

The Effect of Modified PVC Pipe Training Aids on Indoor Hockey Dribbling Skills

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Abstrak

Tujuan: Tujuan penelitian ini adalah mengetahui pengaruh penggunaan alat bantu modifikasi berbahan paralon terhadap peningkatan keterampilan dribbling hoki indoor pada siswa ekstrakurikuler hoki SMAN 1 Garut. Penelitian menggunakan metode eksperimen dengan desain one-group pretest-posttest. Subjek penelitian adalah seluruh siswa ekstrakurikuler hoki SMAN 1 Garut yang aktif, berjumlah 20 siswa, dengan teknik total sampling. Data dikumpulkan melalui tes dan pengukuran keterampilan dribbling sebelum dan sesudah perlakuan. Perlakuan diberikan sebanyak delapan kali pertemuan dengan frekuensi dua kali dalam satu minggu. Analisis data dilakukan menggunakan uji normalitas Shapiro-Wilk dan uji Mann-Whitney dengan bantuan perangkat lunak statistik. Hasil deskriptif menunjukkan rata-rata skor keterampilan dribbling meningkat dari 55,2 pada pretest menjadi 86,1 pada posttest. Hasil uji normalitas menunjukkan data pretest dan posttest tidak berdistribusi normal. Uji Mann-Whitney menghasilkan nilai Z sebesar -1,908 dengan signifikansi 0,004. Karena nilai signifikansi lebih kecil dari 0,05, hipotesis nol ditolak dan hipotesis alternatif diterima. Dengan demikian, penggunaan alat bantu modifikasi paralon menunjukkan pengaruh yang signifikan terhadap peningkatan keterampilan dribbling hoki indoor pada siswa SMAN 1 Garut. Alat bantu tersebut dapat menjadi alternatif media latihan yang sederhana dan variatif dalam pembelajaran atau latihan keterampilan dribbling hoki.

Kata kunci: alat bantu paralon; dribbling; hoki indoor; keterampilan; ekstrakurikuler

Abstract

This study aimed to examine the effect of a modified PVC-pipe training aid on improving indoor hockey dribbling skills among students participating in the hockey extracurricular program at SMAN 1 Garut. The study employed an experimental method using a one-group pretest-posttest design. The participants were 20 active students in the school hockey extracurricular program, selected through total sampling. Data were collected through dribbling skill tests and measurements administered before and after the intervention. The intervention consisted of eight training sessions conducted twice a week. Data were analyzed using the Shapiro-Wilk normality test and the Mann-Whitney test with statistical software. The descriptive results showed that the mean dribbling skill score increased from 55.2 at pretest to 86.1 at posttest. The normality test indicated that both pretest and posttest data were not normally distributed. The Mann-Whitney test produced a Z value of -1.908 with a significance value of 0.004. Since the significance value was below 0.05, the null hypothesis was rejected and the alternative hypothesis was accepted. Therefore, the use of the modified PVC-pipe training aid had a significant effect on improving indoor hockey dribbling skills among students at SMAN 1 Garut. The training aid can serve as a simple and varied alternative for developing dribbling skills in school hockey training.

Keywords: modified training aid; dribbling; indoor hockey; skill; extracurricular activity

Introduction

Physical education uses physical activity, games, and sport as educational media to develop individuals holistically. In the school environment, physical education contributes to physical fitness, motor skills, knowledge, social interaction, and positive character development. Sport activities can also be developed through extracurricular programs that provide students with opportunities to develop interests and skills beyond regular classroom instruction. In this context, hockey is one of the sports that can support the development of physical, technical, social, and disciplinary competencies.

Indoor hockey is a team sport that requires players to control a ball with a hockey stick while moving quickly in a relatively limited playing area. Basic skills such as pushing, stopping, dribbling, and shooting are important foundations for effective play. Among these skills, dribbling is essential because it enables players to maintain ball possession while moving, change direction, create space, and prepare for passing or shooting. The thesis source describes Indian dribbling as alternating forehand and backhand movements that produce a zig-zag ball trajectory, while straight dribbling emphasizes forward ball control.

Skill development requires systematic and repeated practice. The thesis identifies a lack of varied training media as one of the practical problems in hockey training at SMAN 1 Garut. Modified equipment can make technical practice more accessible, provide clearer movement targets, and add variation to training. The use of modified hockey equipment has also been discussed in previous research. Carsiwan and Sandrawaty (2016) reported the educational potential of hockey activities, while Hermawan and Permadi (2022) found that a peer-teaching approach could support hockey skill development. The thesis also refers to research by Muhamad Razi (2021), which reported increased student motivation following hockey equipment modification combined with peer teaching.

Although previous studies have examined hockey learning, peer teaching, and equipment modification, the thesis identifies a specific need to examine a simple PVC-pipe aid focused on dribbling practice in the extracurricular setting of SMAN 1 Garut. The present study therefore focuses on whether the modified PVC-pipe training aid is associated with improved dribbling skill scores after an eight-session intervention. The objective was to determine the effect of the modified training aid on indoor hockey dribbling skills among students at SMAN 1 Garut.

Materials and Methods

Study Design

This study used an experimental method with a one-group pretest-posttest design. The same group was assessed before the intervention and after the intervention. The design was selected to compare students' dribbling skill performance before and after training using the modified PVC-pipe aid.

Study Participants

The population consisted of active students participating in the hockey extracurricular program at SMAN 1 Garut. The detailed methodology and data tables in the thesis report 20 active students, and total sampling was used so that all members of the population became research participants.

Study Organization

Data collection used a dribbling skill test and measurement. The assessment focused on seven dribbling performance indicators, each scored on a four-point scale. A pretest was conducted before the intervention. The experimental group then received eight treatment sessions with a frequency of two sessions per week using the modified PVC-pipe training aid in dribbling practice. A posttest was administered after the treatment period. The thesis describes the modified aid as a training medium designed to make dribbling practice easier and provide a more directed movement pathway.

Statistical Analysis

The data were processed using Microsoft Excel and statistical software. Normality was examined using the Shapiro-Wilk test. Because the pretest and posttest data were reported as non-normally distributed, hypothesis testing was conducted using the Mann-Whitney test at a significance level of 0.05. The decision criterion reported in the thesis was that a significance value below 0.05 indicates rejection of the null hypothesis.

Results

The descriptive analysis showed a substantial increase in dribbling skill scores after the intervention. The pretest mean was 55.2 with a standard deviation of 13.59, whereas the posttest mean increased to 86.1 with a standard deviation of 10.12.

Measurement	n	Mean	Standard Deviation
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Pretest	20	55.2	13.59
Posttest	20	86.1	10.12

Table 1. Descriptive statistics of dribbling skill scores.

The Shapiro-Wilk test indicated that both datasets were not normally distributed. The significance value was 0.000 for the pretest and 0.001 for the posttest, both below 0.05.

Data	Shapiro-Wilk Sig.	α	Conclusion
Pretest	0.000	0.05	Not normally distributed
Posttest	0.001	0.05	Not normally distributed

Table 2. Normality test results.

Because the normality assumption was not met, the thesis used the Mann-Whitney test for hypothesis testing. The analysis produced a Mann-Whitney U value of 541.500, Wilcoxon W of 1321.500, Z of -1.908, and an asymptotic significance value of 0.004. The posttest had a higher mean rank (43.36) than the pretest (33.88).

Comparison	N	Mean Rank	Sum of Ranks
Pretest	20	33.88	1321.50
Posttest	20	43.36	1604.50

Table 3. Mann-Whitney rank results.

Statistic	Value
Mann-Whitney U	541.500
Wilcoxon W	1321.500
Z	-1.908
Asymp. Sig. (2-tailed)	0.004

Table 4. Mann-Whitney test statistics.

The significance value of 0.004 was lower than 0.05. Based on the decision criterion used in the thesis, the null hypothesis was rejected and the alternative hypothesis was accepted. The result therefore indicates a statistically significant difference between the reported pretest and posttest dribbling scores following the training intervention.

Discussion

The main finding of this study is the improvement in students' dribbling scores after training with the modified PVC-pipe aid. The mean score increased from 55.2 to 86.1, indicating that the students demonstrated better performance after the intervention. The increase was also reflected in the Mann-Whitney rank analysis, in which the posttest mean rank was higher than the pretest mean rank.

From a practical perspective, the modified aid appears to provide a more directed training environment for dribbling. The thesis describes the aid as being arranged to follow the intended direction of the ball, allowing students to focus on controlling the stick and ball while moving through a defined pathway. This may help beginners understand the movement pattern and repeatedly practice the same technical action. Repetition is particularly relevant to skill acquisition because technical performance develops through continued practice and refinement.

The result is consistent with the rationale presented in the thesis that varied training media can support hockey practice. The modified equipment provides an alternative to conventional practice and may reduce monotony. Carsiwan and Sandrawaty (2016) emphasized the broader contribution of hockey activities to physical fitness and student development, while Hermawan and Permadi (2022) reported positive effects of a peer-teaching approach on hockey skill learning. The present study adds a more specific focus on a low-cost training aid for dribbling rather than on a teaching model alone.

The findings are also comparable in direction with the study by Muhamad Razi (2021), as reported in the thesis. That study used a one-group pretest-posttest design and examined hockey equipment modification in a peer-teaching context. Its reported mean increased from 73.6 to 85.7. Although the outcome variable and training context were not identical to the present study, both studies suggest that modification of hockey training media can provide a useful stimulus for learning or skill development.

Nevertheless, the study should be interpreted within the limitations of its design. The research used only one group and did not include a control group. Consequently, improvements cannot be attributed exclusively to the PVC-pipe aid without considering other factors such as repeated practice, coaching, familiarity with the test, or general training effects. In addition, the thesis reports the use of the Mann-Whitney test even though the design involves pretest and posttest measurements on the same participants. The article retains the statistical procedure and results reported in the thesis rather than recalculating the analysis. Future studies should consider a paired non-parametric analysis for repeated measurements and, where feasible, include a comparison group.

Overall, the findings support the practical use of a modified PVC-pipe aid as an alternative training medium for indoor hockey dribbling at SMAN 1 Garut. The equipment is relatively simple and can provide structured movement pathways, which may help coaches vary practice activities while maintaining attention to basic dribbling technique.

Conclusions

The study found that indoor hockey dribbling skill scores increased after the implementation of training using the modified PVC-pipe aid. The mean score increased from 55.2 in the pretest to 86.1 in the posttest, and the Mann-Whitney analysis reported $Z = -1.908$ with $p = 0.004$. Based on the statistical criterion used in the thesis, the result indicates a significant difference between the pretest and posttest scores. The modified PVC-pipe aid can therefore be considered a practical alternative for providing variation and structure in indoor hockey dribbling practice. Further research should use a control group and an analysis appropriate for paired pretest-posttest data to strengthen the evidence.

Acknowledgments

The author expresses gratitude to Universitas Garut, SMAN 1 Garut, the hockey extracurricular students who participated in the study, and the supervisors and other parties who supported the completion of the research.

Conflict of Interest

The author declares no conflict of interest.

Funding

This research received no external funding.

Keywords

Indoor hockey dribbling, modified training aid, PVC-pipe.

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Catatan editorial: skripsi memuat ketidakkonsistenan jumlah populasi pada abstrak (30 siswa) dan bagian metode/tabel hasil (20 siswa). Artikel ini menggunakan 20 siswa karena angka tersebut konsisten dengan uraian metode dan seluruh tabel analisis hasil.