



## Relationship Between the Physical Activity Level and Some Physical and Coordinative Abilities among Students at Age (12) Years

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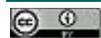
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### Abstract

The aim of this study was to identify the physical activity level and some physical and coordinative abilities among students in the age group (12) years depending on the gender. Additionally, the relationship between the physical activity level and these abilities was explored. To achieve this, the researchers used the descriptive approach on a sample consisting of (115) students in the model school at Yarmouk University, with (75) male students and (40) female students, who were selected randomly. The researchers used some of the German motor test (DMT) battery items, which included some physical abilities (20 meters), flexion the trunk downwards from the stand position, amended sit-up for 40 seconds, walking and running and some coordinative abilities (back dynamic balance, Jump aside for 15s). For data processing, the researchers used the (SPSS) to calculate the mean, standard deviations, frequency and percentage, test (t) and Pearson correlation coefficient. The results of the study showed that there were statistically significant differences at ( $\alpha > 0.05$ ) in all physical abilities according to gender variable and for males, and astatistically significant differences at ( $\alpha < 0.05$ ) in all coordinative abilities according to gender variable and for females. The results of the study also showed a positive correlation between the physical activity level and the physical and coordinative abilities level among the study sample.

**Keywords:** physical abilities; Coordinative abilities; Dynamic balance; Students.



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### 1. Introduction

Physical activity among children, whether recreational or regular, is an important factor affecting on health and quality of life, where diseases can be addressed at any age (Woll and Bös, 2004). Robert Koch-Institut (Hrsg) (2005), stated that the physical and athletic activity is an important activity and prerequisite for healthy growth among children and adolescents, as well as its positive effect on the body and motor development such as psychological happiness and personality development. Doctors and educators warn of the steady increase in weight and the decline in motor abilities due to the apparent motor disability of children. Bös (2003) indicates that the level of motor performance of adolescents has decreased with technological progress, as daily life in most countries, especially developed nations, has become less dynamic, and the deficit or lack of movement begins from childhood and its consequences persist to adulthood by (10-20 %) in most motor abilities since the 1970s, where the distance in the (6) minutes walking and running test was (1024)m, while the distance travelled to their peers in the same test at the beginning of the 20th century (876) m, Because of the increased volume of traffic and the marked increase in construction, the movement of children has been clearly limited and restricted, rather than engaging in outdoor physical activities, which have been compensated for by low- activities within narrow areas such as computer games and television watching (Oppen *et al.*, 2005). Bös (2005) stated that (31.9%) Male students and (37.7%) female student in basic schools practice the physical activity in a sports club as a recreational sport at a rate of one or twice a week, as well (37.7%) males and (31.8%) female practice the physical activity from (3-5) times per week in return (15.3%) Males and (20.9%) female rarely practice the physical activities In regularly. It also requires (9)hours lying, (9) hours sitting and (5) hours standing and only one hour of physical activity of which (15-30) minutes practicing the intense physical activity. The decrease in physical and sporting activity among children is due to the constant change in the lifestyle of the intensity of construction and the increase in the volume of traffic, as well as the lack of sports facilities that children can reach effortlessly.

The results of many studies have shown that there is a positive statistically significant relationship between the physical sports activities level and the physical and coordinative abilities level among children and adolescents (Kretschmer, 2004; Rethorst, 2003; WIAD-AOK-DSB-Studie II, 2003). Additionally, Bös and Woll (2002) stated that there is a statistically significant correlation between the physical activity and respiratory cyclic endurance, as well as statistically significant differences between children practising and non-practicing physical activity and for the benefit of practitioners. Also, there is a statistically significant relationship between the practice of physical activity and physical power, which is characteristic of the speed and strength, as well as the practice of physical

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activity and the coordinative abilities, which is characteristic of the back dynamic balance (Runhaar *et al.*, 2009; Schott, 2000). Bös (2001), stated that the motor abilities is an information system that can be divided into physical and coordinative abilities. Where motor efficiency is associated with the physical activity level, the children with high levels of motor abilities are the most physically active, the physical and coordinative abilities play a fundamental role in the exercise of various motor activities and are considered the cornerstone of the individual to start to practice and then excel and achievement (Castelli and Valley, 2007).

The main purpose of this study is to identify the physical activity level among children in the (12) years age group, where their lives are generally limited to passive mental activities with narrow spaces such as the use of visual means of computer games and watching television, which resulted in the motor deficit, the problem in these tools that its use in limited spaces and for long hours and this affects on the physical and coordinative abilities. This study aimed to identify the correlation between the physical activity level and some physical and coordinative abilities among students at age group (12) years depending on the gender variable.

## 2. Materials and Methods

### 2.1. Subjects

Descriptive approach has been applied on (115) students in the model school at Yarmouk University affiliated to the first Irbid Directorate who are they (75) male students (age 11- less than 12 years; height  $1.45 \pm 0.07\text{m}$ ; mass  $42 \pm 2.5\text{ kg}$ ) and (40) female students (age 11- less than 12 years; height  $1.44 \pm 0.06\text{m}$ ; mass  $42 \pm 3.5\text{ kg}$ ).

### 2.2. Procedures

The researchers used Woll *et al.* (2011) measure to determine the level of physical activity among the study sample, through parents' responses. The measure consists of (6) domains: the interest of practicing sports in the school, physical and athletic activity in the school, routine physical activity field, physical and athletic activity at leisure and outside the sports club, physical activity and regular sports within the sports club and sports facilities. Additionally, the researchers used some of the German motor test (DMT) battery, which included following physical abilities (20) m, flexion the trunk downwards from the stand position, amended sit-up for (40) seconds, walking and running and some coordinative abilities (back dynamic balance, jump aside for (15s). Furthermore, the researchers used stop watches(4), swedish seats (4), numbered rulers (4), length bar (4), mass measurement scale (4), adhesive tape Length (1) meters and width (30) cm (4), wooden beams length (3) m and height (5) cm different width (3, 4.5, 6) cm, square wooden panel shape (40) cm high (5) cm, Plastic cones (6), and registration form for each teacher.

To verify the reliability of the study test, the researchers used the stability method (Test-r test), as tests were applied on standardization sample (10) students of both genders, and re-applied a after week on the same sample that was excluded from the study population and the correlation coefficient between the two applications was extracted, In order to verify the validity of the test, the researchers calculated the stability coefficient square (Table 1).

**Table-1.** Demonstrates the results of the stability and validity coefficient for the study tests

Tests	Stability Coefficient	Validity Coefficient
20m running	0.88*	0.92
back dynamic balance	0.83*	0.89
Jump aside for (15s	0.81*	0.90
flexion the trunk downwards from the stand position	*0.79	0.92
Amended sit-up	*0.75	0.93
6 M walking and running	*0.86	0.89

\*significantly( $p < 0.05$ )

For statistical processing of study data, the means, standard deviations, Pearson correlation coefficient and Test-r test were used.

## 3. Results

The objectives of this study were to identify the physical activity level and some physical and coordinative abilities among students in the age group (12) years depending on the gender. As well as, the relationship between the level of physical activity and these abilities. Furthermore, the results of the Independent Samples T-Test on the means of the physical and coordinative abilities among students at age group (12) years according to the gender variable (Table 2).

**Table-2.** Ruselte of the Independent Samples T-Test on the means of the physical and coordinative abilities (n=115).

physical and coordinative abilities	Gender	Meam	Sd	T	Sig.
20m running/ s	Male	3.91	0.37	5.91*	0.00
	Femal	4.60	0.59		
flexion the trunk downwards from the stand position	Male	-1.91	6.59	0.86	0.39
	Femal	-3.33	7.43		
Amended sit-up	Male	19.51	5.24	2.37*	0.02
	Femal	16.48	5.78		
6 M walking and running	Male	951.46	114.91	11.34*	0.00
	Femal	716.78	58.69		
back dynamic balance	Male	19.51	6.18	6.82*	0.00
	Femal	36.90	13.91		
Jump aside for (15)s	Male	18.93	4.44	11.38*	0.00
	Femal	31.69	5.17		

\*significantly (p<0.05)

To identify the correlation between the level of sports activity and some of the physical and coordinative abilities among students at age group (12) ( $0.05 > \alpha$ ), researchers used the Pearson correlation coefficients (Table 3).

**Table-3.** Pearson correlation coefficients between the level of sports activity and some of the physical and coordinative abilities (n=115)

(Woll et al., 2011) measure	Sport facilities field		physical activity and regular sports within the sports club		physical and athletic activity at leisure and outside the sports club		routine physical activity field		physical and athletic activity in the school		the interest of practicing sports in the school	
	male	female	male	female	male	female	male	female	male	female	male	female
physical and coordinative abilities												
20m running/ s	0.66*	*0.52	*0.60	*0.43	0.38*	0.47*	0.25*	0.62*	0.83*	*0.57	0.67*	0.87*
flexion the trunk downwards from the stand position	0.78*	0.68*	0.79*	0.65*	0.72*	0.65*	0.78*	0.79*	*0.76	0.*71	*0.68	0.72*
Amended sit-up	0.64*	0.80*	0.65*	0.69*	0.61*	0.67*	0.69*	0.73*	*0.71	0.73*	0.72*	0.79*
6 M walking and running	0.77*	0.826*	0.68*	0.73*	0.70*	0.69*	0.81*	0.62*	0.64*	0.63*	0.71*	0.88*
back dynamic balance	*0.78	*0.62	*0.68	*0.65	*0.62	*0.62	0.86*	0.67*	0.66*	*0.64	0.67*	0.654*
Jump aside for (15)s	*0.77	*0.70	*0.62	0.64*	*0.70	0.76*	0.64*	0.67*	0.73*	*0.63	0.77*	0.44*

\*significantly(p<0.05)

#### 4. Discussion

By reviewing the values of the physical and coordinative abilities mean, the results of the study showed that the male students were superiority in the physical ability (running 20m). This is due to the daily motor behaviour performed by males compared to the females by playing during the physical education course and outside the school, where part of this behavior depends on the motor speed during their practice of collective sports such as football and basketball, which are highly competitive level and this is consistent with previous results reported by Bös et al. (2009). Furthermore, the male students were superiority in the physical ability (amended sit-up /40s), this is due to the increased growth, uteinizing and Follicle stimulating hormones at this age. Therefore, leading to the emergence of clear differences between the gender physiological, anatomical and physical, where the size of muscles in males compared to females at the same age group, and the nature of motor behavior among males in this age is more active compared to females, represented in focusing on the development of the trunk strength muscles, back and arm muscles by performing different aspects of basic motor skills such as attachment and climbing and this is consistent with previous results reported by Bataina and Mistrahi (2016), Bös et al. (2009), Weineck (2010). Notably, the muscles mass among the females is (35%) of the body mass, while in males it is (41%), in order to muscle fat among the females, this means that the relative strength among females in general is less than that of males. In addition, the male students were superiority in the physical ability (6 M walking and running), this is due to the nature of motor activities among males whether physical or athletic, which consists of running for long distances or play ball for longe time, also to the strength of the leg muscles and the functional capacity of the heart muscle and the vital capacity of the lungs in males. Also, the males at this age group have (5 ml / kg) of vo2 Max more than females (Rost, 2001). Weineck (2010), stated that in this age group increases the growth, uteinizing and Follicle stimulating hormones and this leads to clear gender differences in physical abilities such as cardio-respiratory endurance, muscles strength and speed and favor to males, so the size of the lungs among the males is greater than females due to physical and hormonal activity. Also, the proportion of hemoglobin mong the females is lower than that of males and this is consistent with previous results reported by Bös et al. (2009), WIAD-AOK-DSB-Studie II (2003), which showed a statistically significant differences in physical ability (6 M walking and running) according to the gender variable and in favor of males. The male superiority of the physical abilities under study is consistent with the results achieved in testing the level of physical activity. The results showed male superiority in the level of interest in the

physical education lesson, regularity in the exercise of sports activities, the practice of daily life activities such as work in the garden and affiliation to clubs.

The results of the study indicated that there were statistically significant differences at ( $\alpha \leq 0.05$ ) between coordinative abilities (Jump aside for (15)s and back dynamic balance) and favor to females and this is consistent with previous results reported by Bös *et al.* (2009). Also, it is not consistent with previous results reported by Dirksen *et al.* (2015), WIAD-AOK-DSB-Studie II (2003). The researchers attribute these differences to the marked improvement in the development of the central nervous system among females earlier than that of males. This development begins at 11 years among the females, while males at 12 years of age. Especially the obvious development in the growth of the cerebellum associated with the overall growth of the body in addition to the exploitation of movement of the hands to maintain the economic balance of the body, which helps in the ability at process analysis, treatment and the absorption of motor skills faster and this is consistent with previous results reported by Meinel and Schnabel (2007). Additionally, the researchers stated that these differences can be attributed to the nature of their daily motor behavior, whether during the physical education classes or outside the school. On the other side, the females depend on the dynamic motor skills that do not depend on physical abilities such as strength, speed and Cardio-respiratory endurance which takes the achievement and competition character as is the case with males. Emrich *et al.* (2004), stated that females prefer physical and sports activities that are characterized by violence or friction during exercise such as gymnastics, aerobics, swimming and volleyball, while males tend to engage in physical and athletic activities that take the form of strength and competition.

The results of the study indicate that there is a significant positive correlation relationship at ( $\alpha \leq 0.05$ ) level between the level of physical activity practice and the level of physical and coordinative abilities among students in the 12-year age group and this is consistent with previous results reported by Bös *et al.* (2009), Kretschmer (2004), Rethorst (2003), Schott (2000), which showed a statistically significant positive correlative relationship between the physical exercise variable and the cardio-respiratory endurance, speed, strength characteristic by speed and the coordinative ability (back dynamic balance). Castelli and Valley (2007), stated that motor efficiency is related to the level of physical activity and the children with high levels of motor abilities are the most physically active.

## 5. Conclusions

Physical and sporting activity among the children, whether recreational or regular, is an important factor affecting on the health and quality of life, where diseases can be addressed at any age through an active lifestyle, which requires a recognition of the level of physical activity practice among children in the 12 year age group, which has become their lives are generally limited to passive mental activities such as the use of optical means of computer games and watching television, which may result in motor incapacity, the problem in those methods that their use is limited to entertainment only and for long hours and this affects on the physical abilities And consensual. Where the study showed male superiority in the physical abilities under study, while females excelled in the the coordinative abilities, in addition there is a positive correlation between the level of physical activity practice and the level of physical and coordinative abilities. Through this study, it is possible to draw the attention of the caregivers of children in that age group to the importance of inclusion physical activities within the sports curriculum, which will improve these abilities.

## References

- Bataina, A. and Mistrahi, N. (2016). Level of differences in motor abilities among bait eedes elementary school complex, students age (6-9) using drodel-koch-test. *Dirasat Journal, University of Jordan*, 44(4): 1563-86.
- Bös, K. (2001). *Handbuch motorische tests*. Hogrefe: Göttingen.
- Bös, K. (2003). *Motorische leistungsfähigkeit von kinder und jugendlichen in w. Schmidt. I. Hartmann-tews and w.-d. Brettschneider (eds), erster deutscher kinder- und jugendsportbericht* Hofmann: Schorndorf. 85-107.
- Bös, K. (2005). Motorische kompetenz- unverzichtbar für die entwicklung von kindern und jugendlichen. *Haltung und Bewegung*, 25(4): 7-15.
- Bös, K. and Woll, A., 2002. "Fitness in der Grundschule. Förderung von körperlich-sportlicher Aktivität, Haltung und Fitness zum Zwecke der Gesund-heitsförderung und Unfallverhütung." In *Wiesbaden: Bundesarbeitsgemeinschaft für Haltungs- und Bewegungsförderung*.
- Bös, K., Woll, A. and Worth, A. (2009). *Motorik-modell: Eine studie zur motorischen leistungsfähigkeit und körperlich-sportlichen aktivitat von kindern und jugendlichen in deutschland*. Nomos Verlag.
- Castelli, D. M. and Valley, J. A. (2007). The relationship of physical fitness and motor competence to physical activity. *Journal of Teaching in Physical Education*, 26(4): 358-74.
- Dirksen, T., Karen, Z. and Wagner, H. (2015). *Bewegungskoordination und schulerfolg? Feldstudie zum einfluss einer bewegungsintervention auf koordinative und schulische leistungen in der sekundarstufe i*. Springer-Verlag Berlin Heidelberg.
- Emrich, E., Klein, M., Papathanassiou, V., Pitsch, W., Schwarz, M. and Urhausen, A. (2004). Soziale determinanten des freizeit—und gesundheitsverhaltens saarländischer schülerinnen und schüler—ausgewählte ergebnisse der idefiks- studie. *Deutsche Zeitschrift für Sportmedizin*, 55(9): 222-31.
- Kretschmer, J. (2004). Zum einfluss der veränderten kindheit auf die motorische leistungsfähigkeit. *Sportwissenschaft*, 34(4): 414–37.
- Meinel, K. and Schnabel, G. (2007). *Bewegungslehre sport motorik. Abriss einer theoriesportlichen motorik unter peadagogischem aspekt*. Meyer and Meyer Verlag: Aachen.

- Opper, E., Worth, A. and Bös, K. (2005). *Kinder fitness-kinder gesundheit. In bundesgesundheitsblatt – gesundheitsforschung gesundheits-schutz. Sport und gesundheit.* Springer Medizin Verlag: Berlin. 854–62.
- Rethorst, S. (2003). Der motorische Leistungsstand von 3- bis 7-Jährigen – gestern und heute. *Motorik*, 26(3): 117–26.
- Robert Koch-Institut (Hrsg) (2005). *Körperliche aktivität. Gesundheitsberichterstattung des bundes.* Heft 26. RKI: Berlin.
- Rost, R. (2001). *Lehrbuch der sportmedizin.* Deutscher Ärzteverlag: Köln. (Hrsg.).
- Runhaar, J., Collard, D., Singh, A., Kemper, H., Mechelen, W., Chin, A. and Paw, M. (2009). Motor fitness in dutch youth: Differences over a 26-year period (1980–2006). *Journal of Science and Medicine in Sport*, 13(3): 323-228.
- Schott, N. (2000). *Prognostizierbarkeit und Stabilität von sportmotorischen Leistungen.* Unveröffentlichte Dissertation, Institut für Sport und Sportwissenschaft, Universität Karlsruhe.
- Weineck, J. (2010). *Optimales training.* SpittaVerlag: Balingen. 16. Auflage.
- WIAD-AOK-DSB-Studie II, 2003. "Bewegungsstatus von kindern und jugendlichen in deutschland. Kurzfassung einer untersuchung auf der basis einer sekundäranalytischen sichtung, einer repräsentativen befragung bei 12- bis 18-jährigen und eines bewegungs-check-up in schulen." In *Eine Analyse des Wissenschaftlichen Instituts der Ärzte Deutschlands. DSB (Hg.). Frankfurt a. M.*
- Woll, A. and Bös, K. (2004). Wirkungen von Gesundheitssport. *Bewegungsther Gesundheitsport*, 20(3): 1–10.
- Woll, A., Kurth, B.-M., Opper, E., Worth, A. and Bös, K. (2011). *The 'Motorik-Modul' (MoMo): physical fitness and physical activity in German children and adolescents.* 170 vols. Springer-Verlag. 1129–42.