

Awareness of Warm-Up and Cool-Down Exercises among Recreational Walkers: A Cross-sectional Study

Dr. Priyanka Gopal Sangole¹, Dr. Yogesh Patil²

¹BPT Intern. TMV'S Indutai Tilak College of Physiotherapy, Pune – 411037.

²Associate Professor. TMV'S Indutai Tilak College of Physiotherapy, Pune – 411037

Abstract:

Introduction: Recreational walking is a simple and accessible form of physical activity; however, recreational walkers may have limited awareness and inconsistent practice of warm-up and cool-down exercises. This study aimed to assess knowledge, attitude, and practice regarding warm-up and cool-down exercises among recreational walkers in Pune.

Methodology: A cross-sectional observational survey was conducted among 290 recreational walkers aged 18–64 years from parks, walking tracks, and open recreational areas in Pune. A researcher-developed, content-validated Knowledge, Attitude, and Practice (KAP) questionnaire was administered. Data were analysed using descriptive statistics and percentage analysis.

Results: The mean age of participants was 26.60 ± 7.81 years, with 158 females and 132 males. All participants (100%) had heard of warm-up exercises, while 91.4% had heard of cool-down exercises. Knowledge regarding the importance of warm-up and cool-down was reported by 92.8% and 86.9%, respectively. Positive attitudes were observed, with 235 participants considering warm-up necessary and 230 considering cool-down necessary. However, only 33.4% always performed warm-up and 41.0% always performed cool-down. The overall KAP score was 68.25%, with knowledge, attitude, and practice scores of 81.33%, 78.28%, and 44.66%, respectively.

Conclusion: Recreational walkers demonstrated good knowledge and favourable attitudes toward warm-up and cool-down exercises, but practical implementation was comparatively low. The findings indicate a clear knowledge–practice gap and highlight the need for physiotherapy-led education, practical demonstrations, and community-based interventions to promote safe and consistent warm-up and cool-down practices.

Keywords: Recreational walking; Warm-up; Cool-down; Knowledge; Attitude; Practice; Physiotherapy

Introduction:

Walking is a simple, natural, and widely practiced form of physical activity that can be performed by individuals across different adult age groups ^(12,13). It is considered one of the safest and most accessible modes of exercise, as it requires minimal equipment, low financial cost, and limited infrastructure ⁽¹²⁾. Walking is commonly adopted as a recreational activity due to its affordability, ease of performance, and significant health benefits, especially among individuals who do not participate in structured or competitive sports activities ⁽²⁾. Because of these characteristics, walking is frequently recommended as

a lifelong physical activity for maintaining general health, cardiovascular fitness, and functional independence ^(12,13).

Recreational walking refers to walking performed for health, fitness, leisure, or relaxation rather than for occupational or competitive purposes ⁽²⁾. Recreational walkers are generally non-athlete individuals who voluntarily engage in walking as part of their daily or weekly routine. This population includes young adults, middle-aged individuals, and a large proportion of older and retired individuals ⁽⁷⁾. Unlike athletes, recreational walkers usually do not receive formal training or professional supervision, which may result in inadequate exercise practices and limited awareness regarding safe walking habits ⁽⁶⁾.

Warm-up exercises are preparatory activities performed before physical activity to gradually increase heart rate, muscle temperature, and blood flow ⁽³⁾. Physiologically, warm-up improves muscle elasticity, joint mobility, and neuromuscular coordination, thereby preparing the body for physical stress ^(3,5). Several studies have demonstrated that appropriate warm-up reduces muscle stiffness and lowers the risk of musculoskeletal injuries during repetitive activities such as walking ^(4,7). Despite these benefits, warm-up is frequently neglected by recreational walkers due to lack of awareness and improper understanding of its importance ^(1,6). Similarly, cool-down exercises are performed after completion of physical activity and involve gradual reduction in exercise intensity followed by stretching and relaxation techniques ⁽⁸⁾. Cool-down plays an important role in maintaining venous return, preventing sudden drops in blood pressure, and facilitating cardiovascular recovery ⁽¹⁴⁾. It also helps reduce post-exercise muscle soreness, stiffness, and delayed recovery, particularly in adults and older individuals ^(9,10). Skipping cool-down may result in dizziness, discomfort, and prolonged muscle fatigue after walking ^(8,14).

Research evidence supports the importance of warm-up and cool-down not only in athletes but also in individuals performing moderate-intensity activities such as recreational walking ^(11,12,13). Structured warm-up has been shown to improve flexibility, joint mobility, and movement efficiency, while cool-down contributes to improved recovery and reduced musculoskeletal discomfort ⁽¹⁵⁾. These effects are particularly relevant for walking, which is a repetitive and weight-bearing activity performed regularly by recreational populations ⁽¹⁵⁾. Despite strong scientific evidence supporting the benefits of warm-up and cool-down exercises, awareness and proper practice among recreational walkers remain limited ^(1,6,16). Studies have highlighted that although some individuals are aware of warm-up and cool-down, many lack knowledge regarding correct techniques, duration, and sequencing ^(1,16). This gap in awareness increases the risk of preventable discomfort, stiffness, and overuse injuries during walking ⁽¹¹⁾. Indian population-based studies have primarily reported overall physical-activity levels rather than the prevalence of recreational walking specifically. The ICMR-INDIAB study reported that 54.4% of adults were physically inactive and that recreational physical activity was uncommon among the surveyed population.

17

Physiotherapists play a crucial role in promoting safe exercise practices through education, awareness programs, and community-based interventions ⁽¹⁶⁾. Physiotherapy-led awareness programs can effectively educate recreational walkers regarding proper warm-up and cool-down techniques, safe walking habits, and injury prevention strategies ^(13,16). Such interventions can enhance safety, improve long-term adherence to walking, and reduce the burden of musculoskeletal problems among recreational walkers ⁽¹⁶⁾. Recreational walking is widely practiced as a simple form of physical activity; however, many individuals perform walking without adequate warm-up and cool-down exercises. This lack of awareness may lead to muscle stiffness, soreness, fatigue, and a higher risk of preventable musculoskeletal injuries. While several studies have emphasized the importance of warm-up and cool-

down in athletes, limited research has focused on recreational walkers. Therefore, there is a need to assess awareness in this population and promote physiotherapy-led educational programs to improve walking safety and encourage long-term participation in walking activities. The objective of the study was to assess the level of awareness (knowledge) regarding warm-up and cool-down exercises among recreational walkers and to identify the current warm-up and cool-down practices followed by recreational walkers.

Materials and Methods

Study design and population:

Crosssectional Observational study design was employed for the present study with Survey-Based (Questionnaire) type. Targeted population of the study was from varies recreational walkers from parks, walking tracks, and open recreational areas in pune . The data was collected from parks, walking tracks, and open recreational areas in Pune, India. Inclusion criteria for the study was adults aged 18- 64, walk regularly(3-5 Day/Week), for at least 20 minutes, both male and female participants and willing to participate and provide written consent. Exclusion criteria for the study was individuals with musculoskeletal, neurological or cardiovascular disorders, participants with recent injury or surgery, individuals with unstable medical conditions, professional athletes and pregnant women. *The study was approved by TMV'S Indutai Tilak College of Physiotherapy Research and Ethical committee.*

Outcome Measure :

Knowledge, Attitude, and Practice (KAP) regarding warm-up and cool-down exercises, measured using Questionnaire. The questionnaire Content validated was calculated by experienced physiotherapists to ensure clarity, relevance, and accuracy.

Sample size determination:

At the time of this study, the total population of recreational walkers above 18 years of age from parks, walking tracks, and open recreational areas in Pune settings was $n = 290$ participants. Hence, a sample size formula, $n = 2(Z_{\alpha} + Z_{\beta})^2 \times \sigma^2/d^2$ was used to determine the sample population in this study were (n = sample size, Z_{α} = probability of falsely rejecting a true hypothesis (alpha value), Z_{β} =probability of failing to reject a false hypothesis (beta value), σ = standard deviation of the outcome or population parameter being studied, d = Size of the effect that is clinically worthwhile to detect.) n of recreatiional walkers between 18 and 64 years was 290.

Sampling technique:

Convenience Sampling technique was used as sampling technique.

Procedure:

Firstly, permission was taken from institutional ethical committee of TILAK MAHARASHTRA VIDYAPEETH, department of Physiotherapy and Ethical clearance was taken from institutional ethical committee of Tilak Maharashtra Vidyapeeth College of Physiotherapy. The aims and objectives of the research was explained to the participants and those who fulfilling the inclusion criteria were included in the study. A researcher developed KAP questionnaire was administered, consisting of sections on knowledge, attitude, and practice regarding warm-up and cool-down exercises. The questionnaire content

validated by experienced physiotherapists to ensure clarity, relevance, and accuracy. Content validated from physiotherapists was incorporated to improve the quality and validity of survey questions. Written informed consent was obtained from each participant before administration. The questionnaire was distributed in-person at parks and walking tracks. Participants completed the questionnaire by selecting appropriate options for each question. Collected data was compiled, coded, and organized for analysis. Data analysis was performed using descriptive statistics and percentage analysis to determine awareness, attitude, and practice patterns.

Statistical Analysis:

Data was analyzed using appropriate software. Descriptive statistics (Mean & SD) of the participant demographics and mean reaction times were analysed. Statistical significance was evaluated using an independent sample t-test (or Mann-Whitney U test, as appropriate). A p value of < 0.05 was considered statistically significant.

Result:

Distribution of Data

The results of the Shapiro Wilk test for normality across all key study variables, including Age, knowledge of warm up and cooldown, awareness of warmup and cooldown, practice of warm up and cooldown. The test values indicate that none of the variables violated the assumption of normality, as all p-values were less than the significance level of 0.05. This suggests that the data distributions significantly deviate from a normal distribution. (Table 1)

Variables	K statistics	P value	Data distribution
Age	0.630	0.0001	Not Normally Distributed
Knowledge of warm up and cool down	0.672	0.0001	Not Normally Distributed
Awareness of warm up and cool down	0.973	0.001	Not Normally Distributed
Practice of warm up and cool down	0.285	0.001	Not Normally Distributed

Table 1. Distribution of Data.

Demographic Data

Age wise Distribution

Variable	Number of Participants
Age	
19 - 20 years	19
21 – 25 years	179
26 – 30 years	52
31 – 40 years	20
41 – 50 years	16
51 – 64 years	4
	290

Out of a total sample of 290 participants, the vast majority are young adults. The single largest age group is 21–25 years, accounting for 179 participants (61.7%). The second largest group is 26–30 years

with 52 participants (17.9%), followed by 31–40 years (n=20), 19–20 years (n=19), and 41–50 years (n=16). Older adults aged 51–64 years represent the smallest group with only 4 participants (1.4%).

Variable	Number of Participants
Duration of Walking	
Less than 15 min	120
15 – 30 min	92
More than 30 min	68
Other	10
	290

Gender wise Distribution

Category	No of participants	Percentage
Male	132	48.52%
Female	158	52.48%
Total	290	100%

Among the 290 participants, 158 are female (52.48%) and 132 are male (48.52%). This demonstrates a well-balanced gender distribution within the study population, with a slight female majority.

Frequency of walking

Variable	Number of Participants
Frequency of walking	
2 – 4 days	100
4 – 6 days	53
Daily	92
Rarely	41
Other	4
	290

The highest proportion of participants report walking 2 to 4 days per week (n=100, 34.5%). A total of 92 participants (31.7%) walk daily, while 53 participants (18.3%) walk 4 to 6 days per week. A smaller segment walks rarely (n=41, 14.1%) or under other routines (n=4, 1.4%).

Duration of Walking

The majority of participants engage in short walking sessions. A total of 120 participants (41.4%) walk for less than 15 minutes per session, and 92 participants (31.7%) walk for 15 to 30 minutes. Only 68 participants (23.4%) walk for more than 30 minutes, while 10 participants (3.4%) report other durations.

Descriptive Statistics

Age

The average age of the study cohort is 26.60 years with a standard deviation of 7.81 years. The participant age ranges from a minimum of 19 years to a maximum of 64 years. The median age is 24 years with an Interquartile Range (IQR) of 3 years, reflecting the concentration of young adults in the sample.

Variables	Mean	SD	Median	IQR	Min	Max
Age	26.60	7.81	24	3	19	64

Knowledge about warm up and cooldown

Knowledge	Category	Frequency (n)	Percentage (%)
1. Heard about warm-up exercises?	Yes	290	100.0%
	No	0	0.0%
2. Heard about cool-down exercises?	Yes	265	91.4%
	No	25	8.6%
3. Know importance of warm-up?	Yes	269	92.8%
	No	21	7.2%
4. Know importance of cool-down?	Yes	252	86.9%
	No	38	13.1%
5. Warm-up helps to:	All of the above	194	66.9%
	Prepare muscles	49	16.9%
	Improve flexibility	25	8.6%
	Reduce injury	22	7.6%
6. Cool-down helps to:	All of the above (Optimal)	176	60.7%
	Relax muscles	82	28.3%
	Reduce stiffness	17	5.9%
	Prevent dizziness	15	5.2%
7. Can skipping cause injury?	Yes (Correct)	215	74.1%
	Not Sure	46	15.9%
	No	29	10.0%

Basic awareness of exercise concepts is exceedingly high: 100.0% (n=290) have heard of warm-ups, and 91.4% (n=265) have heard of cool-downs. Similarly, 92.8% understand the importance of warm-

ups, and 86.9% know the importance of cool-downs. When tested on specific functions, 66.9% correctly identified that warm-ups help prepare muscles, improve flexibility, and reduce injury risk.

Attitude about warm up and cooldown

Attitude	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Warm-up before walking is necessary	112	123	47	6	0
2. Cool-down after walking is necessary	112	118	60	0	0
3. Would like to learn proper techniques	106	141	41	0	0
4. Warm-up/cool-down only for athletes	22	56	32	121	59
5. Physiotherapists play a teaching role	111	132	34	5	8

Participant attitudes are generally positive. A major portion agrees or strongly agrees that warm-ups (235 out of 290) and cool-downs (230 out of 290) are necessary for walking. An overwhelming majority (247 participants) express a desire to learn proper techniques. Furthermore, 180 participants disagree or strongly disagree with the misconception that warm-ups and cool-downs are only for athletes.

Practice of warm up and cooldown

Practice Behavior / Parameter	Category	No of Participants	Percentage (%)
Warm-up Performance Frequency	Sometimes	114	39.3%
	Always	97	33.4%
	Rarely	53	18.3%
	Never	26	9.0%
Warm-up Modality Choice	Slow walking before brisk walking	94	32.4%
	Joint movements	94	32.4%
	Stretching	94	32.4%
	None / Missing	8	2.8%
Cool-down Performance Frequency	Always	119	41.0%
	Sometimes	96	33.1%
	Never	40	13.8%
	Rarely	35	12.1%
Cool-down Modality Choice	Stretching	134	46.2%
	Deep breathing	108	37.2%
	Slow walking	30	10.3%

	None / Missing	18	6.2%
Experienced Post-Walk Pain / Injury?	No	146	50.3%
	Sometimes	72	24.8%
	Yes	70	24.1%
	Missing	2	0.7%
Performed Warm-up/Cool-down Before Injury?	Yes	156	53.8%
	No	116	40.0%
	Missing / Not applicable	18	6.2%

Participant attitudes are generally positive. A major portion agrees or strongly agrees that warm-ups (235 out of 290) and cool-downs (230 out of 290) are necessary for walking. An overwhelming majority (247 participants) express a desire to learn proper techniques. Furthermore, 180 participants disagree or strongly disagree with the misconception that warm-ups and cool-downs are only for athletes. Most participants (243 out of 290) also agree or strongly agree that physiotherapists play an important educational role in this area.

Total KAP Score

Overall KAP = Knowledge score + Attitude Score + Practice Score / 3 = $81.33 + 78.28 + 44.66 / 3 = 68.25\%$ The overall KAP score among recreational walkers was 68.25%, with knowledge at 81.83%, attitude at 78.28%, and practice at 44.66%.

K A P overall Score	
Knowledge Score	81.33%
Attitude Score	78.28%
Pract	44.66%

Discussion

Recreational walking stands out as an easy, safe, and budget-friendly way to improve general health, cardiovascular fitness, and mobility. Although walking is a low-impact activity, appropriate warm-up before exercise and cool-down after exercise may help prepare the body for activity, promote efficient movement, and reduce exercise-related discomfort. The present cross-sectional observational study was conducted to assess the knowledge, attitude, and practice regarding warm-up and cool-down exercises among recreational walkers in Pune, comprising a total of 290 participants. The mean age of the participants was 26.60 ± 7.81 years, with a median age of 24 years, and 61.7% of participants belonged to the 21–25-year age group. The study included both female and male participants. Walking profiles showed that regular participation was common, with 34.5% walking 2 to 4 days per week and 31.7% walking daily. However, walking duration was generally short, with 41.4% walking for less than 15 minutes and 31.7% walking for 15–30 minutes. The self-structured KAP questionnaire used in the study was validated by experienced physiotherapists and was designed to assess participants' knowledge, attitude, and practice regarding warm-up and cool-down activities.

The results revealed a clear gap between exercise awareness and practical execution. Basic awareness was high, as 100% of participants had heard of warm-up exercises, 91.4% had heard of cool-down exercises,

and more than 86% recognized their importance. Furthermore, 66.9% correctly understood that warm-up helps prepare the muscles, improve flexibility, and reduce the risk of injury, while 60.7% recognized that cool-down helps relax muscles, reduce stiffness, and prevent dizziness. In addition, 74.1% understood that skipping warm-up and cool-down may increase the risk of exercise-related discomfort or injury. Previous literature has also emphasized the physiological and preventive importance of appropriate warm-up and stretching practices.^[2-5] Despite this relatively high level of knowledge, actual practice was less consistent. Only 33.4% of participants reported that they always performed a warm-up, while others performed it sometimes or rarely/never. Similarly, only 41.0% always performed a cool-down, while the remaining participants reported occasional or no practice. For warm-up, participants commonly used slow walking, joint movements, and stretching. For cool-down, static stretching was the most commonly preferred method, followed by deep breathing and slow walking. Notably, 48.9% of participants reported experiencing pain, stiffness, or injury after walking, indicating the importance of appropriate preparation and recovery practices. When the present findings are compared with previous literature, both similarities and differences can be observed in exercise adherence among physically active populations. Musonda and Saha (2023) reported that 51% of recreational athletes consistently incorporated stretching during warm-up and cool-down, while 36% practiced it only sometimes.^[1] Similarly, Singh and Kaur (2022) reported inconsistent warm-up and cool-down practices among gym-based strength trainers in Punjab.^[16] In the present study, only 33.4% of recreational walkers reported consistently performing warm-up activities. This comparatively lower level of consistency may be related to the recreational and largely self-directed nature of walking, where participants may not receive regular professional supervision or follow a structured exercise programme. However, this explanation should be interpreted cautiously because the populations, settings, and measurement methods differed between studies. The findings also support the physiological rationale for incorporating an appropriate warm-up before physical activity. Bishop described several potential mechanisms of warm-up, including increased muscle temperature, enhanced metabolic and physiological responses, and preparation of the body for subsequent exercise.^[3] Woods et al. also discussed the role of warm-up and stretching in relation to muscular injury prevention and exercise preparation.^[4] Similarly, Shellock and Prentice highlighted the importance of warming-up and stretching for physical performance and preparation before exercise.^[5] Jan et al. reported that warm-up exercises can influence joint mobility and muscle activation during walking, supporting the importance of preparing the musculoskeletal system before repetitive weight-bearing activity.^[6] Therefore, the present finding of inconsistent warm-up practice among recreational walkers indicates an opportunity for improving practical exercise preparation.

The present study demonstrated a relatively high level of knowledge regarding warm-up and cool-down among recreational walkers. Almost all participants had heard about warm-up exercises (100%), while 91.4% had heard about cool-down exercises, and more than 86% recognized their importance. In addition, 66.9% correctly identified the combined benefits of warm-up, including muscle preparation, flexibility, and injury prevention, while 60.7% recognized the major benefits of cool-down. These findings can be compared with Musonda and Saha (2023), who reported awareness and practice of stretching among recreational athletes, with 51% consistently incorporating stretching and 36% practicing it sometimes.^[1] The authors also identified gaps in detailed understanding and appropriate incorporation of stretching into exercise routines.^[1] Similarly, previous literature has indicated that awareness of warm-up and stretching does not necessarily translate into appropriate knowledge of their specific components, timing, or application.^[2,10] In the present study, the high recognition of the importance of warm-up and cool-down

suggests good basic awareness; however, the lower proportion identifying all specific benefits indicates a need for improving detailed and practical knowledge through physiotherapy-based education.

The attitude findings of the present study indicate a favorable perception towards warm-up and cool-down exercises among recreational walkers. A substantial proportion of participants considered warm-up and cool-down necessary and expressed interest in learning appropriate techniques. In particular, 85.2% of participants reported a desire to learn proper warm-up and cool-down methods. Participants also recognized that these activities are not limited to athletes and acknowledged the potential role of physiotherapists in promoting safe walking practices. This finding is consistent with Gupta et al., who reported a generally appropriate attitude towards physical activity among physiotherapists while identifying gaps between knowledge and recommended physical-activity guidelines.^[20] Similarly, the present study demonstrated a positive attitude despite inconsistent implementation of warm-up and cool-down practices. This suggests that participants may recognize the value of these activities but require structured guidance, demonstration, and reinforcement to translate a favorable attitude into regular practice.

Despite the high level of awareness and favorable attitude, the practice findings demonstrated a clear knowledge–practice gap. Only 33.4% of participants reported that they always performed a warm-up before walking, while 39.3% performed it sometimes and 27.3% rarely or never performed it. Cool-down practice was somewhat better, with 41.0% reporting that they always performed a cool-down. This pattern is comparable with Musonda and Saha, where 51% of recreational athletes consistently incorporated stretching into warm-up and cool-down routines while 36% practiced it sometimes.^[1] Previous research has also demonstrated that although warm-up and cool-down may be recognized by physically active individuals, adherence to these practices can remain inconsistent.^[10,16] In the present study, warm-up methods were distributed between slow walking, joint movements, and stretching, whereas static stretching and deep breathing were the most commonly reported cool-down methods. The lower consistency of practice observed among recreational walkers may be related to the independent nature of recreational walking, where individuals generally exercise without professional supervision or a structured training programme. Therefore, the findings suggest that the primary concern is not merely lack of awareness but difficulty translating knowledge and positive attitudes into consistent practice. Physiotherapist-led education, demonstration of simple standardized routines, and reinforcement through community walking programmes may help address this knowledge–practice gap.

Regarding recovery after exercise, the present findings highlight the importance of appropriate cool-down and flexibility practices. Knudson discussed biomechanical aspects of stretching and its application in exercise settings.^[8] while Bandy and Irion demonstrated that the duration of static stretching can influence hamstring flexibility.^[9] Micheline et al. discussed exercise-related adaptations in central autonomic cardiovascular control, providing physiological context for the body's response to exercise and recovery.^[14] However, the effects of stretching and cool-down should not be interpreted as universally preventing post-exercise soreness or injury, as previous literature has reported mixed findings regarding the role of stretching in injury prevention and performance.^[2,10] Therefore, the present study primarily highlights the need for appropriate education and safe exercise routines rather than establishing a direct causal relationship between skipping warm-up/cool-down and reported pain or injury. The findings of the present study are also relevant to established physical-activity recommendations. Haskell et al. and the American College of Sports Medicine have emphasized appropriate exercise participation and the importance of preparing for and recovering from physical activity within safe exercise practices.^[12,13]

These recommendations provide a broader public-health context for promoting structured and safe physical-activity habits among recreational walkers. Since recreational walking is commonly performed independently, simple physiotherapy-led education may provide an accessible method of improving participants' understanding of warm-up, cool-down, stretching, joint mobility, and exercise progression. Ultimately, the present study demonstrates that although recreational walkers in Pune showed relatively high knowledge and favourable attitudes towards warm-up and cool-down exercises, consistent practice remained comparatively low. The finding that 85.2% of participants expressed a desire to learn proper techniques further indicate an opportunity for targeted educational intervention. The results therefore highlight a knowledge–practice gap rather than simply a lack of awareness. Community-based physiotherapy education, practical demonstrations, simple standardized warm-up and cool-down routines, and reinforcement through walking groups may help recreational walkers translate their existing knowledge and positive attitudes into regular exercise practices. Further studies using larger and more diverse populations, as well as intervention-based designs, may help determine whether physiotherapy-led education can improve adherence to warm-up and cool-down practices among recreational walkers. The was limiting in certain aspects like the use of convenient sampling in urban parks in Pune limit the generalizability of results to rural populations of same geographical regions, the study sample was heavily toward young adults aged 19 to 30 years, with limited of older adults aged 51 to 64 years (1.4%), who are a key demographic for recreational walking. Data were collected using researcher developed questionnaires, which leads to recall bias and social desirability bias, the cross sectional survey design makes a barrier in establishing direct causal relationships between skipping, warm up and cooldown specific injury outcomes and the distance walked was not calculated.

Conclusion

In conclusion, recreational walkers demonstrate a high level of awareness and positive attitudes regarding warm-up and cool-down exercises, yet a substantial proportion fails to execute these practices consistently. More than 35 % of walkers do not routinely perform warm-ups, and nearly 40 % do not perform cool-downs regularly. This inconsistency contributes to post-walk stiffness, muscle pain, and discomfort, which affected nearly half of the participants.

Acknowledgements

We extend our gratitude to the all the recreational walkers of the study from various parks, walking tracks, and open recreational areas in pune .

References

1. Musonda N, Saha J. Awareness of different types of stretching exercises as a warm up and cool down among recreational athletes in North India. Mendeley Data. 2023;1. doi:10.17632/nrp8rswg5m.1
2. Thacker SB, Gilchrist J, Stroup DF, Kimsey CD. The impact of stretching on sports injury risk: a systematic review of the literature. *Med Sci Sports Exerc.* 2004;36(3):371–378.
3. Bishop D. Warm up I: potential mechanisms and the effects of passive warm up on exercise performance. *Sports Med.* 2003;33(6):439–454.
4. Woods K, Bishop P, Jones E. Warm-up and stretching in the prevention of muscular injury. *Sports Med.* 2007;37(12):1089–1099.

5. Shellock FG, Prentice WE. Warming-up and stretching for improved physical performance and prevention of sports-related injuries. *Sports Med.* 1985;2(4):267–278.
6. Jan MH, Lin JJ, Lin DH, Cheng CK, Lin CH, Cheng CK. Effects of warm-up exercises on joint mobility and muscle activation during walking. *J Orthop Sports Phys Ther.* 2018;48(6):465–472.
7. Rössler R, Junge A, Chomiak J, Dvorak J, Faude O. Soccer injuries in players aged 7 to 12 years: a descriptive epidemiological study. *Am J Sports Med.* 2014;42(2):309–315.
8. Knudson D. The biomechanics of stretching. *J Exerc Sci Physiother.* 2015;11(2):65–72.
9. Bandy WD, Irion JM. The effect of time on static stretch on the flexibility of the hamstring muscles. *Phys Ther.* 1997;77(10):1090–1096.
10. McHugh MP, Cosgrave CH. To stretch or not to stretch: the role of stretching in injury prevention and performance. *Scand J Med Sci Sports.* 2010;20(2):169–181.
11. Parkkari J, Kujala UM, Kannus P. Is it possible to prevent sports injuries? Review of controlled clinical trials and recommendations for future work. *Sports Med.* 2011;31(14):985–995.
12. Haskell WL, Lee IM, Pate RR, Powell KE, Blair SN, Franklin BA, et al. Physical activity and public health: updated recommendation for adults from the American Heart Association and the American College of Sports Medicine. *Circulation.* 2007;116(9):1081–1093.
13. Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, Lee IM, et al. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal and neuromotor fitness in apparently healthy adults. *Med Sci Sports Exerc.* 2011;43(7):1334–1359.
14. Michelini LC, Stern JE. Exercise-induced neuronal plasticity in central autonomic networks: role in cardiovascular control. *Exp Physiol.* 2013;98(5):947–960.
15. Arslan E, Ozer GE, Clemente FM. The effects of warm-up protocols on walking efficiency and muscle performance. *J Sports Sci Med.* 2020;19(1):89–96.
16. Singh P, Kaur R. Warm-up and cool-down trends among strength trainers in Punjab. *Res Med Sci Rev.* 2022;6(4):120–128.
17. Anjana, R. M., et al INDIAB Collaborative Study Group (2014). Physical activity and inactivity patterns in India - results from the ICMR-INDIAB study (Phase-1) [ICMR-INDIAB-5]. *The international journal of behavioral nutrition and physical activity*, 11(1), 26. <https://doi.org/10.1186/1479-5868-11-26>
18. Musonda N, Saha J. Awareness of different types of stretching exercises as a warm up and cool down among recreational athletes in North India. 2023.
19. Romer KS, et al. Knowledge and awareness regarding warm-up and stretching among college athletes. *Indian J Physiother Occup Ther.* 2013;7(2):30-34.
20. Gupta S, et al. Knowledge, attitude and practice of physical activity guidelines among physiotherapists in India. *Physiother Theory Pract.* 2022;38(11):1645-1653.
21. Singh A, Kaur R. Knowledge, attitude and practice regarding warm-up and cool-down among gym strength trainers in Punjab. 2022.