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METHODOLOGY

Perceptions of Physical Education Teachers Toward Warm-Up Activities

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Abstract

This study investigates physical education teachers' perceptions of warm-up activities, focusing on their significance, selection, preparation, implementation times, and perceived student benefits. The study involved physical education teachers from public schools using quantitative and qualitative research approaches. One hundred three volunteer physical education teachers participated, 47 females and 56 males. In the quantitative aspect, descriptive statistics were utilized, while the qualitative part was analyzed using a content analysis approach, focusing on participants' responses to open-ended questions. Results reveal that most participants spend 1-20 minutes planning warm-up activities, allocating 6 minutes or more during a lesson. Teachers commonly prefer activities involving the entire class due to ease of implementation and management, often allowing students to choose warm-up activities to foster creativity, increase class activity, and enhance student interest. The findings underscore physical education teachers' importance

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to warm-up activities, indicating sufficient time allocated for planning and implementation. Additionally, teachers believe warm-up activities contribute to effective lesson engagement and student participation. Recommendations include incorporating new exercises, integrating technology, offering regular training seminars, organizing student-led sessions, and exploring music's role in warm-up activities. innovative teaching tool. Further research should focus on the long-term impact of MyFitnessPal usage on health outcomes.

Introduction

Physical education stands out among other subjects by allowing students to move, learn sports concepts, and engage in activities (Bieniek & Deutsch, 2020). It plays a crucial role in the holistic development of students by encouraging healthy lifestyles, socialization, team spirit, and sports participation while fostering cognitive, psychomotor, and affective growth (Ferraz et al., 2020). These multifaceted benefits are based on the motor activities underlying the course. Motor activities are a key feature of physical education classes, leading to changes in the bodies neuromuscular, cardiovascular, and respiratory systems (Akbar et al., 2022). All students need to warm up before engaging in motor activities to prevent injuries and enhance performance (Merino-Marban et al., 2021; Räisänen et al., 2022; Fernandez-Agullo & Merino-Marban, 2022).

A warm-up is performed before exercise to prepare the body for physical activity (Brukner, 2012). Although allocating time for warming up in physical education classes is critical for preparing students for physical activity and increasing participation, research shows that many physical education teachers often neglect this essential component (Ünlü et al., 2023). In addition, warm-up is a crucial component of physical education, aiding in readying the body for activity and minimizing injury risks. It serves as the initial phase of a physical education session, with warm-up exercises potentially influencing the overall lesson's atmosphere (Barney & Leavitt, 2019). A warm-up aims to mentally and physically prepare the body for exercise (Nevia et al., 2014). An adequately structured warm-up can enhance blood circulation to active muscles, increase body temperature, optimize metabolic responses, and increase joint flexibility (Gil et al., 2019; Kapnia et al., 2023).

There are various effective ways to warm up before engaging in physical activity. Dynamic stretching involves moving muscles through movements to increase blood flow and enhance flexibility (Opplert & Babault, 2018). Another practical approach is a mix of aerobic exercise and static stretching. Aerobic activities like running or jumping can elevate heart rate and blood flow, while static stretching can boost flexibility and reduce muscle tension (Barney & Leavitt, 2019). Silva-Capella et al. (2021) found that two different warm-up types (repetitive exercises and an open, playful approach with quick decision-making stimuli) did not significantly influence physical education students' attention and focus. Incorporating core conditioning exercises and small games into warm-ups is also beneficial (Samodra et al., 2022).

Some studies indicate that school-age children show improved motor skills with warm-up routines (Gómez-Álvarez et al., 2021; Ruiz Garrigós et al., 2020). Additionally, a study suggested that integrating core-conditioning exercises into physical education warm-ups could enhance children's trunk muscle endurance, mobility, and balance. Warm-up routines should be implemented before initiating main activities in physical education classes. Traditionally, several minutes of light-intensity active range-of-motion exercises involving the upper and lower extremities, followed by static stretching, are recommended for young participants (Chang et al., 2020). Gómez-Álvarez et al. (2021) explored the immediate impact of various warm-up types on motor skills, highlighting that warm-ups involving adapted games had a more significant effect. Consequently, utilizing small games as warm-up alternatives could be more enjoyable and engaging for students.

Studies on warm-up activities for school-age students primarily concentrate on the ideal duration, methods, and specific performance outcomes (Ferraz et al., 2020; Merino-Marban et al., 2021; Obetko et al., 2020). Additionally, warm-up activities can have benefits beyond physical performance, such as creating a positive learning environment in physical education classes (Deutsch et al., 2022; Ünlü et al., 2023). Also, Barney and Leavitt (2019) state that using music during warm-up activities can create a positive classroom environment, increasing students' participation.

Warm-up activities in physical education classes seem to play an essential role in preparing the body for physical activity and facilitating the transition to the central part of the lesson (Chang et al., 2020), developing motor skills and improving performance (Pajonková et al., 2024) and preventing injuries (Merino-Marban et al., 2021). These activities can affect students' focus, engagement, and physical readiness. However, there are not enough studies in the literature on physical education teachers' perceptions of warm-up activities, their incorporation into lesson processes, and their planning by teachers. This deficiency makes it difficult to understand physical education teachers' decisions in planning and implementing warm-up activities and how they affect students' experiences in these classes. Physical education teachers' approaches to warm-up activities are thought to be critical to students' motivation and the overall efficiency of the lessons. This study aims to contribute to the existing literature by examining physical education teachers' understanding of warm-up activities and their views on the importance of these activities.

Method

Research Design

This study employed a mixed method to assess physical education teachers' views on warm-up activities. Mixed-methods research is standard in health, social, and behavioral sciences, where the researcher merges quantitative and qualitative data sets to comprehend the research issue and derive conclusions by leveraging the benefits of combining these two sets (Creswell, 2017). The quantitative aspect focused on the time spent by physical education teachers on warm-up activities, student involvement, the efficacy of warm-up activities, and the types of warm-up activities. Meanwhile, the qualitative segment involved responses to open-ended questions regarding physical education teachers' perceptions of warm-up activities.

Participants

The study involved physical education teachers from public schools in Aksaray province during the 2023-2024 academic year. Participants were selected through an open sampling approach (Corbin & Strauss, 2014), a form of convenience sampling. This method allowed individuals who met the inclusion criteria and ex-

pressed interest in the topic to participate. When we examined the participants, it consisted of 103 volunteer physical education teachers, including 47 females (45.6%) and 56 males (54.4%). The participants' age distribution was as follows: 19.4% (*n*=20) were aged 21-30, 39.8% (*n*=41) were aged 31-40, 35% (n=36) were aged 41-50, and 5.8% were aged 51 and over. Regarding professional experience, 22.3% (*n*=23) had 1-5 years of experience, 33% (*n*=34) had 6-10 years, 15.5% (*n*=16) had 11-15 years, 14.6% (*n*=15) had 16-20 years, and 14.6% (*n*=15) had more than 21 years of experience. Additionally, 56 participants (54.4%) worked in middle schools, while 47 (45.6%) worked in high schools. The minimum sample size was calculated using the G*Power 3.1.9 program, with 95% statistical power and a margin of error 0.05. The inclusion criteria required participants to be full-time physical education teachers with at least one year of teaching experience.

The study adhered to ethical standards as outlined in the Declaration of Helsinki. The Aksaray University Human Research Ethics Committee (approval document number 2024-290) granted ethical approval. Before the study, an electronic survey was distributed to willing participants via email, social media groups, and personal accounts. Participants received a consent form that detailed the study's purpose, timeline, inclusion criteria, and their right to withdraw at any time.

Data Collection Tool

The data collection tool used in the study was developed based on the questionnaire used by Barney and Leavitt (2019) to determine physical education teachers' perceptions of warm-up activities. The questionnaire was designed to evaluate teachers' perceptions and practices regarding warm-up activities in lessons. The questionnaire included a demographic information section with four questions to determine the participants' demographics. This section focused on variables such as teachers' gender, age, professional seniority, and level of teaching. In addition, ten questions were gathered under three main categories to evaluate teachers' perceptions and practices regarding warm-up activities. These are given below:

1. Planning warm-up activities, their duration and importance
    - How much time do you spend thinking about and planning your warm-up activities?
    - On average, how long do your warm-up activities last in a lesson?
    - Do you think introductory/warm-up activities are essential to your lessons?
2. Student participation and the effectiveness of warm-up activities
    - Do you make sure that your students participate in warm-up activities?
    - Do you think the warm-up activities are sufficient to keep the heart rate and body warm?
    - Do your students' warm-up activities help them use the rest of the lesson more effectively?
3. Methods used in warm-up activities
    - What kind of warm-up activities do you have your students do?
    - Do you allow your pupils to choose the warm-up activities they participate in? If so, do you think this motivates them more, or do they all join the activity?
    - Do you use music in your warm-up activities, and if so, what do you observe in students' movements while the music is playing?
    - Do you use competitive games in your warm-up activities? If so, do students like to compete in warm-up activities, and does competition affect their level of participation?

The validity of the questionnaire was tested through expert opinion and pilot testing. In this process, it was determined that the questions were understandable and designed for the research. Content validity was ensured by evaluating the scope of the questionnaire in line with the relevant literature and expert opinions. In particular, the content validity and comprehensibility of the structured statements were confirmed by the evaluations made with five experienced physical education teachers.

Data Analysis

The data analysis process started by examining the participant's responses to the data collection tool, and then the necessity of data screening and cleaning processes was evaluated (Tabachnick &

Fidell, 2019). Because of the examination, no blank or incompletely completed questionnaires were in the data set, so no removal was made.

In the quantitative dimension of the study, descriptive statistics were used to evaluate the demographic characteristics of the participants and their practices regarding warm-up activities. Numerical data, such as the time allocated for planning and implementing warm-up activities in lessons, was analyzed alongside responses to categorical variables, including allowing students to choose warm-up activities, the use of music during warm-ups, the inclusion of competition games in warm-up activities, the adequacy of these activities in increasing heart rate and preparing the body, and ensure student participation in these activities. The Statistical Package for the Social Sciences (SPSS) was used to perform all analyses.

A content analysis method was applied to the participants' responses to open-ended questions in the qualitative dimension. This process involved coding the data, identifying themes, organizing the data according to these themes, and interpreting the results. A detailed analysis was conducted on the 12 pages of data derived from responses to the open-ended questions, extracting codable units. 469 encoded units were obtained. Participants contributing to the qualitative dataset were anonymized and labeled "PET1, PET2, PET3..." for analysis. To ensure internal reliability, the agreement between the two researchers was evaluated using the "agreement" and "disagreement" methods recommended by Miles, Huberman, and Saldana (1994). An 85% consensus was achieved regarding the data from the open-ended questions.

Results

The analysis of physical education teachers' responses to the question “How much time do you spend thinking and planning your warm-up activities?” is outlined below.

When examining Table 1, it is evident that 10.67% (n=11) of physical education instructors did not dedicate any time to planning warm-up exercises; 9.71% (n=10) did not have a fixed duration but adjusted it based on the lesson; 38.83% (n=40) allocated 1-10 minutes; 15.53% (n=16) spent 11-20 minutes; 5.84% (n=6) devoted 21-30 minutes; 9.71% (n=10) set aside 1 hour; and 9.71% (n=10) allocated a day or longer. Based on the data, it is apparent that most

Table 1
Time Allocated by Physical Education Teachers for Planning Warm-up Activities

Planning Time	***n***	**%**
Never	11	10,67
No specific time (Changing)	10	9,71
1-10 minutes	40	38,83
11-20 minutes	16	15,53
21-30 minutes	6	5,84
31-60 minutes	10	9,71
1 day and over	10	9,71
Total	103	100

physical education teachers spend between 1 and 30 minutes planning warm-up activities.

The physical education teachers' answers to the question, "How much time do you spend on average for warm-up activities in a lesson?" are presented in the table below.

According to Table 2, 5.8% (*n*=6) of physical education teachers spent 3-5 minutes, 34% (*n*=35) spent 6-7 minutes, and 60.2% (*n*=62) spent 8 minutes or more on warm-up activities during a lesson.

Table 2
Lesson Time Allocated to Warm-Up Activities

Warm-up Time	**n**	**%**
3-5 minutes	6	5,8
6-7 minutes	35	34
8 minutes and over	62	60,2
Total	103	100

The analysis of physical education teachers' responses to the question "Do you think that warm-up activities are an important part of your lessons?" is as follows:

All participating teachers emphasized the significance of warm-up activities in their lessons. They believe that warm-ups help prevent injuries and prepare students for class activities. PET1 mentioned, “I find it crucial as it primes students physically and mentally for the lesson and activities.” PET2 expressed, “I view it as highly important for students to engage in general and specific warm-ups relevant to the topic, preparing their bodies for the main tasks.” PET3 highlighted, “It is essential to prevent sports injuries and identify activities that prepare for the lesson.”

The content analysis of physical education teachers' answers to “What kind of warm-up activities do you have your students do?” is presented below.

When the answers are analyzed, the ones given by physical education teachers to this question on the questionnaire vary. Physical education teachers' most frequently preferred warm-up activities are running, playful, and stretching exercises. In addition, most physical education teachers said they like to use many activities together instead of a single activity. In this regard, PET21 stated, “I have students warm up with low-tempo running activities, stretching exercises, and educational games.” PET30 stated, “Low-tempo 5 minutes running followed by stretching exercises.” PET42 stated, “I try to use dynamic and static warm-ups to appeal to the muscle groups suitable for the study as much as possible.”

The content analysis of the physical education teachers' answers to the question, “Do you think the warm-up activities that your students participate in help them spend the rest of the lesson more effectively?” is presented below.

Most physical education teachers stated that the warm-up activities were beneficial for spending the rest of the lesson effectively. When asked how warm-up activities are valuable, PET7 answered, “Yes, it helps them to adapt to the lesson, prepare their bodies, and prevent injuries”; PET50 answered, “Yes, the lesson is taught more actively”; PET71 answered, “Yes, it enhances flexibility because it creates a joint range of motion”; PET92 answered, “Yes, it is more motivating.” Teachers preferred warm-up activities to make students participate more actively in the lesson, motivate them, and prevent injuries. On the other hand, one physical education teacher stated that the students saw the warm-up activities as a waste of time, an-

other noted that they were somewhat practical, and a third teacher said he had no idea. Another stated that the warm-up activities had no effect.

The content analysis of the answers given by the physical education teachers to the question "Do you give your students a chance to choose the warm-up activities in the lesson, and if so, do you think that the students are more motivated or all of them are involved in the activity?" is presented below.

When the answers were analyzed, it was determined that 63 (61.2%) physical education teachers said yes, and 40 (38.8%) said no. PET19 stated, "Yes, the warm-ups at the beginning of the lesson allow students to derive new educational games with their creative ideas and applications after a while." PET62 stated, "When they choose the activity themselves, participation is more active and aware with a sense of responsibility." Their peers also actively participate in the lesson with the ambition to produce a better activity and think, "that I can do better." PET87 said, "Yes, I sometimes believe I ensure they understand their wishes are important to me by letting them play the games they want." Physical education teachers stated that allowing students to choose warm-up activities increases active participation in the lesson and socialization in the classroom, with the emergence of a sense of happiness and competition.

The content analysis of the physical education teachers' answers to the question, "Do you use music during your warm-up activities, and if so, what do you observe in the students' movements while playing music?" is presented below.

Twenty-three physical education teachers (22.3%) said they use music in warm-up activities, while 80 (77.7%) do not. The physical education teachers who answered yes noted that the students performed the movements more rhythmically when accompanied by music, and the participation and enjoyment levels increased. In this regard, PET3 stated, "When I use music, students are more energetic, active, and concentrated, and show a more enthusiastic attitude than during movements without music." PET33 stated, "It makes the movements more fun and rhythmic." In addition, new movement groups emerge more freely with the effect of music, and students' active participation is ensured spontaneously. PET91 stated that '"More rhythmic movements emerge with music."

Content analysis of physical education teachers' answers to the question "Do you use competition games in warm-up activities? If so, do students like to compete in warm-up activities, and do competitions affect their participation levels?" is presented below.

When the responses of the physical education teachers were analyzed, it was determined that 78 (75.7%) of them used competition games in warm-up activities, while 25 (24.3%) did not. Teachers stated that when they used competitive games, students enjoyed them more than other activities and participated more willingly and effectively in the lesson. In this regard, PET88 stated, "The warm-up period becomes more active and fun"; PET94 stated, "I observe that their energy increases and they become more motivated"; PET102 stated, "The competitive approach in schools is erroneous when many academic articles are examined. I agree that the aim of physical education should be for all students, focusing on the development of fundamental movement skills. With the competitive approach, talented students come to the forefront, while others resent the lesson because they cannot succeed and fall behind. I prefer games in which physical and mental development is prioritized in warm-ups. Therefore, physical characteristics alone are not enough to achieve the result." As can be understood from the sample answers, the participants' opinions about using competition games in warm-up activities vary.

In addition, all of the physical education teachers who participated in the study answered yes to the questions "Do you ensure that your students participate in warm-up activities?" and "Do you think that warm-up activities are sufficient to increase heart rate and warm-up the body?"

Discussion and Conclusion

This study aims to determine physical education teachers' perceptions of warm-up activities. The study provides information about the importance of warm-up activities in physical education classes, teachers' choice of warm-up activities, preparation and implementation times, and how they benefit students.

The study found that the physical education teacher spends between 1 and 10 minutes planning warm-up activities. In addition, the majority of physical education teachers stated that the duration of warm-up activities in the lesson was 8 minutes or more. This du-

ration also coincides with the durations reported in Grajciarová's (2023) study, where the average warm-up duration was 6 minutes and 8 seconds in 45-minute classes and 8 minutes and 50 seconds in 90-minute classes. Different studies on the optimal warm-up time suggest that the warm-up should be long enough to increase body temperature and short enough not to decrease physical performance. Jamshidi et al. (2016) stated that significant performance improvements were observed after only 10 minutes of warm-up in their study, while Pardeiro and Yanci (2017) stated that 25 minutes of warm-up caused a decrease in physical performance.

When the views of physical education teachers on the importance of warm-up activities were examined, they stated that warm-up exercises are essential in lessons because they help students prepare for classroom activities and prevent injuries. In parallel with the findings of our study, Barney and Leavitt (2019) also stated that physical education teachers see warm-up exercises as an essential part of lessons. In addition, most of the physical education teachers who participated in our study said that warm-up activities benefit spending the rest of the lesson effectively. Likewise, Pangrazi & Beighle (2016) emphasize that warm-up exercises help children become physiologically ready for physical activity.

It is seen that the most preferred warm-up activities of physical education teachers are running, playful activities, and stretching exercises, respectively. Barney and Leavitt (2019) also stated in their study that physical education teachers often prefer activities involving the whole class, such as dynamic stretching, static stretching, running, and games in warm-up activities. Grajciarová's (2023) study stated that the most common focal points in the warm-up process were dynamic exercises and static stretching movements. Effective warm-ups can include dynamic stretches and sport-specific drills, essential for injury prevention and performance enhancement (Li et al., 2023; Opplert & Babault, 2018).

In the study, physical education teachers stated that the warm-up activities were beneficial for spending the rest of the lesson effectively. In the study, physical education teachers reported that warm-up activities were helpful for effectively conducting the rest of the lesson. It has been suggested that warm-up routines are critical for maximizing performance by increasing readiness and providing significant benefits (McCrary et al., 2015; Neiva et al., 2014). Similarly,

McGowan et al. (2015) emphasized that a well-structured active warm-up improves performance in various sports. At the same time, such routines can potentially prepare students physically and mentally for activities in physical education classes. These findings suggest that integrating structured warm-up routines into physical education classes can increase students' overall engagement and performance and thus optimize the educational outcomes of these classes.

It was found that most physical education teachers allowed their students to choose warm-up activities and observed various positive outcomes related to this approach. Teachers reported that when students were allowed to choose activities, their engagement, motivation, and sense of responsibility increased. These views align with the literature suggesting that participatory approaches in physical education promote active engagement and social interaction among students (Munk & Agergaard, 2018). Teachers can create a more inclusive and socially connected environment by involving students in learning through activity selection and valuing their interests and aspirations. Applying this approach to warm-up activities promotes physical engagement and allows students to prepare both physically and psychologically.

According to another study finding, most physical education teachers do not utilize music in warm-up activities. However, when Karow et al. (2020) examined how warm-up music affects exercise performance, they found that individuals who listened to it performed significantly better than those who did not. They concluded that warm-up exercises, including music selection, could increase motivation and psychological readiness for physical activity. Furthermore, Barney et al. (2016) and Barney and Prusak (2015) state that music is an effective tool to keep students active during introductory and warm-up activities. Although physical education teachers do not prefer music in warm-ups, they actively use games in their lessons, according to our study. Teachers think that games increase students' participation in the lesson, facilitate motivation, and make warm-ups more fun. These results are consistent with the studies' findings (Gunawan et al., 2023).

The results obtained from this study show that physical education teachers consider introductory and warm-up activities as an essential part of the lesson and spend sufficient time preparing and

implementing warm-up activities. Our findings align with many studies in the literature (Barney & Leavitt, 2019; Pangrazi & Beighle, 2016).

Although it is stated in the literature that the use of music helps to create a positive atmosphere for students' participation in introductory/warm-up activities (Barney &Leavitt, 2019; Barney & Prusak, 2015), our study shows that very few physical education teachers prefer music. In this regard, it is important to encourage physical education teachers to use music in their lessons, especially in the warm-up section, and to increase their awareness of this issue in future studies.

Conclusion

This study emphasized the critical role of warm-up activities in physical education classes and their perceived benefits by physical education teachers. Teachers believe warm-up exercises are necessary to prepare students for the lesson and prevent injuries. Most of the teachers stated that 8-10 minutes of warm-up time is sufficient in lessons, which aligns with the existing literature. It was observed that the study's most commonly used warm-up activities were running, fun activities, and stretching, which were in line with the methods recommended in the literature to encourage student engagement and optimize performance. It was also found that allowing students to choose their warm-up activities positively affected engagement and motivation, and this participatory approach created a more inclusive and socially interactive learning environment.

In general, using music is not common in warm-up activities, but previous studies have shown that music positively affects motivation and psychological readiness. In this context, it was suggested that including music in warm-up exercises might provide additional benefits. The study's findings emphasize the importance of well-structured warm-up routines and the need for physical education teachers to consider motivational enhancers such as student participation, activity selection, and music. These elements can provide a more effective and engaging learning experience. Future studies could examine the effects of music use on warm-up activities and how physical education teachers can integrate more innovative strategies into their classroom practice.

Limitations

Physical education teachers working in public schools in Turkey participated in this study. In addition, this is the second study to examine physical education teachers' perceptions of warm-up activities. Therefore, the ability to interpret and compare the study's findings with previous studies was limited. Due to the scarcity of studies on this topic, this study contributes to the literature.

Recommendations

In line with the findings obtained from this study, it is recommended that different activities such as yoga and Pilates should be included in addition to activities such as running, game-based activities, and stretching, which are preferred mainly by teachers for warming up. This may contribute to diversifying students' motor skills. Furthermore, integrating technology into warm-up activities allows students' performance and participation to be monitored through interactive applications and wearable devices. Warm-ups can be student-led to increase students' participation in warm-up activities and develop their leadership skills. Considering the critical importance of warm-up exercises in injury prevention, regular training programs should be organized for teachers to keep their knowledge and skills up-to-date on injury prevention warm-up techniques and activity diversity. Finally, the study reported that music was not used in the warm-up activities; however, it is thought that music has the potential to increase students' motivation and raise their energy levels. In this context, it is recommended that studies be conducted to evaluate the positive effects of music on warm-up activities.

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