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Anthropometrics Parameter and Their Superior to Predict the Risks Pain Joints Associated with Body Weight among Sportswomen

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Abstract

Background: Newly, the A Body Shape Index (ABSI), hip index (HI) and anthropometric risk index (ARI) have been developed as a possible improved alternative to BMI and WC. While actual research aimed to exanimate the association between the anthropometrics parameter and their superior to predict the risks Pain Joints associated with body weight.

Methods: In order to achieve this goal, our total sample consisted of 40 women's soccer team of Relizane at the Algerian football championship, their homogeneity was drawn by age, sex, weight, height and football speciality, tested by Bearing-Sorensen and the Kelly test as a Lumbar Extensor Strength.

Results: Body types or shape index are a slight amount of lean body fat, however, waist circumference predicts the metabolic syndrome as a reduced joint range of motion.

Conclusion: Since ABSI is the ratio of human body shape to body size healthier prominent in the less body fat. While the body shape type may be considered as a proxy measure of fat distribution, seeing the waist circumference is a predictor for abnormal serum lipid and lipoproteins among Sudanese women. While among healthy sportswomen, our findings support larger WC as pear shape, risks increased body gain weight in the hips and thighs and health risk goes up as waist size increases.

Keywords: Anthropometric; Risks Weight-pain joints; Healthy sports women

Introduction

There is a multitude of measurement to estimate the relative risk lifestyle women. Whereas in our newly, the A Body Shape Index (ABSI), hip index (HI) and anthropometric risk index (ARI) have been developed as a possible improved alternative to BMI and WC [1]. While all these measurements integrate the anthropometric parameters in their formulas to estimate or classified (categorising) the health risk or well-being (physical or appearance) [2]. Whereas Barbara Brehm(2014) indicate that the individual involves determining its own balance values according to its appearance and health and fitness benefits [3] leading to the most effective tracking of body-fat percentage as the client progresses toward his or her body composition goals according to the similar [4,5]. As the evidence, our examination founding on the confirmation, which agreed that every girl has a natural body type of rectangle, apple, pear, or an hourglass [6] she can grow in height, weight, strength, and shape depending on her genetic makeup [7]. Although the most recognised among women that they accumulate their adipose in the lower body, including hips [8]. Waist circumference and waist-to-hip circumference ratio, which are the most widely similarly measured used as indices of regional adipose tissue distribution and joint pain associated with the excess of body weight gain [9].

Therefore, Walter Willett confirms [10] that the use of percent body fat as the criteria for assessing body mass index may be inappropriate, in the opposite of Steven R. Gambert (2010) which set, that recording the data such as height, weight, age, and other factors, body fat can be estimated [11]. The case of the body shape type which normally is referring to the ratio of lean body mass to fat, according to Sharkie Zartman et al. (2006). Whereas in the case of this modest study, we refer to Lawrence and Ditmier [12] that the amount of body fat (or adiposity) includes the both distributions of fat throughout the body and the size of the adipose tissue deposits, result in the joint stiffness and pain along with a decline in mobility and stability of motion simply to move and stretch in certain positions conferring by Michael and Matt [12]. Seen these issues and the evidence that body shape type is a critical task of multicellular morphogenesis, "Despite its importance, that there is not a systematic understanding of how body shape is developed and maintained" [13-16].

The present study aimed to inspect the most anthropometrics measurements which can predict the risk Pain Joints associated with body weight in sportswomen. Well, we used, the Body Shape Index (ABSI) and body shape type as measurements to predict the Lumbar Extensor risks [17] associated with physical performance [18]. While comparable studies approved the superiority of Body Shape Index (ABSI) to indicate the presence of abdominal obesity, including healthy [19] human body joint problems [20] skeletal in women, due to the effect of body shape [21] on muscle fatigue and joint pains related to the index body composition [22]. Seen the shows, our study based on body type (body form) as a shape of the subject's silhouette [23] appropriate (size, shape, and weight) of the way in which bodies may be kept healthy and free from disease [24,25]. However, our background indicates that individual carried their weight better, advise on the skeletal structure, body type, and body fat distribution [26] set in waist size as more important measurements than body mass index, esteemed

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in the fat around the middle abdominal fat which is closely linked to increased health disease and disability. Supported by the measurement of body densities fat weight and lean body weight as a more accurate method [27-30] to estimate the excess of body fat and their risks health in the upper body (waist measurement) and lower body (hip measurement) [31].

Methods

Design of the study

Since the body shape types are the cumulative product of a woman's skeletal structure and the quantity and distribution of muscle and fat in the body. Well, Dr Devendra Singh, "Body shape depends on the nature of body fat distribution that, in turn, is substantially correlated with women's sex hormone profile, the risk for disease, and reproductive capability" [32,15].

Ours comes in the present study based on the Bearing-Sorensen and the Kelly test as a Lumbar Extensor Strength [33] Well, Müller (1840) report the skeletal muscle tone as a prolonged and tireless contraction of muscles, ensuring maintenance of a certain posture of the body [34] While David M Selkowitz, et al. Account that 70% to 95% of adults will be affected by low back pain at some time during their lifetime [35]. For the purpose, all participants are engaged in planned physical activity (3 sessions of 1 hour 30 minutes training per week) with any medication. They were informed of the procedures and all provided their written consent. Controlled in the same conditions by a specialised team.

Procedure

The study protocol Design was approved by the laboratory OPPAS Institute of Physical Education and Sports Department sports training university Mostaganem. Were randomly selected according to the following criteria.

Inclusion criteria

All selected samples are football female players, from Relizane senior team, Algerian football championship; their homogeneity was founded on growth characteristic age, sex, weight, height and football as a sports activity [36].

Exclusion criteria

All participants are volunteers. They were evaluated in the same conditions and procedure founded on saving baseline measurement field tests, as Biering-Sorensen test: isometric endurance of boot extensor and Killy test “isometric knee extensor endurance” [37,38] confirmed in clinical studies by involuntary flexion or extension that is allowed based on the body distribution, abnormal movements record in the wrist and torsion spasms of the neck [39].

Anthropometric parameters

A Body Shape Index (ABSI) calculator: Body Shape Index (BSI) is a metric for assessing the health implications of a given human body height, mass and waist circumference. The inclusion of the latter is believed to make the BSI a better indicator of the health risks of excess weight than the standard Body Mass Index According to Krakauer and Jesse [40] the formula for calculating ABSI is:

$$ABSI \equiv \frac{WC}{BMI^{2/3} height 1/2}$$

Where the Body Shape Index (ABSI) is based on WC adjusted for height and weight [41,42] as a new method for determining the health effects of body fat.

Body fat percentage calculator: The Body Fat Calculator was developed used to estimate the total body fat based on body size. To get the best results, measure to the nearest 1/4 inch (0.5cm). We used equations developed by Drs. Hodgdon and Beckett at the Naval Health Research approved by the U.S. Navy method.

Body fat calculator formula for woman: 495/(1.29579-0.35004(LOG(waist+hip-neck))+0.22100(LOG(height)))-450 Thus, different measurements are required. Measure the circumference of your waist at a horizontal level around the navel for men and at the level with the least width for women. Don't pull your stomach in Measure the circumfer of the neck. Start below the larynx with the tape sloping slightly downward to the front. Avoid flaring your neck out. For women only: Measure the circumference of the hips, at the largest horizontal measure [43].

Body shape type calculator: This body type calculator tells its user their body shape and waist to the hip ratio by using the bust, waist and hip measures by on the below.

The bust measurement is the circumference of the bust at the fullest part of the breast while keeping the tape measure snug but not tight.

The waist measurement is the circumference of the narrowest point on the torso, which is often just above the belly button.

The hip measurement is the circumference of the largest part of the hips, with the most prominent curve [44,45] (Figure 1).

The calculator helps. It uses to detect their body shapes types as the health risk level associated with its dimensions [46]. While the usage of these calculators requires the online sources, for example, the metaboliceffect.com/me-shape-calculator recommended by Jade et al. as an accurate means [47].

Physiological stress parameters

Biering-Sorensen: isometric endurance of trunk extensor: In the prone position, the legs are fixed subject to the anterior superior iliac spines (EAIS) by straps at the ankles and hips, upper body with no support. The arms are crossed on his chest and the hands rest on his shoulders. The test measures the hold time of the sternum of the subject above a virtual horizontal line extending [48-50] (Figure 2).

Killy test "isometric knee extensor endurance: The subject pressed his back against the wall. Hips, knees and ankles are flexed to 90 °. The arms are crossed on his chest, hands resting on the shoulders. The test measures the length of maintaining sitting without a chair leaning control wall l [48,51-53] (Figure 3).

Statistical analysis: Seen similar studies recommend ABSI calculated from body weight and height and waist circumference (WC) as valid indicators of fatness supported by several studies in

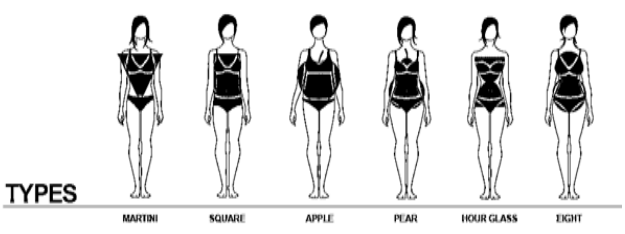

Figure 1: Body shapes types.

Figure 2: The plank position on a stable surface.

Figure 3: The test chair Killy.

health risk, wellbeing and fitness [54,55]. All the statistical analyses were performed using SPSS Statistics for Windows, Version 20.0. Chicago, IL: SPSS and P-values < 0.05 were considered statistically significant. The homogeneity was calculated based on ANOVA one-way and Levene's Statistic founded on to body shape type categories. The regression analysis was used to assess the capacity of the ABSI V's body shape type (BST) to foretell them superiors to predict the risks Pain Joints associated with Body weight, as well as the most of them to control the effect of actual weight on preference.

Results

Levene's Test for Equality of Variances shows the homogeneous of our sample in all variables based on body shape type categories. Whereas ANOVA one-way is not significant in age, height and weight in the opposite of body fat, ABIS, Waist Size, endurance trunk and Kelly test. Confirmed by LSD in the benefit of Hourglass body shape type follow by Rectangle in the opposite of Pear shape type in all comparison. However, our finds confirmed that sportswomen with a very large waist tend to have more fat inside the body [56]. Approves which guide the searcher to support, that increasing waist size is an important and emerging, that increasing waist size is an important and emerging marker for reduced levels of physical activity [57]. Although, it increased is related to additional BMI and BFP as supplementary stress body joints associated with the abdominal stocks region, the case of pear shape flow of a rectangle in the opposite of hourglass shape (lower BMI-BFP) [58] (Tables 1 and 2).

To predict the superiority of the anthropometrics parameter relating risks Pain Joint Associated with Body Weight in healthier sportswomen based on ABSI and BST, we chose the Regression as model analyses with significant $P \leq 0.05$. Through the Table 3 (a) case the body shape index relating to variables chosen in this study Model 1,2 and 3, the program showed that BFP, Killy test and Waist Size as independent variables, were able to explain the changes in ABIS, seen F, T, R, R^2, and Adjusted R^2 are significant at P<0.001 in the opposite of Age, Wight, height, endurance trunk and BMI as Variables excludes. While our results are in conformity with the study: Body shape index in comparison with other anthropometric measures in the prediction of total and cause-specific mortality, that the ABSI showed a stronger association with mortality comparison with BMI [59].

In the case of body BST and variables chose, all the relationships analysed between independent variables and predictors are significant at $P \leq 0.05$. From the regression analyses, Table 4 (b) in Model 1, 2and 3, the program showed that BFP, WC and Killy test, were able to explain the changes in body Fat, where F, T, R, R^2, and Adjusted R^2 are significant at P<0.001 in the opposite of Age, Waist Size, height, endurance trunk and BMI as Variables excludes. Whereas our results line with the evidence that the very best way to know if you are within a healthy weight range is to determine how much of your body weight is fat, approved in the necessity of the measure body shape which can help the user to eliminate some of the inconsistencies associated with BMI [60], reported in the several studies as dissatisfaction of body weight and shape during puberty [60] among girls due to increased body fat [61]. Founded on the principle that women's body shape controls not only their fertility but also their susceptibility to disease and even their longevity. Our present study found that neither the ABSI nor BST as both measurements, were superior to BMI, Height, weight for predicting the presence of the risks in Joint Pain Associated with

Variables		N	Mean ± SD	F	P ≤ 0.05	W	P ≤ 0.05
Age	Hourglass	11	18,90 ± 0,54	0,02	0,98	1,79	0,18
	Rectangle	13	18,92 ± 0,75				
	Pear	16	18,87 ± 0,81				
	Total	40	18,90 ± 0,71				
Weight	Hourglass	11	54,27 ± 1,95	2,61	0,09	2,11	0,14
	Rectangle	13	54,84 ± 1,62				
	Pear	16	55,62 ± 1,09				
	Total	40	55,00 ± 1,60				
Height	Hourglass	11	1,57 ± 0,04	0,84	0,43	2,61	0,09
	Rectangle	13	1,57 ± 0,03				
	Pear	16	1,56 ± 0,01				
	Total	40	1,56 ± 0,02				
BMI	Hourglass	11	21,41 ± 0,96	27,52	0,00	2,99	0,06
	Rectangle	13	22,39 ± 0,62				
	Pear	16	23,68 ± 0,78				
	Total	40	22,64 ± 1,23				
WC	Hourglass	11	26,74 ± 1,73	59,88	0,00	0,21	0,81
	Rectangle	13	30,28 ± 1,69				
	Pear	16	34,57 ± 2,03				
	Total	40	31,02 ± 3,71				
ABSI	Hourglass	11	0,06 ± 0,01	61,91	0,00	2,35	0,11
	Rectangle	13	0,07 ± ,01				
	Pear	16	0,08 ± 0,02				
	Total	40	0,07 ± 0,01				
BFP	Hourglass	11	14,52 ± 0,26	257,56	0,00	0,95	0,39
	Rectangle	13	15,22 ± 0,55				
	Pear	16	18,81 ± 0,64				
	Total	40	16,46 ± 2,02				
Trunk extensor	Hourglass	11	133,23 ± 8,94	18,73	0,00	0,87	0,43
	Rectangle	13	117,81 ± 6,85				
	Pear	16	114,15 ± 8,66				
	Total	40	120,59 ± 11,33				
knee extensor	Hourglass	11	130,52 ± 10,00	18,67	0,00	2,46	0,10
	Rectangle	13	117,82 ± 4,56				
	Pear	16	111,96 ± 8,16				
	Total	40	118,97 ± 10,76				

Table 1: Baseline characteristics of the study population.

Variable dependant	(I) BST	(J) BST	D.M (I-J)	SD	Sig.
BMI	Hourglass	Rectangle	-0,98	0,32	0,00
		Pear	-2,26	0,31	0,00
	Rectangle	Hourglass	0,98	0,32	0,00
		Pear	-1,28	0,29	0,00
WC	Hourglass	Rectangle	-3,54	0,75	0,00
		Pear	-7,82	0,72	0,00
	Rectangle	Hourglass	3,54	0,76	0,00
		Pear	-4,28	0,69	0,00
ABSI	Hourglass	Rectangle	-0,01	0,002	0,00
		Pear	-0,02	0,002	0,00
	Rectangle	Hourglass	0,01	0,002	0,00
		Pear	-0,02	0,002	0,00
BFP	Hourglass	Rectangle	-0,70	0,22	0,00
		Pear	-4,28	0,21	0,00
	Rectangle	Hourglass	0,70	0,22	0,00
		Pear	-3,58	0,20	0,00
Trunk extensor	Hourglass	Rectangle	15,41	3,36	0,00
		Pear	19,07	3,21	0,00
	Rectangle	Hourglass	-15,41	3,36	0,00
		Pear	3,66	3,06	0,24
Killy test	Hourglass	Rectangle	12,70	3,19	0,00
		Pear	18,56	3,05	0,00
	Rectangle	Hourglass	-12,70	3,19	0,00
		Pear	5,85	2,91	0,05

Table 2: LSD test of anthropometric measures based on BST.

(a) By body ABSI as Predictors variable								
Model stepwise	**R**	**R 2**	**Adjusted R 2**	**Coefficients**	**T**	**P**	**F**	**P**
1	0,84[a]	0,71	0,70	(Constant)	-0,26	0,79	93,73	0.000[b]
				BFP	9,68	0.00		
2	0,87[b]	0,76	0.74	(Constant)	1,96	,06	54,35	0.000[c]
				BFP	6,92	0.00		
				knee extensor	-2,24	0.03		
3	0,87c	0,77	0,75	(Constant)	2,02	0,05	40,76	0.000[d]
				BFP	2,73	0,01		
				knee extensor	-2,59	0,01		
				WC	2,04	0,04		
[a]: Variable dependent; ABSI; [b]: Predictors (Constant) ; BFP; [c]: Predictors (Constant); BFP, knee extensor ;[d]: Predictors (Constant); BFP: Knee extensor; Wc: Variables entered but: Age, Waist Size, height, endurance trunk and Killy test								
(b) By body BST as Predictors variable								
Model STEPWISE	R	R_2	Adjusted R_2	Coefficients	T	P	F	P
1	0,90[a]	0,82	0,82	(Constant)	-8,49	0.00	173,88	0.000[b]
				BFP	13,18	0.00		
2	0,93[b]	0,87	0.86	(Constant)	-10,31	0.00	119,32	0.000[c]
				BFP	5,35	0.00		
				Waist Size	3,52	0.01		
3	0.96c	0.92	0.91	(Constant)	-0,95	0,35	134,66	0.000[d]
				BFP	3,79	0.00		
				Waist Size	5,06	0.00		
				knee extensor	-4,80	0.00		
[a]: Variable dependent: BST; [b]:Predictors: (Constant), BFP ; [c]: Predictors: (Constant), BFP, WC ; [d]: Predictors: (Constant), BFP, WC, knee extensor.Variables entered but exclude: Age, Wight, height, endurance trunk and Killy test								

Table 3: Regression analyses relating ABSI *vs.* BST.

Body Weight based on waist and Killy test in the opposite endurance trunk test. Evidence which confirmed that the ideal body shape is the "model" figure, super slim and without much waist shaping and often tall according to McEwen [62]. To examine this Knowledge, we use regression as a model analysis to predict the effect of body weight associated with the body shape typical among our sample, where we used the relationship between body weight and other variables chosen in this study (Table 4). Regression Model 1, the program showed that Waist Size as independent variable, was able to explain the changes in Weight, where F, T, R, R2, and Adjusted R 2 are significant at P<0.001

Model Stepwise	R	R_2	Adjusted R_2	Coefficients	T	P	F	P
1	0,81[a]	0,66	0,63	(Constant)	25,16	0.00	10,33	0.003b
				WC	3,21	0.00		
[a]: Variable dependent; Wight; [b]: Predictors: (Constant); WC: Variables entered but exclude: Age, BST, height, endurance trunk and Killy test, BFP								

Table 4: Shows Regression analyses relating Wight to predict which defect of the actual body weight among or sample.

in the opposite of Age, height, endurance trunk, Killy test ABS, BST and BMI as Variables excludes. Through regression results, we confirmed that body weight largely depends on factors such as body size, body type, and body composition. Whereas body types are a slight amount of lean body fat related to the relation body shape and size considered as attractive and healthy, especially for women's measurements, well the waist circumference can predict the metabolic syndrome [63] reduces to joint range of motion, the adipose tissues around joints obstruct [64] and Angular deviations of joints from normal body [65] among healthy sportswomen according to current study.

Table 3 shows Regression analyses relating ABSI *vs.* BST to predict which anthropometric parameter is superior to prevent the risks Pain Joints among Healthy Sportive Female shows Regression analyses relating Wight to predict which defect of the actual body weight among or sample (Table 4).

To conclude, our results confirmed that Simple anthropometric measurements such as Waist Size provide a useful estimation of the proportion of abdominal or upper-body fat [66] where the use of waist circumference (WC) is often preferred to predict Weight-Pain Joints [67].

However, BST and ABSI explain the anomalies of the Weightiness body fat on Muscles Strength and Pain Joints risk reported in the performance of the sample in the both tests lumbar spine and pelvis. Whilst high Waist Size expresses the excess risk body fat distribution related to the body type and levels Muscles Strength Pain Joints. Well, William et al. [68] said that women's bodies (Pear - Rectangle) produce relatively more androgenic than hourglass-shaped. Whereas Dennis K said that this phenomenon occurred through peripheral fat's role in converting androgens to estrogens or through leptin production in adipose tissue [69]. Our results agreed on one hand, that Hourglass shape as less WC is the best physical profile with less risk relative to the body fat distribution follows by Rectangle as moderate WC in the opposite of Pear as large WC with a lower tone in limb muscles associated with abnormal posture [70] in comparison with other profiles. Assumed waist size as the best anthropometric parameter explains the anomalies of the distribution of fat mass related to the health levels Muscles Strength Pain Joints, identified in the current study as excess body fat record in values of Killy test and endurance trunk as pain body joints related in the case of the pear-shaped to the excess body fat, especially in the hips and thighs, Producing a negative effect in supporting the excess lumbar spine and pelvis [71] clarified by Vincent et al. in maintaining lumbar force as important physical aspects related to quality of life and lumbar health [72].

Discussion

Founded on the body type categories, our sample range between Hourglass, Pear and Rectangle [73-76]. While the most recognizes in the case Pear shape which accumulates fat around hips, thighs and buttocks prominent in later life, joint pain, loss of the cartilage, pain, swelling, and limitation of joint mobility [77-80] while the problem of Rectangular shape return to waist size adjusted for height which manifests a bad distribution of body fat [81]. Since the above, we advise our healthier sportswomen with those type shapes to develop their type body shape based on the rule "less curvaceous shape with a smaller bust and hips" [82] as much as dieting and weight loss according to Sandra and Deborah [83]. Given that the overweight is associated with the changes in body composition affecting the skeletal muscle performance the case of Pear and Rectangle in the opposite of the Hourglass with well-waistline and low waist ratio as an ideal body physical condition [84], confirmed in our case in relation body shape to locomotor performance as an important determinant of physical performance [85-88]. Our results support the indication of Watanabe et al. that lumbar muscle strength as key mobility tasks resists an activated at approximately 30% of maximal voluntary strength values [89]. As a general rule, our attainment supports the analysis of 11 studies that more than 600,000 people with larger waist circumferences as pear shape, risks increased body gain weight in the hips and thighs and health risk goes up as waist size increases [90-92]. Based on the limit of the actual study data acquired and analyse, we linked to the confirmation that excess weight can also have an impact on your joints [93,94].

Conclusion

The conclusions from this study come to confirm the results of the similar studies that body fat reflecting a total body fat differs in its relationship to metabolic variables, where the ABSI depicts fat distribution and relative risk healthy, according to our results concerned body shape type relative measurements to ABSI, we agree that body shape types determine the Risk in skeletal muscle tone based on Strengthening lumbar extensors and Appearance body forms [53,95]. Where these risks are due to change results in the increased body mass index (BMI), body fat percent, and large waist, which negatively affects the body' joints, influence the activity and endurance [96]. Based on these effects, we confirm that the Waist Size is the important measure in all measurements estimating the relative risk lifestyle women [97]. For the risks Weight-Pain Joints, we agreed that individual with a larger waist risks increased body gain weight in hips and thighs and high health risk [98]. While female behaviour ideal healthy body required by Pear to monitor fat accumulated in the lower body [99], Rectangle shape to adjust their bust and hips seen they have basically the same circumference, according to Keiser and Garner [100] confirmed by Jennifer and Michael in waist needs [80]. View the waist is the portion of our body upon which upper part of our body rests according to Manoj [101], we subjected to our sportswomen to perform their waist by the exercise waist training. In terms of storage grease, we agree that the waist circumference should be adjusted to body shape characteristics to obtain the estimated fat distribution area [102], since waist size is challenging a new trend for women to slim down, that lower body adipocytes are a challenge training process for any female, due to the estrogen stimulate lipoprotein lipase activity, manufacturing the fat to accumulate in this area [103]. That Jo et al. recommended the tracks of waist circumference over time, in individuals attempting to lose weight [104]. Therefore, the waist circumference alone is the preferred method for assessing abdominal fat in healthy-weight people [105,106]. Well, our findings supported that Bodie's weight does not convey how much body fat you have or where it is stored the strongest [107]. Whereas the Body weight and BMI alone cannot be used to manage the estimated body fitness health risk [108] among the halter

women's that Myoungok and Injoo [109] confirm that body type is the relationship of human body shape to body size more prominent with the less body fat,well Thoma et al. recommended the body shape as a useful proxy measure of fat distribution patterns [110] seen the waist circumference is strong predictors for abnormal serum lipid and lipoproteins among Sudanese women [111].

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Author Contributions

The author has written, design, measure, calculi, read and approve the manuscript sent

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