant effect of intervention between before and after treatment. The result of this study is that using a knee decker on farmers while working can reduce knee pain by 43%.

This is related to research conducted by In a study (Widagdo, 2023) entitled "The Effect of Using Knee Support on Reducing the Degree of Knee Pain in Elderly Cyclists" in this study it was found that P = 0.001 <0.05 and the results of reducing knee pain in the elderly were 52% so it can be concluded that it is significant in reducing knee pain.

This is related to research conducted by (Trimandasari et al., 2018) entitled 'The Effect of Using Knee Decker on Knee Pain in Pedicab Drivers in Klewer Market' The results obtained show that there is an effect of using a knee decker on reducing the degree of pain in pedicab drivers in Klewer Market, with the results of P = 0.000 (p <0.05). The study also explained the reduction in knee pain due to the mechanism of action of emphasizing around the knee.

During this study, there were limitations that could affect the results of the study, including limited funds to buy a knee decker, so the sample was split into 2 groups so that they could take turns using the knee decker.

Conclusion and Recommendation

The findings demonstrate that knee deckers are effective in reducing knee pain among trail runners. Based on these results, two key recommendations are proposed:

1. Future studies should implement longer intervention periods to better assess the long-term efficacy of knee deckers, and
2. Researchers should incorporate regular follow-up assessments to verify consistent device usage during physical activities.

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