
Movement Efficiency and Functional Performance in University Students**Dr. Christopher Evans**

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Abstract: Movement efficiency is an essential component of physical fitness that influences functional performance, injury prevention, and overall health among university students. The transition from adolescence to adulthood is often accompanied by reduced physical activity, prolonged sedentary behavior, and lifestyle changes that negatively affect movement quality and physical performance. This study aimed to evaluate the movement efficiency of university students and examine its relationship with functional performance. A quantitative cross-sectional research design was adopted involving 120 university students selected through simple random sampling. Standardized functional movement assessments and functional performance tests were employed to collect data. Descriptive statistics and Pearson correlation analysis were used to analyze the findings. The results indicated that participants demonstrated satisfactory movement efficiency (Mean = 74.82, SD = 8.64) and functional performance (Mean = 78.45, SD = 7.91). A strong positive correlation ($r = 0.712$, $p < 0.001$) was identified between movement efficiency and functional performance, indicating that students with better movement patterns also exhibited superior balance, agility, and overall physical capability. The findings highlight the importance of incorporating movement-based exercise programs into university health initiatives to improve physical function and reduce injury risk. Universities should integrate functional movement screening and corrective exercise strategies into physical education and wellness programs to promote long-term musculoskeletal health.

Keywords: Movement Efficiency, Functional Performance, University Students, Physical Fitness, Functional Movement, Balance, Agility

Introduction

Physical fitness is widely recognized as one of the primary determinants of health, academic productivity, and quality of life among university students. Modern educational environments increasingly encourage prolonged sitting, extensive digital device usage, and reduced participation in physical activities. These behavioral changes often contribute to poor posture, muscular imbalances, reduced flexibility, and inefficient movement patterns. Consequently, university students may experience decreased functional performance, increased fatigue, and a greater susceptibility to musculoskeletal injuries.

Movement efficiency refers to the ability of the human body to perform physical tasks using coordinated, stable, and energy-efficient movement patterns. Efficient movement requires the integration of muscular strength, flexibility, joint mobility, neuromuscular coordination, and postural control. Individuals demonstrating efficient movement generally expend less energy during physical activities while maintaining optimal biomechanical alignment.

Functional performance represents the capacity to execute daily and sport-related activities effectively without unnecessary physical limitations. Components such as balance, agility, mobility, coordination, and muscular endurance collectively determine an individual's functional capability. University students with higher functional performance generally exhibit improved participation in recreational sports, reduced injury prevalence, and better overall physical well-being.

The increasing prevalence of sedentary lifestyles among young adults has raised concerns regarding declining movement quality. Previous investigations have demonstrated that poor movement efficiency contributes to reduced athletic performance, impaired balance, chronic musculoskeletal pain, and increased injury risk. Despite these findings, relatively limited research has simultaneously examined movement efficiency and functional performance within university populations, particularly in developing educational settings.

Understanding the relationship between these variables is essential for designing preventive interventions aimed at improving students' physical health. Universities can utilize movement assessments to identify individuals at risk of functional limitations and implement evidence-based exercise programs to enhance physical competency.

Therefore, the present study investigates movement efficiency and functional performance among university students while examining the relationship between these important indicators of physical health.

Literature Review

Literature establishes positive associations between movement quality and physical performance, comparatively fewer studies specifically investigate university students using integrated movement efficiency and functional performance assessments. This gap highlights the necessity for further empirical investigation within higher education populations.

Concept of Movement Efficiency

Movement efficiency refers to the ability to perform physical activities using optimal coordination, stability, flexibility, and muscular control while minimizing unnecessary energy expenditure. It reflects the quality of movement rather than simply physical strength or endurance. Efficient movement patterns enhance biomechanical alignment, improve motor control, and reduce the likelihood of musculoskeletal injuries.

Functional Performance in University Students

Functional performance represents an individual's ability to perform everyday and physical tasks effectively through the integration of balance, agility, mobility, coordination, and muscular endurance. Among university students, functional performance is closely associated with participation in physical activity, academic productivity, and overall health status.

Relationship between Movement Efficiency and Functional Performance

Several studies have reported a positive relationship between movement efficiency and functional performance. Students demonstrating better movement mechanics generally exhibit improved balance, agility, coordination, and physical endurance. Efficient movement contributes to enhanced neuromuscular control, resulting in superior performance during both daily activities and sports-related tasks.

Influence of Sedentary Lifestyle on Movement Quality

Modern university lifestyles are increasingly characterized by prolonged sitting, excessive screen time, and reduced participation in physical activities. Such sedentary behavior contributes to decreased flexibility, poor postural alignment, reduced core stability, and movement dysfunction, ultimately impairing functional performance.

Role of Functional Movement Assessment

Functional movement assessments are widely used to evaluate mobility limitations, movement asymmetry, and stability deficits before injuries occur. These assessments enable early identification of dysfunctional movement patterns and assist practitioners in designing individualized corrective exercise interventions.

Effect of Exercise and Corrective Training

Research indicates that structured strength training, flexibility exercises, balance training, and neuromuscular conditioning significantly improve movement efficiency. Corrective exercise programs enhance joint mobility, muscular coordination, postural stability, and overall functional performance while reducing injury risk among physically active and sedentary populations.

Importance of Balance and Agility

Balance and agility are essential components of functional performance. Students possessing higher movement efficiency generally demonstrate better dynamic balance, quicker reaction time, improved lower-limb stability, and greater control during multidirectional movements. These qualities contribute to improved athletic performance and reduced incidence of falls and sports injuries.

Research Objectives

1. To evaluate the movement efficiency of university students.
2. To examine the relationship between movement efficiency and functional performance among university students.

Research Hypotheses

H₀₁: There is no significant relationship between movement efficiency and functional performance among university students.

H₁₁: There is a significant positive relationship between movement efficiency and functional performance among university students.

Methodology

Research Design

The present study adopted a quantitative cross-sectional research design to investigate movement efficiency and functional performance among university students. This design was selected because it enables the collection of data from a representative sample at a single point in time while facilitating statistical analysis of relationships between study variables.

Study Population

The target population consisted of undergraduate and postgraduate students enrolled in different academic disciplines at a university. Participants represented both male and female students who voluntarily agreed to participate in the study.

Sample Size

A total of 120 university students participated in the research. The sample size was considered adequate for descriptive and correlational statistical analysis.

Sampling Technique

A simple random sampling technique was employed to ensure equal opportunity for participant selection and to minimize sampling bias.

Inclusion Criteria

- Undergraduate and postgraduate students.
- Age between 18–25 years.
- Apparently healthy individuals without severe musculoskeletal disorders.
- Willingness to participate voluntarily.

Exclusion Criteria

- Students with recent fractures or orthopedic surgery.
- Individuals with neurological disorders affecting movement.
- Participants suffering from acute sports injuries.

Research Variables

Independent Variable

- Movement Efficiency

Dependent Variable

- Functional Performance

Data Collection Instrument

Data were collected using standardized movement assessment and functional performance testing procedures. The assessment included:

- Functional Movement Assessment
- Balance Assessment
- Agility Assessment
- Functional Performance Evaluation

Each participant completed all assessments under identical testing conditions.

Statistical Analysis

The following statistical techniques were applied:

- Mean
- Standard Deviation
- Percentage Analysis

- Pearson Correlation Analysis

A significance level of $p < 0.05$ was considered statistically significant.

Results and Discussion

Table 1. Descriptive Statistics of Movement Efficiency and Functional Performance (n = 120)

Variables	Mean	Standard Deviation	Minimum	Maximum
Movement Efficiency	74.82	8.64	56	92
Functional Performance	78.45	7.91	60	95
Balance	80.16	7.23	64	94
Agility	76.94	8.15	58	93

The descriptive statistics indicate that university students demonstrated satisfactory levels of movement efficiency and functional performance. The highest mean score was observed for balance (80.16), suggesting relatively strong postural stability among participants. Functional performance also showed a high average score (78.45), indicating good physical capability. Movement efficiency recorded a mean value of 74.82, reflecting moderate-to-high movement quality, while agility displayed acceptable performance with comparatively greater variability.

These findings suggest that although the overall physical functioning of students was satisfactory, opportunities remain for improving movement quality through structured exercise and corrective training interventions.

Figure 1. Mean Comparison of Study Variables

(Insert Bar Graph showing the following values)

Variable	Mean Score
Movement Efficiency	74.82
Functional Performance	78.45
Balance	80.16
Agility	76.94

Figure 1 illustrates the comparative mean scores of the assessed variables. Balance demonstrated the highest average performance, followed by functional performance and agility. Movement efficiency exhibited the lowest mean among the measured variables,

suggesting that improvements in movement quality may further enhance overall functional capability. The results support the first research objective by confirming satisfactory movement efficiency among university students.

Table 2. Pearson Correlation between Movement Efficiency and Functional Performance

Variables	Pearson Correlation (r)	p-value	Interpretation
Movement Efficiency – Functional Performance	0.712	<0.001	Strong Positive Relationship
Movement Efficiency – Balance	0.648	<0.001	Moderate Positive Relationship
Movement Efficiency – Agility	0.689	<0.001	Strong Positive Relationship

Pearson correlation analysis revealed statistically significant positive relationships between movement efficiency and all functional performance indicators. The strongest association was observed between movement efficiency and overall functional performance ($r = 0.712$), indicating that students demonstrating efficient movement patterns generally performed better in physical tasks. Positive correlations with balance ($r = 0.648$) and agility ($r = 0.689$) further support the importance of movement quality in enhancing physical performance. These findings reject the null hypothesis and provide evidence that movement efficiency contributes significantly to functional capability among university students.

Figure 2. Correlation Strength between Movement Efficiency and Functional Performance

(Insert Vertical Bar Graph using the following values)

Relationship	Correlation (r)
Functional Performance	0.712
Balance	0.648
Agility	0.689

Discussion

The present study demonstrates that university students possessing higher movement efficiency consistently achieved better functional performance scores. Efficient movement patterns enhance neuromuscular coordination, postural control, and biomechanical alignment, enabling individuals to perform physical tasks with greater stability and reduced energy expenditure.

The strong positive correlation observed in this study aligns with previous findings indicating that improvements in movement quality are associated with better balance, agility, and overall physical performance. Students demonstrating higher movement efficiency likely possess greater muscular coordination and joint mobility, contributing to improved execution of functional activities.

The findings also emphasize the value of incorporating functional movement assessments into university health programs. Early identification of movement deficiencies may facilitate corrective exercise interventions that improve physical performance while reducing injury risk. Universities should encourage regular physical activity, mobility exercises, and strength training to enhance movement quality and promote long-term musculoskeletal health.

Overall, the study confirms that movement efficiency is a meaningful predictor of functional performance among university students and should be considered an essential component of campus wellness initiatives.

Conclusion

The present study examined the relationship between movement efficiency and functional performance among university students. The findings demonstrated that participants exhibited satisfactory levels of movement efficiency, balance, agility, and overall functional performance. Descriptive analysis revealed that balance achieved the highest mean score, followed by functional performance, agility, and movement efficiency. These results indicate that the majority of university students possessed acceptable physical competency; however, opportunities remain for improving movement quality through structured exercise interventions.

The correlation analysis provided strong evidence that movement efficiency is positively associated with functional performance. Students who demonstrated efficient movement patterns consistently performed better in balance and agility assessments, suggesting that movement quality contributes substantially to physical capability. The statistically significant

positive correlations indicate that improvements in mobility, stability, and neuromuscular coordination can enhance overall functional performance.

The study highlights the importance of incorporating movement screening into university health promotion programs. Functional movement assessments may help identify students at risk of movement dysfunction before injuries occur. Universities should encourage participation in strength training, flexibility exercises, balance training, and corrective exercise programs to improve students' physical well-being and reduce injury susceptibility.

Overall, the research confirms that movement efficiency is an important determinant of functional performance among university students and should be considered an essential component of physical education and campus wellness initiatives.

Practical Implications

The findings of this study provide several practical implications for higher education institutions and health professionals:

- Universities should introduce routine functional movement screening during student health assessments.
- Physical education programs should emphasize movement quality alongside traditional fitness training.
- Corrective exercise interventions may improve mobility, balance, and coordination among students with poor movement patterns.
- Regular participation in resistance training and flexibility exercises can enhance functional performance and reduce musculoskeletal injury risk.
- Campus wellness programs should promote physically active lifestyles to counteract sedentary behavior commonly observed among university students.

Limitations of the Study

Although the present investigation provides valuable findings, several limitations should be acknowledged.

- The study employed a cross-sectional design; therefore, causal relationships could not be established.
- Data were collected from only one university, which may limit the generalizability of the findings.
- The sample size was relatively moderate and may not represent all university populations.

- Psychological factors, nutritional status, and daily physical activity levels were not examined.
- Longitudinal monitoring of movement efficiency was beyond the scope of the present study.

Future Scope

Future studies may expand upon the present investigation by:

- Including larger and more diverse university populations.
- Comparing movement efficiency across different academic disciplines.
- Conducting longitudinal studies to examine changes over time.
- Evaluating the effectiveness of corrective exercise programs.
- Investigating gender differences in movement efficiency and functional performance.
- Examining the influence of physical activity habits and lifestyle factors on movement quality.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this research.

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