A Comparison of Children's Physical Fitness in Assiut and Mansoura City in Egypt

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Abstract

The aim of this study was to evaluate the differences in the level of Physical fitness between Assiut city (Upper Egypt) and Mansoura city (Lower Egypt) among primary school age children from 7-11 years old. Participants were primary school aged-children (n = 474; 237 from Assiut city and 237 from Mansoura city ranging in age from 7 to 11 years old. The data were collected by using the German motor test. No significant differences were found between cities in the investigated participants' anthropometric parameters. A significant difference between the performances of participants from Assiut and those from Mansoura were found for the majorities of tested parameters (except LJ) with children from Assiut perform better in Sprints and BB, and children from Mansoura city perform better in strength tests such as JS, PU, SU and in 6min endurance test. These results demonstrated the effect of environment on the physical fitness levels during childhood.

Keywords: Physical Fitness, Environment Effect, Children

Introduction

Fitness measuring has been widely used as an assessment of young people's fitness both in schools and in public health (Cale & Harris, 2009). The health related components such like (cardio-vascular (CV), body com- position, flexibility, muscle endurance, or strength) are tested because of their relation to health/disease in later life (Cale & Harris, 2005). It could be argued that among other factors, a young person's fitness may determine how much physical activity (PA) they actually take part in. In addition, Measurement and evaluation of physical fitness is an indispensable tool for physical educators, and it is just as indispensable that researchers should give to practitioners properly validated criteria for such measurement.

Indeed, physical inactivity has been identified as the fourth leading risk factor for non-communicable diseases accounting for more than 3 million preventable deaths in 2009 (WHO, 2009). Being physically active is pivotal not only for adults' health but also holds important health benefits in children and in youth, where low physical activity (PA) and the consequences of such as poor physical fitness have been found to relate to other cardiovascular disease risk factors, including overweight/obesity, and mental despair (Janssen & LeBlanc, 2010). Low PA, poor physical fitness, and overweight track from childhood through adolescence (Janz, Dawson & Mahoney, 2000, Clarke, Lauer, 1993 & Kelder, et al. 1994) into the adult years (Twisk, et al. 1997 & Andersen, Haraldsdottir, et al. 1993) and recently it has been suggested that PA also plays a role in relation to brain function and learning performance (Chaddock, et al. 2011 & Hillman, et al. 2011). Consequently, PA should ideally be promoted in young age in order to avoid attendant substantial and long-lasting health problems and possibly even improve cognitive function and academic performance.

On the other hand, higher fitness levels are related to improved health in children and

youth (Strong, et al. 2005). The importance of muscular fitness (MF) is recognized in most current institutional recommendations for exercise helping to maintain and improve health status (WHO, 2010) and preventing chronic diseases (Wolfe, 2006). Several studies have shown an association between muscular strength and cardiometabolic risk in children and young adults (Steene-Johannessen, et al. 2009, Artero, at el. 2011 & Magnussen, at el. 2012) independent of cardiorespiratory fitness, adiposity and other confounding factors (Grøntved, at el. 2013, Peterson, et al. 2014).

There is evidence in the existing research into correlates or determinants of PA has focused mostly on individual-level factors (Bauman, et al. 2012). Among them, indicators of socioeconomic status such as education (Van Der Horst et al. 2007) and biological factors such as body mass index (Patnode, et al. 2010) have been associated with differences in participation in PA. However, contextual factors such as the quality of the built or social environment are less studied but are thought to have wide- spread effects that may vary across geographic settings (Bauman, et al. 2012, Merlo, 2011).

It has been noted that children's fitness could differ according to geographical area and is worthy of further investigation (Dollman, Norton, & Tucker, 2002), few data are available that examine whether fitness levels differ by location in Egypt among children. A better understanding of the influence of geographic settings (local to national) on physical fitness among children can inform the development of multifaceted interventions, which likely offer the best chance for success (Sallis, Owen , 2008).

Aim of Research

The aim of this study was to explore whether children in the Upper Egypt (Assiut city) displayed any different characteristics in the aspects of physical fitness, compared with children of the same age group in the Lower Egypt (Mansoura city).

Methods

2.1 Participants and setting

Participants were primary school aged-children (n = 474; 237 from Assiut city and 237 from Mansoura city ranging in age from 7 to 11 years old. The data were collected in 2015 in three public primary schools in the city of Mansoura in Egypt. The measurement of physical fitness tests, body height, body weight, and body mass index (BMI) were carefully supervised inside the school gym (Abdelkarim et al, 2017a & 2017b). As the fitness testing involved seven tests and the children had a limited amount of time within their Physical education (PE) lesson, several qualified PE teachers helped with the organization and recording of test results. A well-test environment was considered during the test implementation.

2.2 Test description

The German motor test DMT (Bös, 2009) is targeted for the children ages of 6-18. This test is used to assess physical fitness, including endurance, strength, speed, coordination, flexibility and indicate general motor performance ability (MPA) (Lämmle et al., 2010). The author found a good test-retest reliability coefficients for the motor and mental tests (r_{min}=0.68 to r_{max}=0.94 and r_{min}=0.56 to r_{max}=0.74, respectively).

2.3 Statistical analyses

All statistical tests were processed using SPSS Software (version 22). Values were expressed as mean ± SD. Normality was confirmed using the Shapiro-Wilks W-test. The effect

of city on the anthropometric data and physical fitness performance was analyzed using an independent t-test. Effect sizes was calculated as Cohen's d to assess the practical significance of our findings. Significance was set as $p < 0.05$.

Results:

Our study included 474 primary school children aged between 7 and 11 years old (i.e., 21.1% at 7 years old, 18.57% at 8 years old, 22.78% at 9 years old, 18.57% at 10 years old and 18.99% at 11 years old) with 50% participants from Assiut city (N=237) and 50% from Mansoura city (N=237). Descriptive statistic (Table 1) indicate that from the 474 participants 4.64 % were underweight, 68.78% were normal weight, 13.92% were overweight and 12.66% were obese. To avoid any disturbance effect of gender, age or body weight category (Abdelkarim et al. 2015-2017), the selection of participants in both city was based on recruiting similar number of male (N=112) and female (N=125), similar number of underweight (N=11), normal weight (N=163), overweight (N=33) and obese (N=30) and similar number of children in each age categories (7-11 years old).

Table 1 : Participants' descriptive statistics

Participants		Total		Assuit		Mansoura	
		N	%	N	%	N	%
Total		474	100	237	50	237	50
By Gender	*Male*	224	47,26	112	23,63	112	23,63
	Female	250	52,74	125	26,37	125	26,37
By Weight Category	*Underweigth*	22	4,64	11	2,32	11	2,32
	Normal weight	326	68,78	163	34,39	163	34,39
	Overweight	66	13,92	33	6,96	33	6,96
	Obese	60	12,66	30	6,33	30	6,33
By Age	*7 years old*	100	21,1	50	10,55	50	10,55
	8 years old	88	18,565	44	9,275	44	9,28
	9 years old	108	22,78	54	11,39	54	11,39
	10 years old	88	18,565	44	9,275	44	9,28
	11 years old	90	18,99	45	9,49	45	9,49

Consequently, no significant differences were found between cities in the investigated participants' anthropometric parameters with t(472)=-1,70, p>0,05for height, t(472)=-1,18, p>0,05 for weight and t(472)=-0,26, p>0,05for BMI (Table 2) .

Table 2: Effect of city on the anthropometric data

Anthropometric parameters	City		Student t	95% CI		Cohen's d
	Assiut	Mansoura		Lower	Upper	
Height (m)	1,35 ± 0,11	1,37 ± 0,10	$t_{(472)}$=-1,70, p>0,05	-0,04	0,003	0,19
Weight (kg)	34,58 ± 9,9	35,69 ± 10,7	$t_{(472)}$=-1,18, p>0,05	-2,98	0,74	0,11

BMI	18,62 ± 3,6	18,71 ± 3,5	$t_{(472)}$=-0,26, p>0,05	-0,72	0,56	0,03

Concerning, the physical fitness performance (Table 3) significant difference between the performances of participants from Assiut and those from Mansoura were found for the majorities of tested parameters (except LJ) with children from Assiut perform better in Sprints ($t_{(472)}$=-4,68, p=0,000, d=0.43) and BB ($t_{(472)}$=3,67, p=0,000, d=0.34) and children from Mansoura city perform better in strength tests such as JS ($t_{(472)}$=-2,67, p=0,008, d=0.25), PU ($t_{(472)}$=-3,75, p=0,000, d=0.34) and SU ($t_{(472)}$=-2,80, p=0,005, d=0.26) and in 6min endurance test ($t_{(472)}$=-2,80, p=0,005, d=0.8). This results show the priority for the children from Mansoura in the performances involved the energetic abilities such like (strength and endurance) which is combined with a better anthropometric parameters.

Table 3: Effect of city on physical fitness performances

Physical Fitness testes	City		Student t	95% CI		Cohen's d
	Assiut	Mansoura		Lower	Upper	
Sprint (s)	4,68 ± 0,59	4,93 ± 0,57 *	$t_{(472)}$=-4,68, p=0,000	-0,35	-0,14	0,43
BB (points)	27,46 ± 10,6	23,95 ± 10,2 *	$t_{(472)}$=3,67, p=0,000	1,63	5,38	0,34
JS (points)	22,05 ± 9,4	24,04 ± 6,5 *	$t_{(472)}$=-2,67, p=0,008	-3,45	-0,53	0,25
PU (points)	9,43 ± 4,62	10,9 ± 3,87 *	$t_{(472)}$=-3,75, p=0,000	-2,24	-0,69	0,34
SU (points)	13,05 ± 6,67	14,76 ± 6,67 *	$t_{(472)}$=-2,80, p=0,005	-2,91	-0,51	0,26
LJ (cm)	108,37 ± 22,97	106,11 ± 22,59	$t_{(472)}$=1,08, p>0,05	-1,85	6,36	0,1
6min (m)	733,8 ± 143,2	835,8 ± 177,9 *	$t_{(472)}$=-6,88, p=0,000	-131,1	-72,8	0,8

Balancing Backwards (BB), Jumping Sideways (JS), Push-Ups (PU), Sit-Ups (SU) and Long Jumping (LJ).

* significant difference between Assiut and Mansoura participants

Discussion

The main findings of this study indicate no significant differences were found between cities in the investigated participants' anthropometric parameters. The children from Mansoura city had a significantly better performance than their peers from Assiut city in the fitness items involved strength and endurance. However, the children from Assiut demonstrated better performance in fitness items involves sprint and coordination. The findings of the study also show no significant differences between area in which the children live and test for long jumping.

Due to the limited information about the level of physical activity and physical fitness among Egyptian cities, it could be hypothesized that the children from Mansoura city were taller and heavier than their peers from Assiut city with almost the same BMI. This indicate that the

children in Mansoura city are physically better than children from Assiut city.

It is also possible to conceive an association between a low PA level and the worsening anthropometric and physiological parameters. Unhealthy habits could be formed at this age regarding nutritional lifestyle and low physical activity (PA) levels and could contribute negatively to their anthropometrical and the physiological parameters. This suggested that in the social contexts of children, schools that do not adequately provide PA sufficient for health benefits might instead become effective environments for the propagation of negative lifestyles which mainly include bad nutrition habits and sedentary behavior.

Regular attendance of moderate-intensity level PA could result in better anthropometric and physiological parameters in children. Various PA interventions have been implemented with different populations to examined their associations with different anthropometric, physiological, and body composition parameters (Ortega, et al. 2008 & Fogelholm, 2008). Therefore, we could say that the children from Mansoura city are likely to have a better PA level comparing to their peers from Assiut city.

Perhaps a primary strategy for improving the long-term health of children and adolescents through exercise may be creating lifestyle patterns of regular PA that carry over to the adult years. The study from El-Gilany (2011) showed that only 11.3% of participants from Mansoura sample (1708 student from Mansoura University) were physically inactive, much lower than the 45.8% of college students in a Saudi Arabian study (Al-Hazzaa, 1990).

On the other hand, the better performance in the coordination ability (BB) which has been demonstrated by children from Assiut city confirm the last findings (Abdelkarim, et al. 2015), showed that at the beginning of primary school age the children from Assiut have performed at the same level comparing to their German peers at the same age, but with age growing the development of the performance was not as the same level like their German peers.

In addition, we could also reflect the differences in the physical fitness levels to the socio-demographic variables which are consistently correlated with PA in children and adolescents (Sallis, et al. 2000, Uijtdewilligen, et al. 2012 & Van der Horst, et al. 2007). Stalsberg and Pedersen (2010) reported that 58% of the reviewed articles found that children and adolescents from families with higher socioeconomic status tend to be more physically active than those from families with lower socioeconomic status.

Conclusion

In generally, the level of physical fitness among the children from Mansoura city is better than their peers those from Assiut city. These results demonstrate that Mansoura city offer better chances for children to participate in different physical and sport activities. This study also has limitation, it is a cross sectional study and the findings are associations, not causations. Some schools from Assiut and Mansoura cities in Egypt was selected for the study. The results would therefore need to be affirmed by bigger studies incorporating more schools in the other regions in Egypt in order to be adequately powered statistically. Not many schools in Egypt have sport facilities and appropriate sport equipment facilities, hence factors such as weather and PA levels may be provide an expansion of this study.

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