CHARLES UNIVERSITY IN PRAGUE

FACULTY OF PHYSICAL EDUCATION AND SPORT

EVALUATION OF HEALTH RELATED PHYSICAL FITNESS OF ELEMENTARY SCHOOL STUDENTS IN LIBYA

An Extended Abstract of the Doctoral Thesis

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Abstract

The present thesis introduces evaluation of health related physical fitness of elementary school students in Libya. The main aims of this theses is evaluating the elements of physical fitness related to health of students of elementary education of Libya, and comparing their level with students of other countries according to the availability of data. The methods were Statistical survey and comparative analysis.

The researcher used a set of fitness tests related to health using the presently implemented physical fitness test battery to get results to present the realistic outcomes to officials who take care of physical activity, which is one of the bases of health as we know.

This theses identifies the current health-related fitness levels of students in (Aljmeel, Regthaleen, Zwara) school district and suggests cultural differences that may influence that fitness status, and discussed four the evaluating of elements of physical fitness related health, cardiorespiratory endurance, muscular strength, flexibility and body composition which measured by 1 mile run, sit up test, sit and reach and skinfold caliper. The study showed that the mean and std were: height, weight, cardiorespiratory, muscular strength, flexibility and skinfold are (141.832 ± 9.405), (42.398 ±10.592), (10.957 ± 1.579), (20.045 ± 11.690), (13.865 ± 6.024), skinfold is (17.546 ± 9.973) respectively. Also, there was significant differences relate to the factor city and how it affected muscular strength ($p \leq 0.05$), (0.009) for which the mean value was (17.77±10.006) and how it affected skinfold ($p \leq 0.05$) for which the mean value was (0.05), (16.12±8.568) in favor to Zwara district. On the other hand there were no significant differences by the other factors on the other elements.

Also, it noticed that is a completely different between Libyan students and their counterpart from US in components of health related physical fitness in favor to US, that refer to the differences between developed country and less developed country.

Keywords: Fitness, Physical fitness related health, body composition, flexibility, muscular strength and endurance, health, field testing.

Abstrakt

Název: Hodnocení zdravotně orientované zdatnosti studentů základní školy v Libyi.

Cíle: Hodnocení prvků fyzické zdatnosti studentů základní školy v Libyi a porovnání jejich úrovně se studenty jiných zemí na základě dostupných dat.

Metody: Statistický výzkum a srovnávací analýza.

Výsledky: Badatel pracoval se sadou fitness testů vztahujících se ke zdraví s použitím nově zavedené sady fyzických testů, aby dosáhl výsledků a mohl prezentovat reálné výstupy odborníkům, jež se zabývají fyzickým cvičením jakožto jedním ze základů zdravého životního stylu.

Tento výzkum rozpoznává současnou úroveň zdravotně orientované zdatnosti studentů ve školních oblastech (Aljmeel, Regthaleen, Zwara) a naznačuje kulturní rozdíly, jež mohou ovlivnit tento fitness statut, a hovoří o čtyřech hodnotících prvcích zdravotně orientované zdatnosti, a to kardiorespiratorní zdatnost, svalová síla, flexibilita a tělesná skladba, jež jsou měřeny během na 1 míli, sklapovačkami, analýzou flexibility a měřením tloušťky kožní řasy kaliperem. Studie ukázala, že průměr a směrodatná odchylka byly následující: výška, šířka, kardiorespiratorní zdatnost, svalová síla a flexibilita jsou (141,832 ± 9,405), (42,398 ±10,592), (10,957 ± 1,579), (20,045 ± 11,690), (13,865 ± 6,024) a kožní řasa je (17,546 ± 9,973). Dále byly zjištěny zásadní rozdíly vztahující se k city faktoru a jak toto ovlivnilo svalovou sílu ($p \leq 0,05$), (0,009), pro niž platil průměr (17,77±10,006), a kožní řasu ($p \leq 0,05$), pro niž platil průměr (0,05), (16,12±8,568), což se vztahuje k oblasti Zwara. Na druhé straně nebyly zjištěny žádné zásadní rozdíly ostatních faktorů ve vztahu k jiným prvkům.

Také bylo vypozorováno, že zdravotně orientovaná zdatnost libyjských studentů ve srovnání s jejich protějšky ze Spojených států je dosti odlišná,

což odráží rozdíly mezi vyspělými a méně vyspělými státy.

Klíčová slova: Fitness, zdravotně orientovaná zdatnost, tělesná skladba, flexibilita, svalová síla a výdrž, zdraví, testování v praxi

Introduction

Physical education is a necessity for the health and well-being of every student. As a unique and essential part of the total education program, physical education can significantly enhance all aspects of development including health, physical fitness, movement knowledge, academic performance, goal setting, self-esteem, and social skills. Evidence continues to mount that regular physical activity can prevent and manage coronary heart disease, which is the leading cause of death. Researches finding clearly demonstrate that daily exercise, from early childhood throughout life, is a primary factor in maintaining health and enriching that quality of life. People begin to acquire and establish patterns of health-related behavior during childhood and adolescence. Schools are an efficient vehicle for providing this physical education instruction. Although many students participate in extra-curricular athletics, and these programs may meet the movement and exercise needs of the participants during their season of competition, such programs do not accommodate all a comprehensive education and must be included on daily basis. Finally, it should be understood that quality physical education is predicated upon having competent, dedicated, and knowledgeable teachers who utilize appropriate instructional techniques, strategies, and assessments. Physical education is important for the health and well being of people of all ages. It is enjoyable, builds self-confidence and improves ones health and fitness. Specific sports skills are developed in individual as well as team sports. Students experience a variety of lifetime and recreational activities.

In 2009, Faktor study showed there is surely evidence supporting regular physical activity participation in the primary and secondary prevention of numerous chronic diseases. Physical inactivity is a principle risk factor for cardiovascular disease and an increasing a set of chronic hypokinetic (inadequate movement or activity) diseases, including: obesity, diabetes mellitus, cancer (breast and colon), bone and joint diseases (osteoporosis and osteoarthritis), depression, and hypertension. (p. 1)

At the same time, reports which make a relationship between increased physical fitness and physical activity with reduce the cardiovascular diseases' and all-cause mortality have stimulated scientific interest in the assessment of both fitness and activity. Several reports have discussed and recommended methods designed to obtain reliable and valid data on activity and fitness. (Murphy et al, 1988). (p. 708)

On the other hand, our society now is undergoing an important period of serious and performance, and physical education like other sciences help in rising the physical efficiency of

members of the society, whether children or youth, and sportive activities are the pillar of healthy life and performing them help improve the quality of our life where we could live a happy sound life enjoying good health.

Maud & Foster (2006) study found that a regular physical activity or fitness, a high level of cardiorespiratory fitness and the maintenance of normal weight are strongly associated with several positive health outcomes across the lifespan.

Tammelin (2003) study will goose (1961) has defined physical fitness as "a capacity for sustained physical activity".

In addition, health related physical fitness involves of physiological functioning that promotes good health and provides the resources for individuals to successfully perform their daily activities without undue fatigue. Most authorities agree that this involves cardiovascular function, strength, muscular endurance, and flexibility. Level of fatness is another important indicator of overall health related fitness. (Jerry et al., 1988). (p. 33)

According to Stiehl et, al (2008) study refer that physical activity is bodily movement of any type and many include recreational, fitness, and game or sport activities such as jumping rope, lifting weights, or playing soccer, as well as daily activities such as walking to the store, taking the stairs, or raking leaves. Physical education, on the other hand, must provide learning opportunities, appropriate instruction, meaningful and challenging content.

Both physical activity and physical education are important because each contributes to the development of healthy, active individuals. (p.6)

According to Almaiuof study (2004) showed that health-related physical education curriculum can provide students with substantially more physical activity during physical education classes. In turn, improved health and well-being have significant positive consequences for both individuals and society as a whole. The scientific and empirical evidence is indisputable lifelong participation in physical activity have a significant positive impact on people health and well-being. (p. 2)

Aims of the research

Evaluating the elements of physical fitness related to health of students of elementary education of Libya, and comparing their level with students of other countries according to the availability of data.

Research hypotheses

1. There are differences of statistical indications between the levels of students of elementary education (city of Al-nikat Al-khams) and their counterparts from the USA in the element of body composition in favor to Libyan students.

2. There are differences of statistical indications between the levels of students of elementary education (city of Al-nikat Al-khams) and their counterparts from the USA in the elements of cardiorespiratory endurance, muscular strength and flexibility in favor to American students.

Research method

The researcher compared the elements of physical fitness related to health of elementary school students in Libya and compared them with their counterpart from USA. Students were evaluated in four components of health related fitness which were muscular strength, cardiorespiratory endurance, body composition and flexibility by sit-up, 1mile run, skinfold caliper and sit and reach, respectively. The tests were conducted in a hole except 1 mile run was performed in a field. The researcher used some tools in these tests which were a stop watch, skinfold caliper, sit and reach box and cons. The researcher described the tools and instruments, the study organization and data analysis. AAHPERD health related physical fitness test manual study (1983) showed that the norms are to be used to evaluate student performance. (p. 9)

Research sample

Health related physical fitness test results were obtained from each school in order for these four fitness criteria could be statistically analyzed. The researcher connected schools that subjects were tested. The researcher selected approximately six elementary schools located in different counties namely Zwara, Al Jemel and Regdaleen which were used as sources of data. The students were males and they were 5^{th} and 6^{th} grade pupils aged 10-11 years. At least 311 students were tested. The advantage of this Method was giving a chance for all the students to be tested. (n=311). According to Trochim, 2001, a study showed the methods that follow can be considered subcategories of purposive sampling methods. The researcher chooses highest schools in terms of the number of students. You might sample for specific groups or types of people as in modal instance, expert, or quota sampling. The researcher selected a sample using

purposive sampling to provide the first patch of data. The sample comprised of 100 participants for each county however some of the participants were absent or sick. On the other hand, the researcher added some participants to the sample. Consequently the sample is as shown in table 1. In addition, the methods of research were divided into two types. First, the pilot study which helped the researcher identify and ascertain the validity of the tools and instruments, ensure the availability of assistants during the tests, determine a suitable time for implementation of the program, acknowledge the difficulties faced the researcher and assistants during the tests, and understand how the assistants do the initial testing. Second, the researcher used the physical fitness testing related to health which were four tests as mentioned in this study. Furthermore, the researcher used a scientific method that is not widely used in his country because he thinks these tests will assist him to evaluate and investigate the level of physical fitness and health in his country and comparing them with developed country. The researcher started tests at the beginning of the 2011. The researcher selected the method approach which is suitable for the nature of the research. (p. 56)

Table (1): The numbers of participants and means

City	*Number of participants (Males)*	*Mean*			
		10 years		*11 years*	
		Height	*Weight*	*Height*	*weight*
Aljmeel	***92***	***144.85±8.95***	***49.75±10.70***	***140.94±10.40***	***46.92±10.18***
Regthaleen	***103***	***138.21±7.50***	***38.71±9.85***	***142.28±8.05***	***39.28±7.58***
Zwara	***116***	***137.34±8.63***	***39.52±9.54***	***146.8±9.14***	***41.9±11.41***

Table (1) refers to the number of the participants in all the cities. Aljmeel (92), Regthaleen (103) and Zwara (116). The mean of height and weight for all participants.

Tools instruments and procedures

A pilot study was completed to ensure clarity and how the research procedures are applied in this study. The actual fitness testing was performed within a fitness tests that contained the following stations: sit-ups, sit and reach, skinfold measures and the one mile run/walk.

Sit and reach box. A box which consisted of a 50 cm ruler was used to measure flexibility of the back. (Lamb, A., Jennifer, 1994) (p. 17, 18)

The procedures of the test as the researcher mentioned in the appendices.

Skinfold caliper. Skinfold caliper (Cambridge Scientific Industries, Inc., Cambridge, MD) was used to measure skinfold thickness. (Lamb, A., Jennifer, 1994) (p. 17, 18)

The procedures of the test as the researcher mentioned in the appendices.

Running track. A six lane, 400 m outdoor track was used as the test site for the one mile run/walk. (Lamb, A., Jennifer, 1994) (p. 17, 18)

The procedures of the test as the researcher mentioned in the appendices.

Stop watch. A Stop watch was used to monitor the time for the one mile run/walk and 1min set up test. . (Lamb, A., Jennifer, 1994) (p. 17, 18)

The procedures of the test as the researcher mentioned in the appendices.

Table (2) Produced battery of tests and measurements

Test	*Element measured*	*Unit*
1 mile run	*Cardiorespiratory endurance*	*min and sec*
Sit up test	*Muscular strength*	*Repetition*
Sit and reach	*Flexibility*	*cm*
Skinfold caliper	*Body composition*	*mm*

Table (3) Two different skinfold sites

Aria	***Unit***
Subscapular	*Mm*
Triceps	*Mm*

Data analysis

In 2005 Jerry et al study showed that statistics are simply an objective means of interpreting a collection of observation. Various statistical techniques are necessary to describe the characteristics of data, test relationships between sets of data and test the differences among sets of data. The researcher therefore analyzed the data using basic statistical procedures which are the mean, standard deviation, skewness, the percentile, analysis of variance and regression. The researcher also used SAS and SPSS statistical application programs to illustrate the outcome. First of all, the mean which is a commonly used method of describing central tendency. Secondly, standard deviation is also important to use as an indicator of dispersion. Thirdly, the percentile was used to divide data into 99 parts and provide information about how the data spread from smallest to largest value. Fourthly, the researcher used the skewness to show the homogenous for the sample. Fifthly, regression analysis is a statistical tool used for investigating relationships between variables. Usually, the investigator seeks to ascertain the causal effect of one variable upon another. Sixthly, analysis of variance was used to compare more than two groups. Finally, graphics and tables were used to explain or demonstrate to the reader how the outcomes were obtained. (p. 97)

The statistical procedures used by the researcher to analyze the data are follow as:

1. The mean.
2. Standard deviation.
3. Skewness.
4. The percentile.
5. Analysis of variance.
6. Regression.
7. Graphics.
8. Tables.

Descriptive statistics were performed on all health related fitness components. Analyzes of variance were also calculated to determine significant differences ($p \leq .05$) between the subjects for the three cities in terms of the health-related components as regards to physical fitness. Current physical fitness levels were then evaluated by health-related criteria for each component of health related physical fitness. These components were: muscular strength, flexibility, body composition and cardiorespiratory endurance.

Results

This study was designed to evaluate the health-related fitness level of Libyan students in three different cities which are namely Aljmeel, Regthaleen and Zwara. The physical Fitness Test battery, which includes measures of muscular strength, flexibility, body composition, and cardiorespiratory endurance, was used. The following schools participated in the survey: Alshoumokh, Omar Ibn Alkhatab, Alfajer Eljadeed, Azahef Alakdar, Alshuhada and 2nd of March. The subjects involved in this study were 311 students. The ($p \leq .05$) level was used to determine significant differences between the three cities in terms of health-related components of physical fitness. On the other hand, to compare Libyan students and their counterpart from USA, the participants' characteristics and a discussion of the physical fitness variables are presented in this chapter. Sum of skinfolds (Tricep and subscapular), 1min sit up test, 1 mile run, sit and reach, are the variables which were analyzed and compared in this study.

Results for all districts who participated in the experiment

The tables below show the values for all participants who participated within the experiment to measure the four components of physical fitness related health, cardiorespiratory endurance (1 mile run), muscular strength (sit-up test for abdominal), body composition (triceps and subscapular) and flexibility (sit and reach for back). The tables show the values of mean, standard deviation, skewness, percentile, regression and analysis of variance. The tables illustrate a comparison between the three cities: Aljmeel, Regthaleen and Zwara. SAS and SPSS statistical application programs were used to obtain the results.

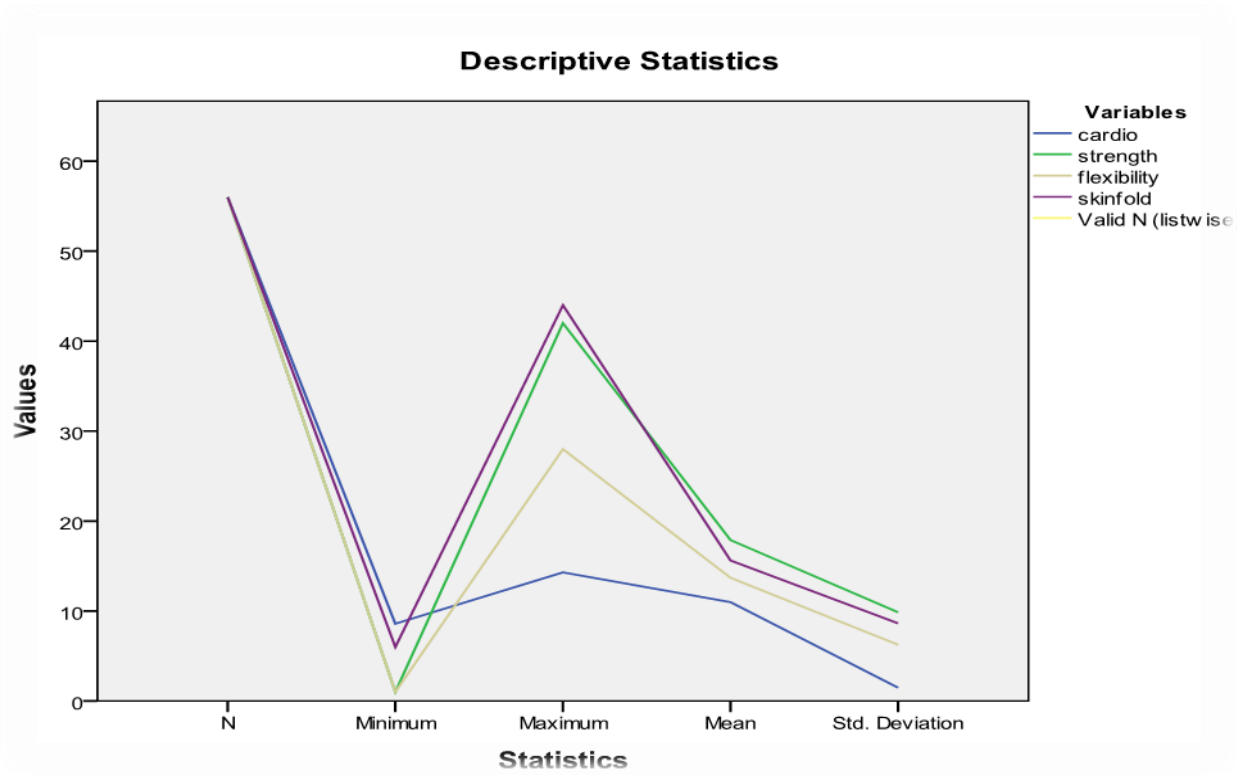

Figure 1: *Minimum, maximum, mean, std, std.err and skewness for high, weight, cardiorespiratory, strength, flexibility and skinfold in different cities age 10.*

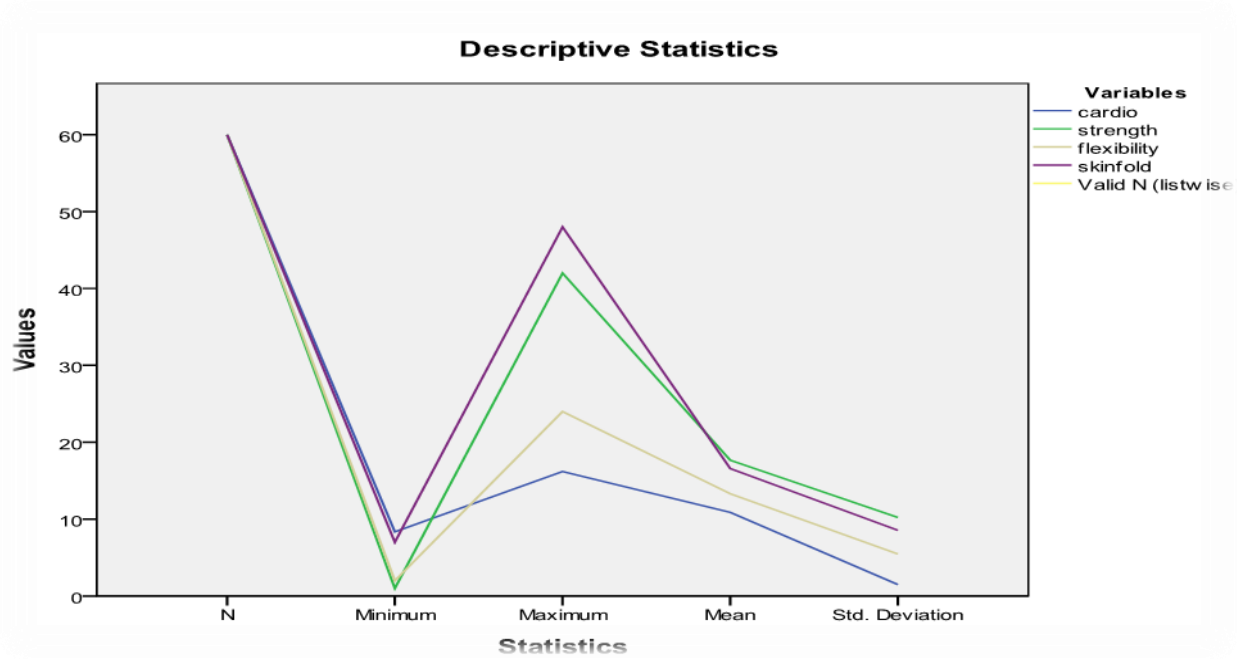

Figure 2: *Minimum, maximum, mean, std std.err and skewness for high, weight, cardiorespiratory, strength, flexibility and skinfold in different cities age 11.*

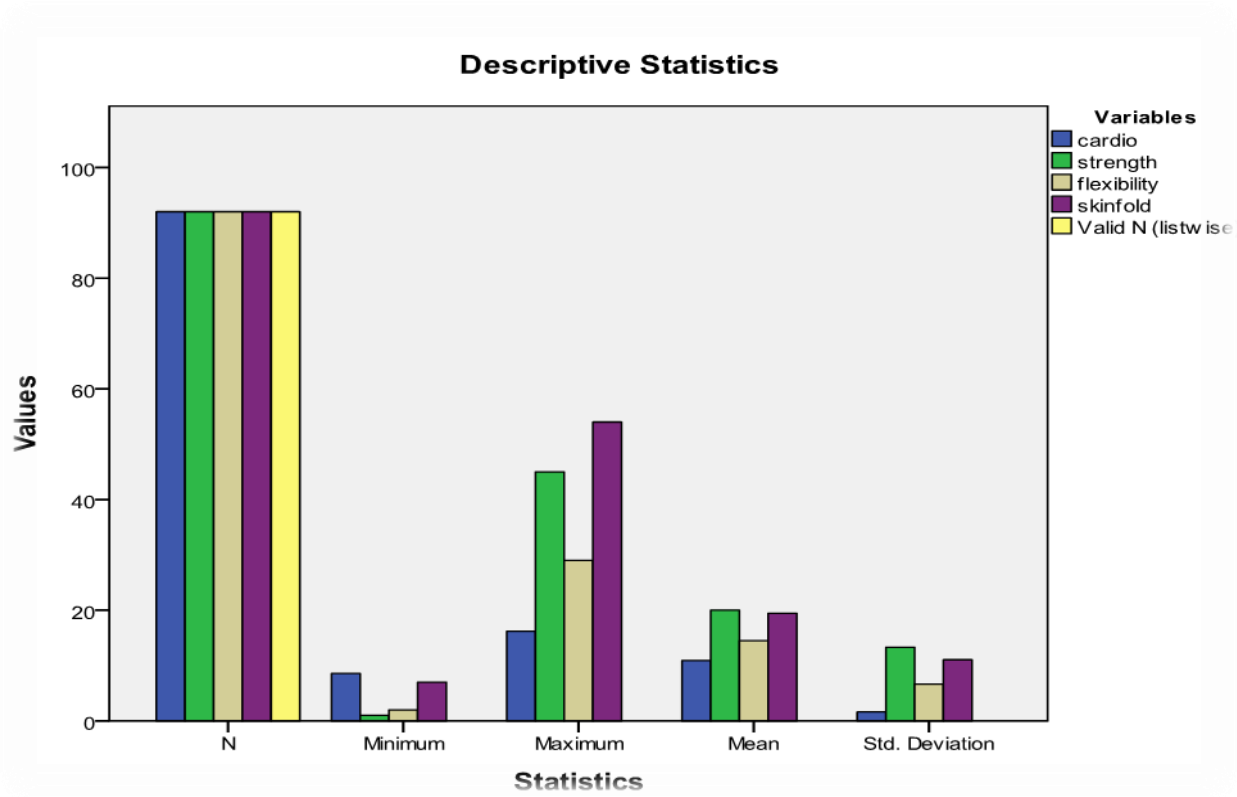

Figure 3: *Minimum, maximum, mean, std, stderr and skewness for high, weight, cardiorespiratory, strength, flexibility and skinfold in Aljmeel city.*

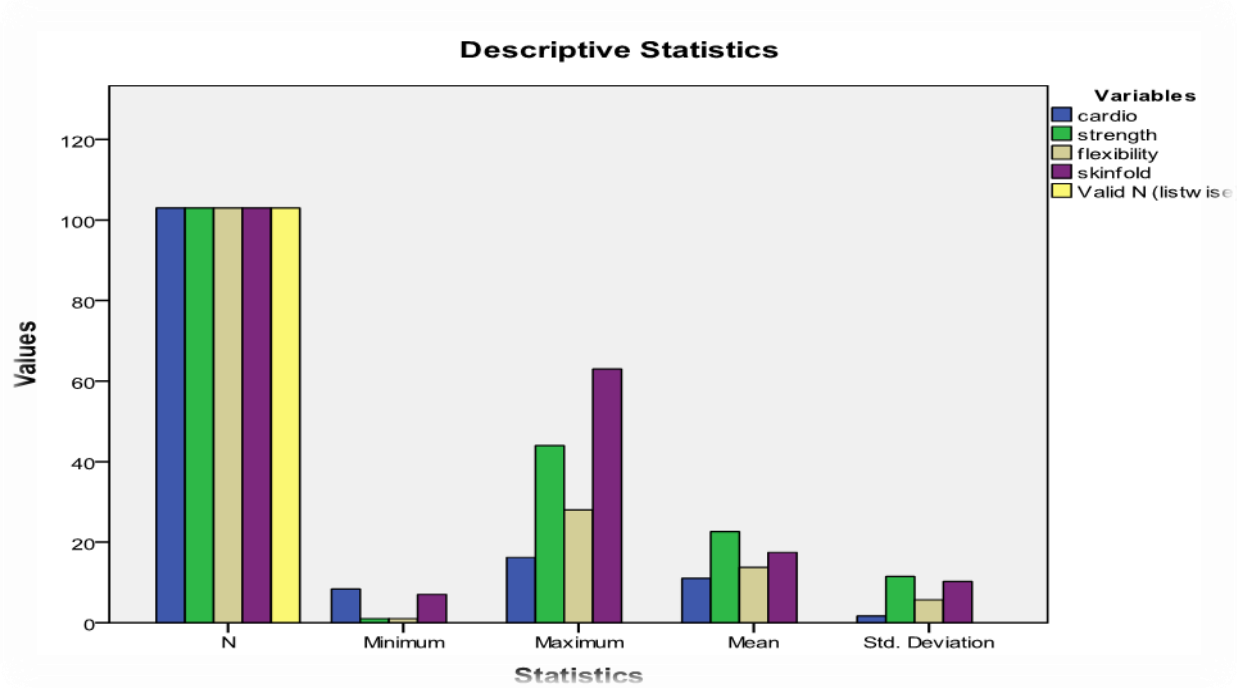

Figure 4: *Minimum, maximum, mean, std, stderr and skewness for high, weight, cardiorespiratory, strength, flexibility and skinfold in Reghdaleen city.*

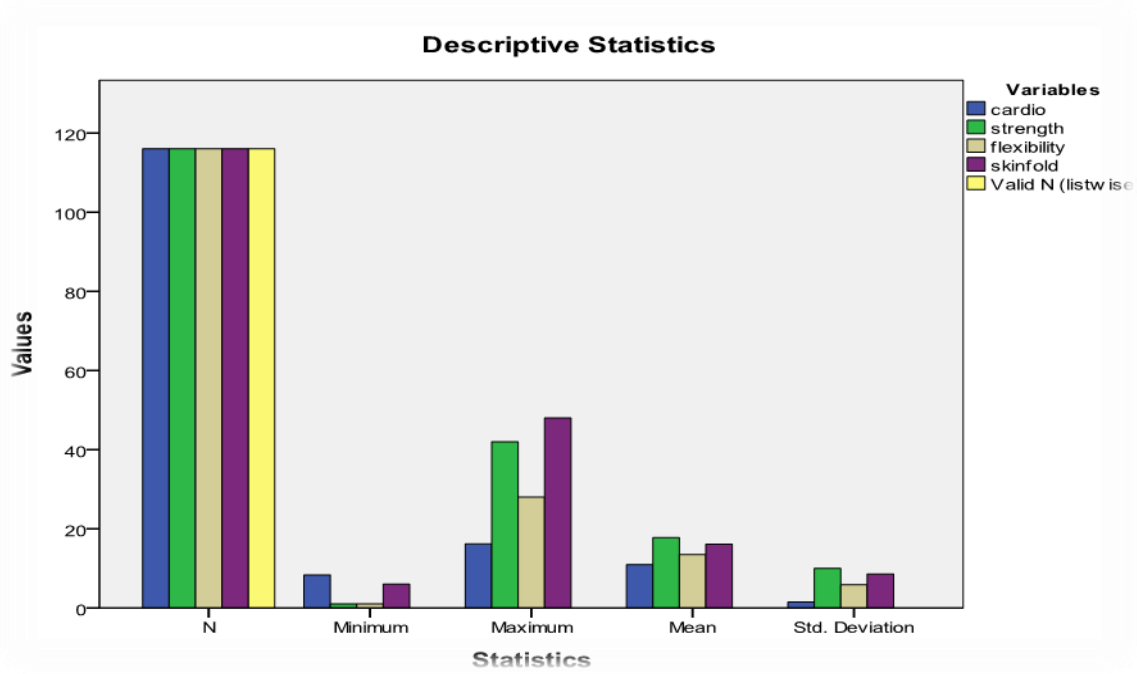

Figure 5: *Minimum, maximum, mean, std, stderr and skewness for high, weight, cardiorespiratory, strength, flexibility and skinfold in Zwara city.*

Analysis of variance for all districts.

Tables showed the significance differences or non significances differences between the city, age, city and age in the components of health related physical fitness. It was significance differences in muscular strength and body composition in favor to Zwara city.

Table (4) Analysis of variance for factors affecting on cardiorespiratory endurance model (1)

Source	*DF*	*ANOVA SS*	*Mean Square*	*F Value*	*Pr > F*
Age	*1*	*0.005*	*0.005*	*0.00*	*0.962*
Ctiy	*2*	*0.668*	*0.334*	*0.13*	*0.876*
*City*Age*	*2*	*2.642*	*1.321*	*0.52*	*0.593*
Error	*305*	*769.546*	*2.523*		
Total	*310*	*772.862*			

ANOVA for factors affecting on cardiorespiratory are shown in the table (4). None of factors age, city and interaction between city and age affected cardiorespiratory endurance significant which are (0,962), (0,876), (0,593), respectively ($p > 0.05$)

Table (5) Analysis of variance for factors affecting on muscular strength model (1)

Source	*DF*	*ANOVA SS*	*Mean Square*	*F Value*	*Pr > F*
Age	*1*	*101.325*	*101.325*	*0.76*	*0.385*
City	*2*	*1281.007*	*640.504*	*4.79*	*0.009*
*City*Age*	*2*	*166.202*	*83.101*	*0.62*	*0.538*
Error	*305*	*40818.833*	*133.832*		
Total	*310*	*42367.369*			

ANOVA for factors affecting on muscular strength are shown in the table (5). It can observed that effects of age and city*age are not significant which are (age=0,385, city*age=0,538), ($p > 0.05$), but the effect of city is significant which is (0.009), ($p < 0.05$).

Table (6) compression of means by Duncan for factors effecting muscular strength.

City	**
Aljmeel	*20.02* ± *13.317* *a*
Regthaleen	*22.62* ± *11.475* *a*
Zwara	*17.77* ± *10.006* *b*
Age	*NS*
10	*19.41* ± *11.054* *a*
11	*20.55* ± *12.188* *a*
City×Age	*NS*
Aljmeel × 10	*20.17*± *12.90*
Aljmeel × 11	*19.90*± *13.77*
Regthaleen × 10	*20.69*± *10.63*
Regthaleen × 11	*23.95*± *11.92*
Zwara × 10	*17.892*± *9.86*
Zwara × 11	*17.66*± *10.22*

**Highly significant at level 1%

The same letters are non significantly different (a), (b) refers to significantly different.

Table (6) showed that there is no significantly different in age and city and age, but there is significantly different in city (*0.009)*, (17.77 ± 10.006) which is Zwara on muscular strength trait.

Table (7) Analysis of variance for factors affecting on flexibility model (1)

Source	*DF*	*ANOVA SS*	*Mean Square*	*F Value*	*Pr > F*
Age	*1*	*5.085*	*5.085*	*0.14*	*0.7098*
Ctiy	*2*	*52.215*	*26.108*	*0.71*	*0.4913*
*City*Age*	*2*	*13.737*	*6.868*	*0.19*	*0.8292*
Error	*305*	*11178.789*	*36.651*		
Total	*310*	*11249.828*			

ANOVA for factors affecting on flexibility are shown in the table (7). It can observe that effects of age, city and city*age are not significant on flexibility, which are (0.7098, 0.4913, and 0.8292) respectively, ($p > 0.05$)

Table (8) Analysis of variance for factors affecting on skinfold model (1)

Source	*DF*	*ANOVA SS*	*Mean Square*	*F Value*	*Pr > F*
Age	*1*	*203.190*	*203.190*	*2.06*	*0.15*
Ctiy	*2*	*568.482*	*284.241*	*2.89*	*0.05*
*City*Age*	*2*	*46.001*	*23.000*	*0.23*	*0.79*
Error	*305*	*30015.400*	*98.411*		
Total	*310*	*30833.074*			

ANOVA for factors affecting on skinfold are shown in the table (8) there are none of factors age and interaction between city and age affected cardiorespiratory significant which are (015, 0.79) respectively ($p > 0.05$), but there are significantly different by city which is 0.05 ($p < 0.05$) .

Table (9) Compression of means by Duncan for factors effecting skinfold.

City	**
Aljmeel	*19.44 ± 11.059 a*
Regthaleen	*17.45 ± 10.238 a*
Zwara	*16.12 ± 8.568 b*
Age	*NS*
10	*16.19 ±*
11	*18.27 ±*
City×Age	*NS*
Aljmeel × 10	*17.80 ± 8.60*
Aljmeel × 11	*20.76 ± 12.62*
Regthaleen × 10	*16.88 ± 12.15*
Regthaleen × 11	*17.85 ± 8.76*
Zwara × 10	*15.62 ± 8.63*
Zwara × 11	*16.58 ± 8.55*

**Highly significant at level 1%

The same letters are non significantly different (a), (b) refers to significantly different.

Table (9) showed that there is no significantly different in age and city and age, but there is significantly different in city (*0.05*) (16.12 ± 8.568) which is Zwara on skinfold trait.

Regression coefficient values for height and weight for the elements of health related physical fitness.

There are effects of height and weight in the all the elements of health related physical fitness, some of them increase and the others decrease.

Table (10) Analysis of variance for factors affecting on cardiorespiratory endurance model (2)

Source	*DF*	*Anova SS*	*Mean Square*	*F Value*	*Pr > F*
Age	*1*	*0.114*	*0.114*	*0.05*	*0.828*
Ctiy	*2*	*6.913*	*3.456*	*1.43*	*0.241*
*City*Age*	*2*	*2.485*	*1.242*	*0.51*	*0.599*
Height	*1*	*2.573*	*2.573*	*1.06*	*0.303*
Weight	*1*	*35.608*	*35.608*	*14.71*	*0.001*
Error	*303*	*733.490*	*2.420*		
Total	*310*	*772.862*			

ANOVA for factors affecting on cardiorespiratory endurance, model 2 are noticed in the table (10). All factors affected cardiorespiratory endurance trait were not significant which are (0.828, 0.241, 0.599, 0.303) ($p > 0.05$), except effect of weight was significantly different which is *0.001*, ($p < 0.01$)

Table (11) Regression of cardiorespiratory endurance on height and weight.

Intercept	*10.96 ±1.50*
Height	*- 0.011 ± 0.01*
Weight	*0.037 ± 0.009*

Regression of height and weight in cardiorespiratory endurance were observed in table (11). From results above it can derives that if the height increase 1cm the cardiorespiratory endurance will decrease by 0.011, will if the weight increase 1kg the cardiorespiratory endurance will increase by 0.037.

Table (12) Analysis of variance for factors affecting on muscular strength model (2)

Source	*DF*	*ANOVA SS*	*Mean Square*	*F Value*	*Pr > F*
Age	*1*	*27.247*	*27.247*	*0.21*	*0.647*
Ctiy	*2*	*1213.926*	*606.963*	*4.66*	*0.010*
*City*Age*	*2*	*212.478*	*106.239*	*0.82*	*0.443*
Height	*1*	*210.670*	*210.670*	*1.62*	*0.204*
Weight	*1*	*1324.360*	*1324.360*	*10.16*	*0.001*
Error	*303*	*39493.434*	*130.341*		
Total	*310*	*42367.369*			

ANOVA for factors affecting on muscular strength, model 2 are noticed in the table (12). All factors affected muscular strength trait were not significant which are (age=0.647, city and age=0.443, height=0.204) ($p > 0.05$) , except effect of city and weight were significantly different which are (city=0.001, weight=0.001) ($p < 0.01$)

Table (13) Regression of muscular strength on height and weight.

Intercept	*12.31 ±11.04*
Height	*0.10 ± 0.08*
Weight	*-0.23 ± 0.07*

Regression of height and weight in muscular strength were observed in table (13). From results above it can derives that if the height increase 1cm the strength will increase by (0.10), while if the weight increase 1kg the strength will decrease (0.23).

Table (14) Analysis of variance for factors affecting on flexibility model (2)

Source	*DF*	*ANOVA SS*	*Mean Square*	*F Value*	*Pr > F*
Age	*1*	*2.106*	*2.106*	*0.06*	*0.809*
Ctiy	*2*	*123.566*	*61.783*	*1.71*	*0.183*
*City*Age*	*2*	*5.610*	*2.805*	*0.08*	*0.925*
Height	*1*	*11.0138*	*11.013*	*0.30*	*0.581*
Weight	*1*	*142.736*	*142.736*	*3.94*	*0.048*
Error	*303*	*10965.875*	*36.191*		
Total	*310*	*11249.828*			

ANOVA for factors affecting on flexibility, model 2 are noticed in the table (14). All factors affected flexibility trait were not significant which are (0.809, 0.183, 0.925, 0.581) ($p > 0.05$, except effect of weight was significantly different which is *0.048*, ($p < 0.05$)

Table (15) Regression of flexibility on height and weight.

Intercept	*19.83 ±5.82*
Height	*-0.02 ± 0.04*
Weight	*-0.07 ± 0.04*

Regression of flexibility on height and weight are observed in table (15). From results above it can derives that if the height increase 1cm the flexibility will decrease by (0.02), while if the weight increase 1kg the flexibility will decrease (0.07).

Table (16) Analysis of variance for factors affecting on skinfold model (2)

Source	*DF*	*ANOVA SS*	*Mean Square*	*F Value*	*Pr > F*
Age	*1*	*493.140*	*493.140*	*6.90*	*0.009*
Ctiy	*2*	*289.270*	*144.635*	*2.02*	*0.134*
*City*Age*	*2*	*23.036*	*11.518*	*0.16*	*0.851*
Height	*1*	*2005.425*	*2005.425*	*28.04*	*0.001*
Weight	*1*	*8206.586*	*8206.586*	*114.76*	*0.001*
Error	*303*	*21668.133*	*71.512*		
Total	*310*	*30833.073*			

ANOVA for factors affecting on skinfold, model 2 are noticed in the table (16). Factors city and city*age affected skinfold trait were not significant which are (city=0.134, city*age=0.851) ($p > 0.05$, but effect of age, height and weight were significantly different which are (age=0.009, height=0.001, weight=0.001) ($p < 0.05$)

Table (17) Regression of skinfold on height and weight.

Intercept	*38.77 ±8.18*
Height	*- 0.31 ± 0.06*
Weight	*0.56 ± 0.05*

Regression of skinfold on height and weight are observed in table (17). From results above it can derives that if the height increase 1cm the skinfold will decrease by 0.31, while if the weight increase 1kg the skinfold will increase by 0.56.

Percentile norms for Libyan and American students.

Tables showed the comparison between Libyan students and USA students by percentiles. The values referred to the highly differences between Libyan students and USA students in the components of health related physical fitness in favor to USA students.

Table (18) Percentile norms for Libyan and American students Age 10 and 11 years for the one mile run (minutes and seconds) in cardiorespiratory endurance.

	N = 139		N= 172	
Percentile	***1 mile run in minute Age 10***		***1 mile run in minute Age 11***	
	Libya	***USA***	***Libya***	***USA***
5	*8.8*	*6.25*	*8.59*	*6.04*
10	*9.12*	*6.56*	*9.12*	*6.05*
15	*9.22*	*7.26*	*9.22*	*7.19*
20	*9.48*	*7.4*	*9.44*	*7.30*
25	***9.58***	***7.57***	***9.51***	***7.48***
30	*9.9*	*8.1*	*9.9*	*8.00*
35	*10*	*8.23*	*10.21*	*8.08*
40	*10.32*	*8.34*	*10.39*	*8.21*
45	*10.43*	*8.49*	*10.51*	*8.39*
50	***11.25***	***9.03***	***11.13***	***8.56***
55	*11.3*	*9.19*	*11.15*	*9.06*
60	*11.45*	*9.34*	*11.25*	*9.25*
65	*11.5*	*9.45*	*11.32*	*9.46*
70	*12*	*10.1*	*11.50*	*10.10*
75	***12.2***	***10.38***	***11.7***	***10.40***
80	*12.4*	*11.05*	*12.26*	*11.31*
85	*12.5*	*11.31*	*12.51*	*12.02*
90	*12.8*	*12.11*	*13.33*	*12.40*
95	*13.3*	*13*	*13.57*	*13.37*
99	*15.44*	*14.28*	*16.20*	*15.25*

Table (18) refers the proportions of the results of cardiorespiratory endurance. The results for USA students higher than there counterpart from Libyan students. The percentiles for US students age 10 years are (25) the lowest percentile is 7.57, (50) the middle percentile is 9.03 and (75) the highest percentile is 10.38. Libyan student's percentiles are 9.58, 11.25 and 12.2 respectively US students age 11 years are (25) the lowest percentile is 7.48, (50) the middle percentile is 8.56 and (75) the highest percentile is 10.40. Libyan student's percentiles are 9.51, 11.13 and 11.7 respectively.

Table (19) Percentile norms for Libyan and American students Age 10 and 11 years for sit-up test (repetition) in muscular strength.

	N=139		N=172	
Percentile	***Sit up / repetition Age 10***		***Sit up / repetition Age 11***	
	Libya	***USA***	***Libya***	***USA***
5	*1*	*15*	*2*	*17*
10	*1*	*19*	*3*	*23*
15	*7*	*23*	*6*	*26*
20	*1*	*25*	*8*	*28*
25	***12***	***27***	***11***	***30***
30	*14*	*29*	*13*	*31*
35	*15*	*30*	*14*	*33*
40	*17*	*31*	*16*	*34*
45	*18*	*33*	*18*	*35*
50	***19***	***34***	***20***	***37***
55	*21*	*35*	*23*	*38*
60	*23*	*36*	*25*	*39*
65	*25*	*37*	*27*	*40*
70	*25*	*39*	*28*	*41*
75	***28***	***40***	***30***	***42***
80	*30*	*42*	*31*	*44*
85	*31*	*44*	*33*	*46*
90	*32*	*47*	*39*	*48*
95	*40*	*50*	*42*	*51*
99	*43*	*59*	*45*	*61*

Table (19) shows the proportions of the results of cardiorespiratory. The results for US students higher than there counterpart from Libyan students. The percentiles for US students age 10 years are (25) the lowest percentile is 27, (50) the middle percentile is 34 and (75) the highest percentile is 40. Libyan student's percentiles are 12, 19 and 28 respectively. US students age 11 years are (25) the lowest percentile is 30, (50) the middle percentile is 37 and (75) the highest percentile is 42. Libyan students percentile are 11, 20 and 30 respectively .

Table (20) Percentile norms for Libyan and American students Age 10 and 11 years for sit and reach test (cm) in flexibility.

N=13 **N=172**

Percentile	*Sit and reach / cm Age 10*		*Sit and reach / cm Age 11*	
	Libya	*USA*	*Libya*	*USA*
5	*4*	*12*	*4*	*12*
10	*6*	*17*	*6*	*16*
15	*8*	*18*	*8*	*18*
20	*8*	*19*	*9*	*20*
25	***10***	***20***	***10***	***21***
30	*10*	*21*	*10*	*22*
35	*12*	*22*	*11*	*23*
40	*13*	*23*	*12*	*23*
45	*13*	*24*	*13*	*24*
50	***14***	***25***	***13***	***25***
55	*14*	*26*	*14*	*26*
60	*15*	*26*	*15*	*26*
65	*16*	*27*	*16*	*27*
70	*17*	*28*	*16*	*28*
75	***18***	***28***	***17***	***29***
80	*20*	*29*	*19*	*30*
85	*21*	*30*	*21*	*31*
90	*22*	*31*	*22*	*32*
95	*25*	*33*	*24*	*34*
99	*28*	*37*	*29*	*38*

Table (20) shows the proportions of the results of flexibility. The results for US students higher than there counterpart from Libyan students. The percentiles for US students age 10 years are (25) the lowest percentile is 20, (50) the middle percentile is 25 and (75) the highest percentile is 28. Libyan student's percentiles are 10, 14 and 18 respectively. US students age 11 years are (25) the lowest percentile is 21, (50) the middle percentile is 25 and (75) the highest percentile is 29. Libyan students percentile are 10, 13 and 17 respectively.

Table (21). Percentile norms for Libyan and American students Age 10 and 11 years for skinfold test (mm) in body composition.

N=139 **N=172**

Percentile	*Skinfold caliper / mm Age 10*		*Skinfold caliper / mm Age 11*	
	Libya	*USA*	*Libya*	*USA*
5	*7*	*7*	*8*	*8*
10	*9*	*9*	*10*	*9*
15	*10*	*10*	*10*	*10*
20	*10*	*11*	*11*	*11*
25	***11***	***11***	***12***	***12***
30	*12*	*12*	*12*	*12*
35	*12*	*12*	*13*	*12*
40	*13*	*13*	*14*	*13*
45	*13*	*13*	*14*	*14*
50	***14***	***14***	***14***	***15***
55	*14*	*14*	*15*	*16*
60	*15*	*15*	*16*	*16*
65	*16*	*16*	*17*	*17*
70	*17*	*17*	*20*	*19*
75	***18***	***18***	***21***	***20***
80	*20*	*19*	*24*	*22*
85	*22*	*21*	*30*	*24*
90	*27*	*24*	*32*	*28*
95	*41*	*28*	*42*	*33*
99	*59*	*33*	*54*	*38*

Table (21) shows the proportions of the results of cardiorespiratory. The results for US students similar to their counterpart from Libyan students . The percentiles for both students are (25) the lowest percentile is 11 (50) the middle percentile is 14 and (75) the highest percentile is 18. US students age 11 years higher than there counterpart from Libyan students except lowest percentile is similar. The percentiles for USA students are (25) the lowest percentile is 12, (50) the middle percentile is 15 and (75) the highest percentile is 20. Libyan students percentile are 12, 14 and 21 respectively.

From table 4 it is observed that there were no significant differences of the factors age, city and city*age in terms of affecting cardiorespiratory endurance (p≥0.05), (0.962), (0.876), (0.593), respectively. As for muscular strength shown in the table 5 referred to insignificant differences in terms of factors age, city*age and how they affected muscular strength, (p≥0.05), (0,385), (0,538), respectively. However, there was significant differences relate to the factor city and how it affected muscular strength (p≤0.05), (0.009) for which the mean value was (17.77±10.006) in favor to Zwara district as shown in the table 6. Table 7 showed that there were no significant differences a regards to factors age, city and city*age which affected flexibility (p≥0.05), (0.709), (0.491), (0.829), respectively. It follows from tables 8, 9 that there were no significant differences of factors age, city*age which affected skinfold (p≥0.05), (0.15) and (0.79) whose means were (19.44±11.059) and (17.45±10.238), respectively. On the other hand, there was significant differences of factor city and how it affected skinfold (p≤0.05) for which the mean vale was (0.05), (16.12±8.568) in favor of Zwara.

By regression it observed from tables 10 to 17 that there is an affect of height and weight in the components of physical fitness related health (cardiorespiratory endurance, muscular strength, flexibility and skinfold). In table 26 the affect of weight was significantly different which is (0.001), ($p < 0.01$). Regression of height and weight in cardiorespiratory endurance were observed in table 27. If the height increases by 1cm, the cardiorespiratory endurance will decrease to (0.011). If the weight increases by 1kg the cardiorespiratory endurance will increase to (0.037). In reference to the table 28 the affect of weight was significantly different which is (0.001), ($p < 0.01$). Regression of height and weight in terms of muscular strength were observed in table 29**.** If the height increases by 1cm, the strength will increase to (0.10). Whereas if the weight increase by 1kg, the strength will decrease to (0.23). According to the table **30** the affect of weight was significantly different which (0.001) is, ($p < 0.01$). Regression of height and weight as regards to flexibility were observed in table 31 indicating that if the height increases by 1cm, the flexibility will decrease to (0.02). While if the weight increases by 1kg, the flexibility will decrease to (0.07). According to results shown in table 32 it was noticed that the affect of height and weight were significantly different which are (age=0.009, height=0.001, weight=0.001) ($p < 0.05$) and the regression of height and weight in skinfold were observed in table 33. It was further observed that if the height increases by 1cm the skinfold, will decrease by (0.31), while if the weight increases by 1kg, the skinfold will increase by (0.56).

According to data analysis, it was observed that the researcher has reached the following results: From tables model (1) 4 to 9 appeared that there were no significant differences between the three districts (Aljmeel, Regthaleen and Zwara) in cardiorespiratory endurance and flexibility as shown in tables 4, 7 which refer to parity of the three districts. The researcher finds that the reason for the lack of statistically significant differences between groups in cardiorespiratory endurance are due to the convergence of students in terms of age where they represent pupils on the 10-11 years age group. In addition to that, students in these age groups are exposed to the same educational program at school which indicates a lack of interest in sporting activities. But there was significant differences in terms of the city factor which affected muscular strength ($p \leq 0.05$), (0.009) as shown in table 5 for which the mean value was (17.77±10.006) and skinfold indicated in table 8, ($p \leq 0.05$), (0.05) whose mean value was (16.12 ± 8.568) in favor of Zwara district. The reason is the participation in different physical activities at school, and abundance of possibilities and equipments. On the other hand, Zwara more developed areas in the field of sports compared to Aljmeel and Regthaleen. It has shown more interest in different physical activities and sport in schools than Aljmeel or Regthaleen. Ontario (2006) showed that resources provided or recommended for schools should specify the amount and kind of equipment required for such activities. (p.23)

Physical activity equipment encourages children to particularly play and become involved in physical activity. According to the National Heart Foundation of Australia 2008 "physical activity should be fun!" making it fun encourages children to participate". Using physical activity equipment also enables physical activity to become more flexible and mobile, equipment can be used on site or taken away for use at the participant's convenience. (Department of health, 2011)

Discussion of regression analysis of height and weight.

From tables model (2) 10 to 17, it was observed that if the height increases by 1cm, the cardiorespiratory endurance will decrease by 0.011, while if the weight increase by 1kg the cardiorespiratory endurance will increase by 0.037 in table 28, 29. In the table 30, 31 it noticed if the height increase by 1cm the strength will increase by 0.10, while if the weight increase by 1kg the strength will decrease by 0.23. As for table 32, 33 appeared that if the height increase by 1cm the flexibility will decrease by (0.02), while if the weight increase by 1kg the flexibility will decrease 0.07. Finally, referring to table 34, 35 it observed that if the height increase by 1cm

the skinfold will decrease by 0.31, while if the weight increase by 1kg the skinfold will increase by 0.56.

Discussion of comparative results for Libya and US students.

The levels of these standards in the percentiles tables, officials can in the field of physical education at the level of basic education depends on them to evaluating students in health-related fitness through putting degrees for them to express their level of fitness related to health, and to modified and develop physical fitness related health programs even we can catch up the level of physical fitness related health of children from other country, which many scientists considers that are most important requirements of this age group, so, that it can make comparisons as mentioned in the tables 36 to 43 that allude to comparison the percentile of Libyan students with the counterpart from US.

Table 18 shows the percentiles degree for Libya and US in cardiorespiratory endurance element for pupils aged 10and 11years. Results (age 10 years) for US students are higher than their counterpart from Libya, the percentiles for US students are (25) lowest percentile 7.57, (50) middle percentile 9.03, (75) highest percentile 10.38. Libyan students' percentiles are 9.58, 11.25 and 12.2 respectively. US students age 11 years are higher than their Libyan counterpart. The percentile for US students (25) lowest percentile 7.48, (50) middle percentile 8.56 and (75) highest percentile 10.40. Libyan students' percentiles are 9.51, 11.13 and 11.7 respectively. Table 19 shows the percentiles degree for both Libyan and US children in muscular strength element for pupils aged 10and 11years. The percentile for US students age 10 years (25) lowest percentile 27, (50) middle percentile 34 and (75) highest percentile 40. Libyan students' percentiles are 12, 19 and 28 respectively. US students age 11 years are higher than their Libyan counterpart from Libya. The percentile for US students (25) lowest percentile 30, (50) middle percentile 37 and (75) highest percentile 42. Libyan students' percentiles are 11, 20 and 30 respectively. The table 20 refers to the percentiles degree for both Libyan and US children in flexibility element age 10and 11 years. US students age 10 years are higher than their counterpart from Libya. The percentile for US students (25) lowest percentile 20, (50) middle percentile 25. (75) highest percentile 28. Libyan students percentiles are 10, 14 and 18 respectively. The percentiles for US students age 11 years are (25) the lowest percentile is 21. (50) middle percentile 25, (75) highest percentile 29, Libyan students percentiles are 10, 13 and 17 respectively. In reference to table 21 it observes the percentiles degree for children, Libya and US in skinfold element age 10and 11 years. US students age 10 years are similar to their

counterpart from Libyan students. The percentiles for both students are (25) is the lowest percentile 11. (50) The middle percentile is 14. (75) The highest percentile is 18. Both results for US and Libyan students were similar in the lowest percentile. US students age 11 years were higher than Libyan students in middle percentile, as for the highest percentile Libyan students were higher than US students. The percentiles for US students are (25) lowest percentile 12, (50) middle percentile 15, (75) highest percentile 20. Libyan students percentile are 12, 14 and 21 respectively.

A comparison between Libyan and US students shown in tables 18 to 21. It was observed that the US students' results are better than those of Libyan students which are an indication of the level of education, equipments and sport culture of this country. Using physical activity equipment also enables physical activity to become more flexible and mobile. Equipment can be used on site or taken away for use at the participant's convenience.

(Department of health, 2011)

Malina et, al (2004) study showed that the estimate of the number of participants in the US for the mid-1990s suggests that approximately 22 million youth 5 to 17 years of age participate in sport programs sponsored by community organizations, such as Kiwanis, Police Athletic League, American Youth Soccer Organizations, Little League Baseball and Pop Warner Football. Expressed as percentages of the United States population 5 to 17 years of age in 1995 (about 48.4), 45%, 5%, 30% and 0.1% participate in agency, club, recreation and intramural sports, respectively. (p.624)

That means, there are differences of statistical indications between the levels of Libyan students of elementary education and their counterparts from the USA in the elements of cardiorespiratory endurance, muscular strength and flexibility in favor to American students, and there are no differences of statistical indications in skinfold.

Conclusion

According to the obtained results within the limits of the research subject in addition to the measurements and the tests that have been done, and according to statistical analysis of data related to the values of the variables in this study, the researcher had been derives that is a differences significance in some elements of health related physical fitness, and non differences significant on others in favor Zwara city. On the other hand, most of the results or the values were equal. Also, it noticed that is a completely different between Libyan students and their

counterpart from US in components of health related physical fitness in favor to US, that refer to the differences between developed country and less developed country. Indeed, by this study noticed that the level of health related physical fitness in Libya comparison with the developed country is very low. According to the study, the researcher noticed that Physical education is a necessity for the health and well-being of every student. As a unique and essential part of the total education program, physical education can significantly enhance all aspects of development including health, physical fitness, movement knowledge, academic performance, goal setting, self-esteem, and social skills. Evidence continues to mount that regular physical activity can prevent and manage coronary heart disease, which is the leading cause of death. Researches finding clearly demonstrate that daily exercise, from early childhood throughout life, is a primary factor in maintaining health and enriching that quality of life. People begin to acquire and establish patterns of health-related behavior during childhood and adolescence. Schools are an efficient vehicle for providing this physical education instruction. Finally, culture of the society, possibilities and equipments play an important role in making children engage in different physical activity.

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