

The Effects of Stretching Exercise in Enhancing Side Kick Performance in Karate

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ABSTRACT

This study investigated the effects of specific stretching exercises on side kick (yoko-geri) performance among 38 first-year female Bachelor of Physical Education students at Tagoloan Community College, using a quasi-experimental pretest-posttest design without random assignment. Participants were divided into two groups: Group 1 (n=20) performed Sitting Single Leg Hamstring Stretch and Half Split Stretch, while Group 2 (n=18) performed Butterfly Stretch and Seat-Side Straddle Stretch, with routines held for 16 seconds each, repeated 2-3 times, 2-3 days per week over five weeks at the college's covered court and parking areas. Pre-test results showed moderate-to-high "Good" (chest-level) kicking performance in both groups (Group 1 mean=3.40, SD=0.598; Group 2 mean=3.28, SD=0.461), with 73.68% at Level 3. Post-tests indicated significant improvements: Group 1 reached "Outstanding" (face-level, mean=4.00, SD=0.00; $t(19)=-4.49$, $p=.001$; $W=0.00$, $p=.002$), and Group 2 also "Outstanding" (mean=3.72, SD=0.461; $t(17)=-3.69$, $p=.002$; $W=0.00$, $p=.006$). However, no significant between-group difference emerged in performance increments ($t(36)=-1.53$, $p=.134$; $U=120$, $p=.081$), confirming both routines equally enhanced flexibility, neuromuscular coordination, range of motion, and kick execution. These findings, grounded in biomechanical theory, support integrating such stretching into PE curricula and karate training while recommending future longitudinal studies on long-term effects and individual factors.

INTRODUCTION

Karate as a traditional Japanese martial art originated in Okinawa, Japan. It had been practiced widely for more than 40 years across the world (Lozovyy, 2023). In the Philippines, karate continues to thrive with various organizations promoting martial arts education and training (Yu, 2024). One of the key challenges in karate is flexibility, a crucial factor in executing effective and powerful kicks. Ensuring that practitioners, particularly beginners, develop proper muscle extension techniques is essential for achieving precise movements and avoiding injuries (Nascimento et al., 2023).

Flexibility plays a significant role in optimizing kicking mechanics by allowing practitioners to perform a wider range of motions, maintain balance, and improve overall performance (David, 2024). However, achieving proper flexibility requires structured stretching routines, time, and dedication (Karaduman, 2022). Karate instructors emphasize the importance of incorporating stretching exercises to refine leg extension, kicking form, and neuromuscular coordination while minimizing the risks of muscle strain due to repetitive movements (Hampton, 2024).

Despite the importance of this study, Esparrago and Esparrago-Kalidas (2024) highlighted the limited empirical evidence on the effectiveness of specific stretching exercises for enhancing flexibility and performance in karate kicks. Identified the most effective exercises was important for enhancing student performances. Current literature lacks comprehensive studies comparing different stretching exercises and their impact on karate performance, especially among students. Studies suggest that while stretching enhances muscle elasticity and motor skills, the effectiveness of different stretching approaches varies based on execution, adherence, and individual physiological factors (Özkaya et al., 2024).

This study aims to evaluate the impact of four specific stretching exercises, Sitting Single-Leg Hamstring Stretch, Half Split Stretch, Butterfly Stretch, and Seated Side Straddle Stretch, on side kick (yoko-geri) performance among first-year Bachelor of Physical Education female students at Tagoloan Community College. Using a quasi-experimental design, the study compares the effectiveness of these stretching routines over five weeks, measuring improvements in flexibility and kicking execution. The findings seek to support physical educators, coaches, and students in refining martial arts training programs, ensuring optimal performance and injury prevention in karate practice.

MATERIALS AND METHODS

This study used a quasi-experimental design to assess the effects of stretching exercises in enhancing side kick performance in karate. A total of 38 first-year female Bachelor of Physical Education students from Tagoloan Community College participated, divided into two groups practicing different stretching routines: Sitting Single-Leg Hamstring Stretch and Half Split Stretch, and Seated Side Straddle Stretch and Butterfly Stretch. The research was conducted over five weeks, including pre-tests, stretching interventions, and post-tests, held in designated college facilities. Measurements focused on hip flexibility, kicking execution, and muscle engagement, analyzed using paired t-tests and Wilcoxon statistical methods to determine effectiveness. Ethical compliance was ensured through participant consent and institutional approval, and findings aim to support structured flexibility training in karate and physical education programs.

RESULTS AND DISCUSSION

This research provides valuable insights into the effects of stretching exercises on enhancing side kick performance (yoko-geri) among first-year female Bachelor of Physical Education (BPED) students. The study evaluates the effectiveness of two stretching combinations and compares their impact on flexibility and kicking performance. The results confirm that structured stretching significantly contributes to better athletic output, aligning with research by Zvetkova et al. (2023) and Bryant et al. (2023), who emphasized the role of flexibility routines in performance improvement.

The analysis of the pre-test results revealed that both groups began with relatively strong kicking skills. Sitting Single Leg Hamstring Stretch and Half Split Stretch group recorded a mean of 3.40 (SD = 0.598), while Butterfly Stretch and Seat-Side Straddle Stretch group recorded a mean of 3.28 (SD = 0.461), both rated as “Good” (Bryant et al., 2023; Behm et al., 2023). These results confirmed that participants had a foundational level of flexibility and technique, which allowed for measurable enhancements due to stretching interventions rather than initial skill disparities (Warneke et al., 2022).

Post-test results showed a notable improvement in both groups. Sitting Single Leg Hamstring Stretch and Half Split Stretch group achieved a perfect score of 4.0 (SD = 0.00), while Group 2 scored a mean of 3.72 (SD = 0.46), both indicating performance at face-level kick execution

(Suyudi et al., 2024). Statistical analysis supported these improvements with t-test results of $t(19) = -4.49$, $p < .001$ for Sitting Single Leg Hamstring Stretch and Half Split Stretch group and $t(17) = -3.69$, $p = .002$ for Butterfly Stretch and Seat-Side Straddle Stretch group, confirming the effectiveness of both routines (Behm et al., 2023; Forte and Teixeira, 2023). These findings illustrate the role of stretching in enhancing motor coordination and physical performance, as previously emphasized by Bouguezzi et al. (2023) and Bryant et al. (2023).

When comparing the two groups' levels of improvement, statistical tests (Mann-Whitney $U = 120$, $p = .081$; $t(36) = -1.53$, $p = .134$) revealed no significant differences, despite Sitting Single Leg Hamstring Stretch and Half Split Stretch group showing slightly higher average gains. This indicates that both stretching combinations were equally effective in improving side kick execution (Warneke et al., 2024; Özkaya et al., 2024). As noted by Shah et al. (2023), the consistent application of stretching protocols, regardless of the technique, can enhance muscle elasticity and joint mobility when the muscles targeted are functionally similar.

These results are in line with biomechanical theories such as those of Scarr et al. (2022), who proposed that improved movement efficiency and power transmission can result from increased flexibility across interconnected body systems. Moreover, Zvetkova et al. (2023) emphasized the role of muscle-tendon preparation and joint mobility in karate performance. Participants in this study showed improved leg control, stronger hip rotation, and better triangular alignment during the kick, attributes linked to proper flexibility training (Latash, 2022; Lee et al., 2024).

Further, the observed post-test improvements reinforced the practicality of these routines within educational and sports programs. Both stretching combinations targeted key muscle groups involved in side kick execution, such as hamstrings, groin, and hip flexors (Sakhalkar et al., 2022), Eske (2024), and Andito et al. (2023). Since the routines required minimal equipment and time, they can be readily integrated into warm-ups or skill-building sessions, an approach supported by Kwon & Kim (2025) and David (2024), who highlighted the value of short, consistent efforts in martial arts training.

To sum up, the study demonstrates that both stretching programs, Sitting Single Leg Hamstring with Half Split, and Butterfly with Seat-Side Straddle, are equally valuable tools in enhancing flexibility and athletic performance. These findings echo the suggestions of AbdElaziz and Saber (2024) and Zaichik (2022), who advocated for structured and adaptive training routines in martial arts. The outcomes also validate the inclusion of stretching modules in academic PE training and support future research exploring long-term impact and application across different populations (Esparrago & Esparrago-Kalidas, 2024).

CONCLUSION

The study concludes that both stretching exercises: Sitting Single Leg Hamstring Stretch with Half Split Stretch, and Butterfly Stretch with Seat-Side Straddle Stretch, significantly enhanced the participants' kicking performance. While the Sitting Single Leg Hamstring Stretch with Half Split Stretch showed slightly higher average gains, statistical analysis confirmed no meaningful difference between the two, establishing that each method was equally effective in enhancing flexibility and kick height. Overall, the results validate the importance of structured stretching in developing athletic performance, refining motor skills, and supporting long-term physical health.

RECOMMENDATIONS

This study recommends the inclusion of teaching basic flexibility concepts into the early-stage in karate training, especially for beginners, to help them understand the role of muscle stretching in kick execution, ensuring greater safety, effectiveness, and skill development. It

also encourages for further empirical research comparing the impact of specific stretching routines on flexibility and performance, particularly within academic settings, to determine the most effective methods for enhancing kicking ability. Additionally, the study highlights the need to address the under-representation of female and younger practitioners in existing literature by exploring how stretching interventions influence their physical development, thus supporting the creation of more inclusive and targeted training programs in higher education.

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