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**EXTENDED
ABSTRACT**

Evaluating the Impact of NetballSmart Warm-Up on Youth Agility and Power

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I. INTRODUCTION

Injury prevention programs like NetballSmart have grown in popularity, yet evidence on their performance benefits remains limited [1]. This study explores the impact of NetballSmart Dynamic Warm-Up on agility and power among JMIX youth netball players, comparing it with normal routines to evaluate effectiveness in enhancing physical performance.

II. METHODS

Twenty JMIX netball players aged 12–17 was randomly assigned to NetballSmart (NSDW) or normal (NW) warm-up groups. Agility was measured via the Illinois Agility Test, muscular power via vertical and broad jump tests. The NetballSmart dynamic warm-up [2] was delivered biweekly for four weeks, progressively targeting strength, balance, and neuromuscular control. The normal group performed general jogging and static stretching.

III. RESULTS AND DISCUSSION

A. Effects of Warm-Up on Agility and Power

Table I presents the pre- and post-intervention performance outcomes for both NSDW and NW groups. The aim was to evaluate the effects on agility, explosive horizontal power (broad jump), and vertical power (vertical jump). A significant improvement in agility performance was observed in both groups. The NSDW group showed a substantial reduction in mean Illinois test times from 20.3 ± 1.60 s to 16.5 ± 0.96 s ($p < 0.001$). Similarly, the NW group improved from 20.4 ± 1.34 s to 16.9 ± 1.82 s ($p < 0.001$). These results suggest that both warm-up protocols were effective in enhancing agility, but the greater mean reduction in the NSDW group indicates that NetballSmart may be more efficient. This aligns with previous studies highlighting the value of structured, multi-component warm-up routines like NetballSmart in improving neuromuscular control, balance, and movement efficiency [1]. The NSDW program's inclusion of dynamic movements, change-of-direction drills, and sport-specific activation likely contributed to these gains.

Both groups experienced non-significant improvements in broad jump performance. The NSDW group increased from 159.1 ± 18.55 cm to 170.3 ± 23.24 cm ($p = 0.129$), while the NW group improved from 156.7 ± 16.31 cm to 162.9 ± 21.13 cm ($p = 0.336$). Although the changes were not statistically significant, the NSDW group showed a larger absolute

improvement, suggesting potential benefits with longer intervention periods. Previous research supports the idea that neuromuscular warm-ups can positively influence lower-body power over time, particularly when they include plyometric elements [2].

Likewise, vertical jump performance showed non-significant improvements in both groups. The NSDW group improved from 25.3 ± 4.30 cm to 27.2 ± 6.91 cm ($p = 0.218$), while the NW group changed from 26.5 ± 3.34 cm to 26.9 ± 1.85 cm ($p = 0.678$). These findings suggest that while the NetballSmart warm-up may begin to elicit adaptations in lower-body explosive strength, a longer intervention or supplemental strength training may be necessary to achieve statistical significance. Studies by [3] suggest that consistent exposure to dynamic and plyometric warm-up elements over several weeks is required to produce meaningful gains in vertical power.

TABLE I
PAIRED T-TEST RESULTS (NSDW AND NW GROUPS)

Variables	Groups	Pre	Post	p value
Illinois (s)	NSDW	20.3 ± 1.60	16.5 ± 0.96	<0.001*
	NW	20.4 ± 1.34	16.9 ± 1.82	<0.001*
Broad Jump (cm)	NSDW	159.1 ± 18.55	170.3 ± 23.24	0.129
	NW	156.7 ± 16.31	162.9 ± 21.13	0.336
Vertical Jump (cm)	NSDW	25.3 ± 4.30	27.2 ± 6.91	0.218
	NW	26.5 ± 3.34	26.9 ± 1.85	0.678

*Significant difference between pre and post

B. Effects of Warm-Up on Agility and Power

The comparison between the NetballSmart Dynamic Warm-Up (NSDW) and normal warm-up (NW) groups in Table II showed no statistically significant differences in agility ($p = 0.536$), broad jump ($p = 0.896$), or vertical jump ($p = 0.464$). However, the NSDW group consistently recorded slightly better performance in all three tests, suggesting a potential advantage of sport-specific, neuromuscular-focused warm-ups. Although the improvements were not significant, these findings align with previous research indicating that dynamic warm-ups like NetballSmart can enhance movement

quality, coordination, and lower-body power when applied consistently over time [1][4].

TABLE II
INDEPENDENT T-TEST RESULT (NSDW AND NW)

Variables	NSDW	NW	t (18)	P value
Illinois (s)	16.5 ± 0.96	16.9 ± 1.82	-0.63	0.536
Broad Jump (cm)	27.2 ± 6.91	26.9 ± 1.85	0.13	0.896
Vertical Jump (cm)	170.3 ± 23.24	162.9 ± 21.13	0.75	0.464

IV. CONCLUSIONS

Both the NetballSmart Dynamic Warm-Up (NSDW) and normal warm-up (NW) effectively improved agility among youth participants, with NSDW showing slightly greater gains. Although improvements in broad jump and vertical jump were not statistically significant, the NSDW group consistently performed better across all measures. These results suggest that structured, sport-specific warm-up routines like NetballSmart may offer practical benefits for enhancing agility and lower-body power, especially with continued use over time.

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