



THE ROLE OF HEALTHY NUTRITION IN DELAYING THE ONSET OF FATIGUE DURING PHYSICAL EXERTION AMONG FEMALE STUDENTS OF THE COLLEGE OF PHYSICAL EDUCATION AND SPORTS SCIENCES, AL-MUTHANNA UNIVERSITY

Assistant Lecturer Riyadh Kadhimi Awad Al-Dhalimi

Open Educational College – Al-Muthanna Study Center

Riyadhk.al.dhalimi1979@gmail.com

Abstract

Healthy nutrition is one of the fundamental factors that contribute to improving physical performance and maintaining the efficiency of the body's functional systems, particularly among female students who engage in various physical activities in colleges of physical education and sports sciences. The quality, quantity, and timing of food intake play a pivotal role in supplying the body with the necessary energy and replenishing nutrients lost during physical exertion, which positively affects the ability to sustain performance and delay the onset of fatigue. The research problem is represented by answering the following question: What is the relationship between dietary habits and the level of early physical fatigue among female students of the College of Physical Education and Sports Sciences at Al-Muthanna University during physical exertion? The research population consisted of (60) female students from the College of Physical Education and Sports Sciences at Al-Muthanna University. A sample of (24) students was selected and divided into two groups: the main experiment group, comprising (17) students, and the pilot experiment group, comprising (7) students, in a manner consistent with the research objectives and procedures. The descriptive correlational approach was used because of its suitability to the nature of the research problem, along with the SPSS program to obtain the final results. The results demonstrated the importance of balanced nutrition: adherence to balanced meals containing carbohydrates, proteins, healthy fats, vitamins, and minerals helps delay the onset of fatigue during physical exertion. They also demonstrated the effect of eating before physical activity: consuming a light carbohydrate-containing meal one to two hours before exercise contributes to increased energy and physical endurance during sports activity. The researcher's most important recommendation is to incorporate nutrition education programs into curricula and workshops in colleges of physical education in order to enhance female students' awareness of the importance of proper nutrition.

Keywords: Healthy nutrition, fatigue, physical exertion

1-1 Research Introduction and Importance

Healthy nutrition is one of the fundamental factors that contribute to improving physical performance and maintaining the efficiency of the body's functional systems, particularly among female students who engage in various physical activities in colleges of physical education and sports sciences. The quality, quantity, and timing of food intake play a pivotal role in supplying the body with the necessary energy and replenishing nutrients lost during physical exertion, which positively affects the ability to sustain performance and delay the onset of fatigue.

Physical fatigue is a natural physiological phenomenon that occurs as a result of increased consumption of energy sources and the accumulation of metabolic by-products during physical activity, leading to a decline in physical and functional efficiency. In this context, the importance of healthy nutrition is evident through its



role in supporting energy stores, particularly carbohydrates, promoting the development of muscle tissue through proteins, and the role of vitamins and minerals in regulating vital processes and improving physical recovery (Al-Kilani, 2015, p. 45).

This study derives its importance from the fact that female students of the College of Physical Education and Sports Sciences constitute a group exposed to repeated physical exertion as part of academic requirements and practical training. This necessitates attention to their dietary patterns and their effect on delaying the onset of fatigue during physical exertion. The study also sheds light on the relationship between healthy nutrition and the level of physical endurance, thereby providing a scientific basis for guiding female students toward sound dietary practices that support athletic performance and general health (Hammad, 2001, p. 65).

Food is considered one of the basic human needs. Through food, human cells obtain the energy they require, and the body obtains the substances necessary for building new cells. Proper nutrition therefore constitutes a foundation for building a healthy body. Numerous studies have shown that the body consists of specific elements and consequently requires food composed of particular nutrients in order to achieve proper development.

The importance of this research stems from the direct effect of healthy nutrition on improving physical performance and delaying the onset of fatigue during physical exertion:

1. Highlighting the role of healthy nutrition in delaying the onset of fatigue during physical exertion among female students of the College of Physical Education and Sports Sciences.
2. Clarifying the relationship between a sound dietary pattern, the level of physical endurance, and the functional efficiency of the body.
3. Contributing to raising nutritional awareness among female students and encouraging them to adopt healthy dietary practices.

1–2 Research Problem

What is the relationship between dietary habits and the level of early physical fatigue among female students of the College of Physical Education and Sports Sciences at Al-Muthanna University during physical exertion?

1–3 Research Objective

1. To identify the role of healthy nutrition in delaying the onset of fatigue during physical exertion among female students of the College of Physical Education and Sports Sciences.

1–4 Research Hypothesis

1. Does healthy nutrition have a role in delaying the onset of fatigue during physical exertion among female students of the College of Physical Education and Sports Sciences?

1–5 Research Domains

1–5–1 Human Domain: The research includes female students of the College of Physical Education and Sports Sciences at Al-Muthanna University for the 2025/2026 academic year.

1–5–2 Spatial Domain: College of Physical Education and Sports Sciences at Al-Muthanna University.

1–5–3 Temporal Domain: From 3/1/2026 to 3/3/2026.

3– Research Methodology and Field Procedures

3–1 Research Method

The researcher adopted the descriptive method using the correlational approach because of its suitability to the nature of the research problem.

3–2 Research Population and Sample

The research population consisted of (60) female students from the College of Physical Education and Sports Sciences at Al-Muthanna University. A sample of (24) female students was selected and divided into



two groups: the main experiment group, comprising (17) students, and the pilot experiment group, comprising (7) students, in a manner consistent with the research objectives and procedures.

3-3 Research Tools

For the purpose of addressing the research problem, the researcher relied on the following means:

1. Arabic references and sources.
2. Questionnaire.

3-4 Pilot Experiment

The pilot experiment was conducted on 10/1/2026, when the scale was distributed to (7) female students from the College of Physical Education and Sports Sciences.

The pilot experiment aimed to:

1. Verify the suitability of the scale forms for the research sample and the method of their distribution.
2. Determine the time required for a student to answer the questionnaire, in addition to determining the total time required to administer the questionnaire:

1. The questionnaire prepared by Al-Haddad in 2018 (Appendix 1) on healthy nutrition was adopted. It contains several data items and domains. The data consisted of (age – height – weight – academic stage), and it contains three domains, with four items for each domain, bringing the total to 12 items. The response method was as follows:

(Strongly Agree – Agree – Neutral – Disagree – Strongly Disagree)

2. A questionnaire prepared by Malik (2021) was adopted to identify and measure fatigue. It consists of nine items, and the responses were in three forms: (Yes – No – Sometimes) (Appendix 2).

3-5 Scientific Properties of the Scale

3-5-1 Validity (Content Validity)

The validity of the scale was verified by presenting it to a group of experts and specialists to determine the suitability of its domains as well as its items.

3-5-2 Reliability

The researcher adopted the test-retest principle as a scientific procedure to verify the reliability of the scale by calculating the correlation coefficient between two tests administered by the researcher one week apart. The results showed that the reliability coefficient reached (0.83), indicating the reliability of the scale and, consequently, its suitability for application.

3-6 Main Experiment

The researcher completed the research procedures on 20/1/2026. The scale forms were distributed to the research sample of (17) female students from the College of Physical Education and Sports Sciences at Al-Muthanna University. After the forms were retrieved, the data were tabulated for statistical processing in a manner that fulfilled the research objectives.

3-7 Statistical Methods

The SPSS statistical package was used to process the data statistically.

4-1 Presentation, Analysis, and Discussion of Results

Table (1)

Shows the standard levels, categories, and frequencies of the research sample members:

No.	Levels	Categories	Frequency
1	Very Good	43.365–51.500	10
2	Good	40.035–46.395	11
3	Average	31.795–42.064	10
4	Acceptable	25.665–33.744	9



5	Poor	20.415–25.623	8
6	Very Poor	16.145–21.404	7

The researcher believes that the presence of this number of female students at the (Very Good) and (Good) levels is attributable to their possessing a degree of health that reflects their awareness of the nature of what is required of them during lectures. Success is measured by the extent to which tasks are accomplished as required, whereas effectiveness is measured by the optimal utilization of motor and physical abilities (Allawi, 1994, p. 214).

As for the average level, the researcher believes that the majority of female students fall within this level, which is considered logical given the variation in their health and nutritional levels, in addition to individual differences in physical, health, and cognitive capabilities. Fatigue during physical exertion is a common condition experienced by humans when engaging in various physical activities, whether simple or intense. It is a decline in muscular capacity to perform due to bodily exhaustion and results from the interaction of several physiological and psychological factors. Understanding the causes of fatigue is important for improving athletic performance and daily motor functions and for developing appropriate training and nutritional programs (Abu Al-Ela, 2003, p. 78).

With regard to the (Acceptable) and (Poor) levels, this provides an indication that female students falling within these two levels lack many of the health-related components they need to ensure continuity of performance and delay the onset of fatigue in a manner consistent with the requirements of study and training. Consequently, weak health and physical awareness in this regard is reflected in their level of performance in various academic and training lectures. Therefore, the student should possess an adequate level of health awareness and knowledge concerning what is appropriate for delaying and combating fatigue.

Table (2)

Shows the arithmetic means and calculated standard deviations for differences in professional behavior among female students in individual and team sports

Sports	Mean	SD	Calculated t
Individual	36.302	13.83	0.965
Team	304.77	19.66	0.965

Table (2) shows that the arithmetic mean for individual sports was (36.302), with a standard deviation of (13.83), whereas the arithmetic mean for team sports was (304.77), with a standard deviation of (19.66). The calculated (t) value was (0.965), which is lower than the tabulated value of (1.96), indicating that there are no statistically significant differences in professional behavior between female students in individual and team sports.

Neglecting to eat meals before the start of lectures is one of the main causes of the onset and prevalence of fatigue among female students, especially in view of their physical constitution. Therefore, meals rich in nutrients must be consumed before practical lectures and even afterward in order to replenish the important nutrients lost by the body (Al-Haddad, 2018, p. 30).

The nature of study in the field of physical education and sports sciences also involves tasks that require effort, knowledge, and skill. Therefore, the female student should be aware of health and nutrition and should seek to acquire information on the various health aspects related to her specialization.

5-1 Conclusions

1. Adherence to balanced meals containing carbohydrates, proteins, healthy fats, vitamins, and minerals helps delay the onset of fatigue during physical exertion.

2. Consuming a light meal containing carbohydrates one to two hours before exercise contributes to increased energy and physical endurance during sports activity.



3. Drinking sufficient amounts of water before and during physical activity reduces muscle fatigue and helps delay signs of fatigue.

4. It was observed that female students who lack certain essential nutrients, such as iron, calcium, and magnesium, experience greater difficulty tolerating physical exertion and feel fatigued more quickly.

5–2 Recommendations

1. Incorporating nutrition education programs into curricula and workshops in colleges of physical education to enhance female students' awareness of the importance of proper nutrition.

2. Planning sports meals so that meals consumed before and after physical activity include the nutrients necessary to enhance endurance and delay fatigue.

3. Monitoring the levels of essential nutrients among female students and ensuring that they obtain iron, calcium, magnesium, and vitamins important for better physical performance.

4. Encouraging regular fluid intake before, during, and after exercise to avoid dehydration and reduce muscular fatigue.

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Appendix (1): Nutrition

Response Scale: Strongly Agree – Agree – Neutral – Disagree – Strongly Disagree

No.	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	I make sure to eat a balanced breakfast before physical activity					
2	I consume carbohydrates before exercise to obtain sufficient energy					
3	Consuming protein helps me improve performance					

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	and reduce fatigue					
4	I drink sufficient amounts of water before, during, and after exercise					
5	Dehydration causes me to feel fatigued quickly during physical exertion					
6	I eat healthy snacks before training (such as fruits or nuts)					
7	I notice that good nutrition delays the onset of fatigue during exercise					
8	Vitamin and mineral deficiencies affect my athletic performance level.					
9	I adhere to eating regular meals daily to maintain energy.					
10	I consume a balanced diet containing all essential nutrients.					

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11	Malnutrition leads to reduced physical endurance.					
12	I need more knowledge about sports nutrition to improve my performance					

Appendix (2): Fatigue

No.	Item	Yes	No	Sometimes
1	Do you feel fatigued early?			
2	Are there visibly apparent symptoms when you are fatigued?			
3	Does exercising fatigue your mental abilities?			
4	Do you suffer from the intensity of exercise during lectures?			
5	Do you exert a great deal of effort during lectures?			
6	Do you talk a lot during the lecture?			
7	Do practical lectures have a negative effect on you?			
8	Do you suffer from deformities?			
9	Do you have physical injuries or internal			

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	functional injuries?			
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