

Study Of The Fto Gene To Predict Body Composition In Obese Women

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Introduction and research problem:

Obesity is one of the diseases of the modern civilization that has emerged due to lack of movement, activity and dependence on machines, which causes the emergence of diseases of lack of movement and this occurs due to the accumulation of fat in the body and this leads to difficulty in movement, loss of agility, joint fatigue and flabby muscles (١: ١٧٦) .

Genes also have a role in determining the type of muscle fibers in a way that represents approximately (٤٥٪), and that genes affect the increase in susceptibility to anaerobic exercise (٢: ٤٥) .

Indicates that genetics and biotechnology are fast-growing sciences, and genes play an important role in the field of physical education, as they are responsible for half of the variables in physical performance among members of society, as well as they are responsible for half of the variables in response For physical training, they stress that genes may be more important than training in explaining the differences in performance between players (٣:٥).

Studies have shown that physical activity reduces the effect of the gene on body gaining more weight, scientists are still unable to understand how the "FTO gene" causes weight gain, although they suspect that it affects appetite and behavior, the gene appears to be very effective in the brain It is particularly active in “the regions that regulate the energy balance dose and the amount of exertion, and the loss of energy balance is the basis for the development of obesity”, and there may be a counteracting effect of physical activity in the brain and on energy output (٩) .

The researcher states that weight gain means an excessive increase in the amounts of fat that accumulate in the body, which increases the person's weight and changes the shape and components of his body, making him obese. Thus, obesity is one of the diseases of the age that doctors warn of, and it means that the person has a craving for eating large quantities. of food, and she is neglectful and entrapped by the desire to devour food in increasing quantities that are more than what the body requires and the effort it makes.

From the above, the researcher indicates that obesity is more prevalent among women and has many causes such as lack of movement or organic or genetic causes. Obesity has many complications such as type 2 diabetes, heart disease and others, while the researcher found that one of the most important causes of obesity is genetics and that the gene FTO is one of the main causes of obesity and this is what was indicated by the studies of the study "Ashraf Ahmed" (2017) (1), the study of "Rasha Refaat" (2014) (2), the study of "Alaa Aldin Magd" (2017) (3), a study Marwa Abd el Hafez (2017) (4), the study of "Mina Saad" (2015) (5)

From the foregoing, and through the researcher's knowledge, she found that obesity is linked to the genetic factor, as it is the genes that cause changes in the components of the body and thus the incidence of obesity, and by looking at previous studies, the researcher is trying to subject these observations to a scientific study to identify the basic and important role that genes play, especially the existence of a relationship between a gene FTo and body components in predicting obesity, in addition to finding the relationship between the known body components with the concentration of this gene, where the research problem and its importance lies in trying to identify the existence of a relationship between the Fto gene and the researcher's belief in the importance of studying genes and body components to predict body components in affected women With obesity.

Search objective :

The research aims to verify the role of the Fto gene in causing obesity in women by studying the components of the body

Search questions :

- Is there a statistically significant correlation between the FTO gene and the variables and body components of the obese women under study ?
- Is it possible to predict the physical components of the body through the FTO gene in the obese women under study ?

Terms used in the search:

Jin FTO

A gene responsible and linked to obesity (٩) .
obesity

One of the diseases of modern civilization that appeared due to lack of movement, activity and dependence on machines, which causes the emergence of diseases of lack of movement and this occurs due to the accumulation of fat in the body, and this leads to difficulty in movement, loss of agility, fatigue of joints, and sagging muscles (١٧٦)

Research plan and procedure

Research Methodology :

The descriptive approach was used due to its relevance to the nature and purpose of the study, as the study is based on describing and explaining the current situation.

research community :

Obese women in the Minia Educational Administration, and their number is ١٤٨.

The research sample :

The number of research sample members was ١٥ women.

The skew coefficients of the group under consideration in age, height, weight and health fitness variables under study ranged between (- ٠.٦٣, ١.٨٨), meaning that they were limited to (+ ٣, - ٣), which indicates that it lies within the moderation curve and thus the sample is moderately distributed. .

Research executive steps

- First : Preparatory procedures (preparation stage) .
- ١. Determining the general framework of the research, its fields and objectives, the basic variables to be measured, the research steps, and

the appropriate tools and devices for measuring the variables under study, through previous studies .

٢. Obtaining the necessary administrative approvals to make the measurements for the research .
٣. Address the Minia Educational Administration to count the number of obese women whose weight exceeds ٩٠ kilograms .
٤. Determine the laboratory in which the blood samples will be analyzed.

– Second - the survey :

The researcher conducted an exploratory study on (١٢) women from the research community and from outside the research sample, by applying measurements of body components to ensure the availability of tools and devices used in the implementation of the basic experiment, where the validity of the tools and devices used was confirmed, as was done on two days (day for physical tests, and a day for physiological tests) a week before the basic measurements are taken .

– Third - Drawing blood samples (the basic stage)

١. On Sunday, February ١٢, ٢٠٢٢ AD, it was agreed with the doctor of analysis to take blood samples from the sample .
٢. On Thursday, February ١٧, ٢٠٢٢ AD, it was agreed with the women “the research sample” to be present.
٣. On Saturday, February ٢٠, ٢٠٢٢ AD, the researcher went to the headquarters of the educational administration, accompanied by the doctor, to take samples at exactly nine o'clock in the morning. The samples were taken from nine thirty in the morning until ten thirty in the morning.
٤. Samples were taken from ١٥ women by the doctor. The blood samples were emptied into tubes containing EDTA to preserve blood samples from clotting, and they are numbered from ١ to ١٥.

٥. The tubes were placed in an ice box and then transferred directly to the analysis lab in Cairo.
٦. The lab was set for Saturday ٢١/٢/٢٠٢٢ AD to take the results of the samples after the analysis.
٧. Measurements of body components were made on the sample a week before blood samples were drawn.

Measurements and tests used in the research :

Basic measurements

١. Height measurement (height) .
٢. Measuring the weight
٣. The chronological age and the training age were recorded through the list of records.
٤. Body Components :
 - Trunk Fat
 - Body mass
 - Fat mass
 - Belly fat

Statistical processing :

The researcher used the following statistical methods to suit the nature of the research, which are :

- SMA .
- standard deviation .
- Coefficient of skewness .
- Percentage improvement .
- Mediator.
- regression analysis.

The researcher agreed to a level of significance (. . ٥), and she used the statistical program Spss, which is among the ready-made statistical programs.

View and discuss results

First - View the results :

The researcher will review the results of the search as follows :

Verification of the validity of the first hypothesis: which states :

There is a statistically significant correlation between the FTO gene and body components among the obese women under study.

Table (١)

Correlation coefficients between the FTO gene and body components
Among the obese women under study (n = ١٥)

body components	FTO	error level
fat mass	* ٠.٥٩	٠.٠٢٠
belly fat	** ٠.٨٠	٠.٠٠٠
Trunk fat	* ٠.٥٦	٠.٠٣٠
body mass	** ٠.٧٥	٠.٠٠١

(t) tabular value at the level of significance (٠.٠٥) = ٠.٥١٤ (٠.٠١) = ٠.٦٤١

*Significant at the level (٠.٠٥) ** Significant at the level (٠.٠١)

It is evident from Table (١) that:

- There is a direct, statistically significant, correlation between the FTO gene and body components among the obese women under study.

table (٢)

Correlation coefficients between the FTO gene and physical variables
Among the obese women under study (n = ١٥)

body components	FTO	error level
fat mass	- ٠.٣١	٠.٢٥٩
belly fat	- ٠.١٧	٠.٥٤٢
Trunk fat	- ٠.٣١	٠.٢٦٣
body mass	- ٠.٢١	٠.٤٥٤

(t) tabular value at the level of significance (٠.٠٥) = ٠.٥١٤ (٠.٠١) = ٠.٦٤١

*Significant at the level (٠.٠٥)

** Significant at the level (٠.٠١)

It is evident from Table (٢) that :

- There is a non-significant correlation between the FTO gene and physical variables among the obese women under study.

The researcher attributes this result to the existence of a non-statistically significant correlation between the FTO gene and the research variables (leptin hormone / body components / physical variables) in that the genetic chromosome is fixed and does not change or be affected by athletic training or any external or internal influences on it. Rather, the gene is the trait that It determines the human form or nature and characteristics .

The researcher also indicates that the hormone FTO is an indicator of obesity, as confirmed by many studies, such as the study of "Ashraf Ahmed" (٢٠١٩) (١), which found no statistically significant changes in the genotypes (GG, GT, TT) in terms of Age, gender and anthropometric measurements (weight - height - waist, hip, head and mid-humerus circumference), but there is an increase in body mass index, which is higher in the genotypes carrying the allele (GT, TT) (T) .

This result is consistent with the results of the Rasha Refaat study (٢٠١٩) (٦), which found that genotyping of the FTO rs ١٧٨١٧٤٤٩ polymorphism revealed that variants carrying the G risk allele showed a statistically significant association with obesity in comparison with the T allele .

Verifying the validity of the second hypothesis: which states:

Body composition can be predicted by the FTO gene in obese women under investigation.

Table (٣)
Regression analysis between body components and the FTO gene
Among the obese women under study (n = ١٥)

Variable	R	R ^٢	constant value	B	Beta	F	T . test
fat mass	٠.٥٩	٠.٣٥	٢٤.٣١	٢.٩١	٠.٥٩	* ٧.٠٧	* ٢.٦٦
belly fat	٠.٨٠	٠.٦٤	- ٠.٠٣	١.٤٧	٠.٨٠	** ٢٣.٣٤	** ٤.٨٣
Trunk fat	٠.٥٦	٠.٣١	١٥.٩٣	٣.٩٠	٠.٥٦	* ٥.٩٤	* ٢.٤٤
body mass	٠.٧٥	٠.٥٦	٢٤.٥٨	١.٤٧	٠.٧٥	** ١٦.٦٨	** ٤.٠٨

*Significant at the level (٠.٠٥) ** Significant at the level (٠.٠١)

It is clear from Table (٣) :

- It is possible to predict body components (fat mass) through the FTO gene in obese women, where the value of the multiple correlation (R) between the two variables was (٠.٥٩) and it represents the contribution of the independent variables to the dependent variable, and it caused a variation of (R^٢) and its value is equal to (٠.٣٥) with a percentage of their contribution (٣٥%) in the dependent variable, and the value of (P) was (٧.٠٧), which is a function at the level (٠.٠٥), and therefore body components (body mass) can be predicted through the FTO gene, and the predictive regression equation can be formulated as Next: Body mass = ٢٤.٣١ + ٢.٩١ (sample scores on the FTO gene) .
- It is possible to predict body components (belly fat) through the FTO gene in obese women, where the value of the multiple correlation (R) between the two variables was (٠.٨٠), which represents the contribution of the independent variables to the dependent variable, and it caused a variation of (R^٢) and its value is equal to (٠.٦٤) with a percentage of their contribution (٦٤%) in the dependent variable, and the value of (P) was (٢٣.٣٤) and it is a function at the level (٠.٠١), and therefore body components (belly fat) can be predicted through the FTO gene, and the predictive regression equation can be formulated as Next: Belly fat = - ٠.٠٣ + ١.٤٧ (Sample scores on the FTO gene) .

- It is possible to predict body components (trunk fat) through the FTO gene in obese women, where the value of the multiple correlation (R) between the two variables was (٠.٥٦), and it represents the contribution of the independent variables to the dependent variable, and it caused a variation of (R ٢) and its value is equal to (٠.٣١) with a percentage of their contribution (٣١٪) in the dependent variable, and the value of (P) was (٠.٩٤), which is a function at the level (٠.٠٥), and therefore body components (trunk fat) can be predicted through the FTO gene, and the predictive regression equation can be formulated as Next: Trunk fat = ١٥.٩٣ + ٣.٩٠ (sample scores on the FTO gene).
- Body mass (BMI) can be predicted through the FTO gene in obese women, where the value of the multiple correlation (R) between the two variables was (٠.٧٥) and it represents the contribution of the independent variables to the dependent variable, and it caused a discrepancy of (R ٢) and its value equal to (٠.٥٦)) with their contribution percentage (٥٦٪) in the dependent variable, and the value of (P) was (١٦.٦٤), which is a function at the level (٠.٠١), and therefore body mass can be predicted through the FTO gene, and the predictive regression equation can be formulated as follows:

Body mass = ٢٤.٥٨ + ١.٤٧ (sample scores on the FTO gene) .

This is what she agrees with in the study of "Marwa Abd el Hafez" (٢٠١٦) (٣), which aimed and reached the possibility of predicting the occurrence of obesity and body components. The results of the research showed that all anthropometric measurements are much higher in patients with Obesity compared to healthy people in terms of weight, height, body mass index, fat percentage, water percentage, muscle mass, waist circumference, hip circumference, and hip /waist ratio .

She also agreed with the study "Rasha Refaat" (٢٠١٤) (٧), which found an association between genotyping of the FTO rs ١٧٨١٧٤٤٩ polymorphism and obesity, through the presence of a statistically significant correlation with obesity .

Conclusion

In light of the research results, the researcher reached the following conclusions :

١. The ACTN ٣ gene is an indicator of what the youngsters will be like in the future and thus saves time and effort .
٢. The presence of the ACTN ٣ gene in the muscle fibers helps to improve the level of the player better.
٣. Increasing the gene's ability to produce actinin leads to an increase in muscle capacity.

Thanks and appreciation

The researcher extends her sincere thanks and great appreciation to everyone who contributed to this work in the most complete way, especially the experts in the field in facilitating the researcher's task from the Minia Educational Administration, as well as the medical aspect of the research appropriate to the nature of the sample. Minya Educational Club, which allowed the application of the research because of the time and information they allocated in order to produce the research in the hoped manner and the ability to achieve the desired goal.

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Research Summary

The research aims to verify the role of the Fto gene in causing obesity for women by studying the components of the body. The descriptive approach was used due to its relevance to the nature and objective of the study. The study is based on describing and explaining the current situation. Obese women in the Minia Educational Administration numbered **128** women. The research sample was **10** women, aged between **20: 30** years, who were randomly selected from the research community, and the research reached the following conclusions :

- There is a direct, statistically significant, correlation between the FTO gene and body components among the obese women under study.
- Body composition (fat mass / belly fat / trunk fat / body mass) can be predicted through the FTO gene in obese women.

Key words

- Jin
 - FTO
 - Body Components
- obesity