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Study of energy and dietary intake of athletics players with down syndrome

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Abstract:

The research aims to evaluate actual energy intake across the athletics players with Down syndrome in Cairo, by estimating nutritional value of athletics players with Down syndrome meals as compared with energy requirements and Studying the anthropometric measurement and it's relationship with dietary intake. The researcher used the descriptive approach on a sample of (29) athletics players with Down syndrome Male gendered between the ages of (15 - 20 years), players registered in the records of the Egyptian Sports Federation for Intellectual Disabilities, **and the results of the research showed that** There is a great reduction in the consumption of the caloric intake compared with the RDA, There is a great reduction in the consumption of the basic nutrient elements intake compared with the RDA, there is a great rising in the consumption of the electrolytes and the vitamins specially the phosphorus, iron, zinc, Vitamin A, Riboflavin, &vitamin C compared with the RDA, there is a great reduction in the consumption of the Potassium and Calcium compared with the RDA, The sample receives the daily recommended percentage of potassium in their natural dietary pattern for both weight and height only, The sample receives the daily recommended percentage of Carbohydrates in their natural dietary pattern for height only, There are statistical significant differences in the Anthropometric measurements between the research sample and the standard.

Keywords: dietary intake, athletics, Down syndrome, estimated energy requirement.

الملخص:

يهدف البحث إلى تقييم استهلاك المأخوذ الفعلي من الطاقة لدى لاعبي ألعاب القوى ذوي متلازمة داون في القاهرة، من خلال تقدير القيمة الغذائية لوجبات لاعبي ألعاب القوى ذوي متلازمة داون مقارنة باحتياجاتهم اليومية من الطاقة ودراسة المقاييس الجسمية وعلاقتها بالمأخوذ اليومي من الغذاء، استخدم الباحثون المنهج الوصفي لملائمته لطبيعة البحث، عينة البحث مكونة من (29) لاعباً من لاعبي ألعاب القوى من ذوي متلازمة داون ذكور تتراوح أعمارهم بين (15 – 20 سنة)، اللاعبين المقيدين بسجلات الاتحاد الرياضي المصري للإعاقات الذهنية مقسمين إلى مجموعتين (لاعبين سباقات الجري من 15: 18 عام)، (لاعبين سباقات الرمي من 19: 20 عام)، وكانت اهم نتائج البحث أن هناك انخفاضاً كبيراً في استهلاك السعرات الحرارية والعناصر الغذائية الأساسية المتناولة مقارنة بالتوصيات الغذائية العالمية، وهناك ارتفاع كبير في استهلاك الأملاح المعدنية والفيتامينات وخاصة الفوسفور والحديد والزنك وفيتامين أ والريبوفلافين وفيتامين ج مقارنة بالكمية الموصي بها يومياً، هناك انخفاض كبير في استهلاك البوتاسيوم والكالسيوم مقارنة بالكمية الموصي بها يومياً، وتتلقى العينة النسبة الموصي بها يومياً من البوتاسيوم في نمطهم الغذائي الطبيعي لكل من الوزن والطول فقط، وتحصل العينة على النسبة اليومية الموصي بها من الكربوهيدرات في نمطهم الغذائي الطبيعي للطول فقط، وتوجد فروق ذات دلالة إحصائية في المقاييس الجسمية بين عينة البحث والمقاييس الجسمية المعيارية.

الكلمات المفتاحية: المدخول الغذائي، ألعاب القوى، متلازمة داون، الاحتياجات المقدرة من الطاقة.

Study of energy and dietary intake of athletics players with down syndrome

Introduction and research problem:

Efforts to improve physical fitness, body composition, and overall health for individuals with Down syndrome should include participation in physical activities, especially ones that are enjoyable and that develop skill and fitness. Sports programs and teams are ideal since most leagues emphasize participation and skill development, keeping in mind the capabilities of all players. For athletes with disabilities, Special Olympics

provides opportunities for training and competition, culminating in the experience of major international events. With the benefits of regular physical activity now well established, adequate nutrition for growth, fitness, and performance is a concern for these athletes. High-quality nutritional support requires knowledge of actual energy expenditure, the basis for adequate food intake.

Research in the general Down syndrome population suggests a higher-than-average prevalence of obesity. Many individuals may become obese during adolescence, coinciding with the potential decrease in physical activity or organized sports participation. Lower activity levels and energy expenditure, often associated with poor fitness, could lead to weight gain over time. In contrast, obesity in the general population occurs with increased food intake and positive energy balance; it is unclear whether this is true for individuals with Down syndrome.

Until now, no study has been undertaken to examine the energy expenditure, dietary intake, and nutritional status of sports-playing athletes with Down syndrome. This is despite the fact that Down syndrome is the most common chromosomal disorder in humans, associated with mental retardation, growth failure, obesity, and a variety of malformations and medical conditions (Rodriguez-Mañas et al.2021)

Nutrition is a critical part of health and development. Better nutrition is related to improved infant, child and maternal health, stronger immune systems, safer pregnancy and childbirth, lower risk of non-communicable diseases (such as diabetes and cardiovascular disease), and longevity.

Malnutrition, in every form, presents significant threats to human health. Today the world faces a double burden of malnutrition that includes both under nutrition and overweight, especially in low- and middle-income countries. There are multiple forms of malnutrition, including under nutrition (wasting or stunting), inadequate vitamins or minerals, overweight, obesity, and resulting diet-related non communicable diseases.

The developmental, economic, social, and medical impacts of the global burden of malnutrition are serious and lasting for individuals and their families, for communities and for countries. (22)

Human life and health depends on an appropriate supply of basic nutrients for body energy and tissue building. As for the macro nutrients, carbohydrate is the primary fuel to produce energy, with fat as an additional concentrated fuel, protein provides the amino acids necessary for

building tissue. The micro nutrients, vitamins and minerals, serve as control agents for biochemical reactions of body metabolism and structural material for certain tissues. Nutrient need change through the life cycle according to requirements for growth and maintaining body composition and are supplied by a balanced diet based on variety and moderation.

Nutrition and physical activity go hand in hand, Activity demands carbohydrate and fat as fuel, protein to build and maintain lean tissues; vitamins and minerals to support both energy metabolism and tissue building, and water to help distribute the fuels and to dissipate the resulting heat and wastes.

Energy intake (EI) that exceeds energy expenditure is the main driver of weight gain. Energy consumed in foods is transformed to substrates that are either oxidized to produce metabolically useful energy that drives biological processes or stored as fat when in excess. World Health Organization reported that the principal reason for the problem of excess weight is a sustained energy imbalance between calories consumed and calories expended and numerous genetic and environmental factors play intermediary roles in this process. Food environment, marketing of unhealthy foods, urbanization and reduction in physical activity also play important roles.

Energy intake is dependent on carbohydrate (4 kcal/g, 17 kJ/g), protein (4 kcal/g, 17 kJ/g), and fat (9 kcal/g, 38 kJ/g) and can be assessed through dietary methods (weighed food intake, laboratory analysis of foods, quantified 24-h dietary recall and food frequency questionnaire). (15)

There is little literature concerning habitual energy intake and its determinants in Down syndrome, though research in other groups suggests a positive association between energy intake and physical activity (PA) level. For example, PA has been shown to be an important determinant of energy consumption in elderly people. It is well established that regular exercise is associated with numerous health benefits, but it is not known whether the same is true for people with Down syndrome. In fact, the opposite is likely to be true, as it has been suggested that people with Down syndrome have a genetic predisposition to obesity. For this population group to be able to take advantage of any public health initiatives related to healthy eating and active living, it is necessary to establish a clear understanding of the relationship between energy intake and PA. However, this information is only useful in the wider context if we already know that this group is not currently consuming the recommended daily intake of

energy. It has been suggested that athletes, regardless of age or disability, consume more energy than their sedentary counterparts. This increased requirement for energy means it is particularly important for athletes to match their energy intake to total energy expenditure (TEE) to avoid either chronic energy deficiency or a state of positive energy balance which is likely to be detrimental to sporting performance. (PEKER et al., 2023)(Carty et al.2021)

Research problem

The problem of the research becomes clear through the researcher's work as an athletics coach in the field of mental disabilities especially with Down syndrome category. She noticed that athletes with Down syndrome suffer from problems in gaining or losing weight and not consistency in the mass and size of the external body with the age stage. They also suffer from a weakness in the level of training performance, weakness in the ability to endure and continue to perform the duties of the training unit. and also noticed that many of them have physical, functional and physical abilities that do not allow them to advance in the training level despite their practice of sports for many years, and through the researcher's review of scientific studies and references, she noticed a lack of references that could be relied upon in the nutrition of athletes with Down syndrome.

Due to the researcher's interest in improving the training level of athletes with Down syndrome, she will conduct an analytical survey study on athletes with Down syndrome. To study the nutritional status

Research aims:-

This research aims to:

1. Evaluate actual energy intake in comparison with estimated energy requirements for the sample.
2. Finding a relationship between dietary intake and anthropometric measures for the sample.

Research questions:-

1 -Is there statistical relationship between actual energy intake and estimated energy requirement of athletics players with Down syndrome?

2 -Is there statistical relationship between dietary intake and anthropometric measures of athletics players with Down syndrome?

Research terms:-

Energy intake:

Energy intake is defined as the caloric or energy content of food as provided by the major sources of dietary energy: carbohydrate (16.8 kJ/g), protein (16.8 kJ/g), fat (37.8 kJ/g) and alcohol (29.4 kJ/g). (21)

Dietary intake:

Dietary intake is the long-term average daily intake of a nutrient or food. (17)

Estimated Energy Requirement:

Estimated Energy Requirement (EER) is the average dietary energy intake that is predicted to maintain energy balance in healthy, normal weight individuals of a defined age, gender, weight, height, and level of physical activity consistent with good health. (18)

Athletics:

A variety of competitions in running, walking, jumping, and throwing events. Although these contests are called track and field. (19)

It also means "The general name for a particular group of sports in which people compete, including running, jumping, and throwing". (16)

Down syndrome:

Genetic disorder caused when abnormal cell division results in an extra full or partial copy of chromosome 21. This extra genetic material causes the developmental changes and physical features of Down syndrome. (20)

Related studies:-

Dietary intake has been assessed in young individuals with Down syndrome in only two studies from the USA. All subjects in the first study were living in the community, and in the second study, two subjects lived with their families and two lived in a 'group home'. No comparisons with dietary intake recommendations were made in the first study, and in the second study, authors concluded that females should pay attention to their fat and saturated fat intake as it was higher than recommended. No dietary intake data has been collected in adults with Down syndrome. Therefore, more studies are needed on dietary intake in adolescents and adults in the UK. This will enable the nutrition-related health of individuals with Down syndrome to be assessed compared with dietary intake recommendations and enable nutritional interventions, if needed, to be developed. High-

quality dietary intake data can be obtained using the multiple pass 24-hour recall, which is a very detailed method of dietary assessment. No study has been done utilizing this method in individuals with Down syndrome, and it is regarded as the most suitable method of dietary assessment for the whole population.

- **However there is some studies which are connected to a related subjects like:**
    1. The study of Shereen M. Hassan et al, (2022 AD) (14), The Prevailing Nutritional Problems among Children with Down Syndrome; Case-Control Study, and This study aimed to determine the adequacy of nutrient intakes and DS children's most common food habits. This case-control study recruited 126 children aged 6 to 12 (42 with DS and 84 non-DS) from Menoufia and Gharbia governorates, the data was collected by socioeconomic status and health history were collected. BMI was calculated using body weight and height measurements. Diet and eating habits were also investigated, and 24-hour food recalls for three days were used to determine nutrient intake, The results indicate that most of the studied children were from rural areas; most non-DS mothers had university degrees, while most DS mothers' children were illiterate. Obesity was found among 85.7% of DS and 28.6% of non-DS children. Cholesterol and LDLc levels were comparable in both groups. The IQs of non-DS exceeded 98, while those of DS fell below 52. Children with DS prefer fatty meats and chicken with skin over tea and spicy foods. Non-DS and DS groups met less than 80%, 70%, 90%, 20%, 60%, and 60% of caloric, carbohydrate, fat, fiber, calcium, and vitamin A requirements, respectively. The deficiency was prevalent in DS children.

    2. The study of Edyta Wernio et al, (2022 AD) (5), Analysis of Dietary Habits and Nutritional Status of Children with Down Syndrome in the Context of Lipid and Oxidative Stress Parameters, and This study aimed to assess the problem of disturbances in the nutritional status and eating habits of children with Down Syndrome. This Analysis study recruited 39 patients (15 boys, 24 girls) with Down syndrome Age ≥ 9 years and <18 years, the data was collected by The nutritional status was assessed by anthropometric tests and Dual X-ray Absorptiometry. Eating habits were assessed using the Child Eating Behavior Questionnaire and the Food Frequency Questionnaire. Blood samples were taken to determine the oxidative stress and lipid parameters, the results indicate that Obesity was

recognized in 15% of subjects and 23% were overweight. Children that were overweight were characterized by higher levels of triglycerides, atherogenic index of plasma, and apoA2 and apoE levels. Fat mass, fat mass/height2 index, and visceral fat mass correlated with thiobarbituric acid reactive substances and advanced oxidative protein product level. The analysis of the Child Eating Behavior Questionnaire showed that children struggling with being overweight were more interested in food compared to those with normal body weight. A positive correlation was identified between waist circumference and food interest categories. Insufficient consumption of dairy products, vegetables, whole grain products, as well as fruits, seeds, nuts, and fatty fish was noted. Patients were less likely to consume products that are a good source of mono- and polyunsaturated fatty acids.

3. The study of Esradeniz Doğan et al, (2020 AD) (7), A study on the examination of eating behaviors and eating habits of individuals with Down syndrome, and this study aimed to reveal the nutritional status and habits of individuals with Down syndrome in order to raise awareness for families and experts about the nutrition of the Down syndrome group that needs special attention in terms of nutrition. This study enrolled 20 individuals with a diagnosis of Down syndrome between the ages of 14-36, who live in the city of Denizli and who have the capacity to answer the questions asked to them, the data was collected by interview technique was used in order to determine the eating behaviors of the individuals prepared by the researchers, In the preparation of the questionnaire, ‘A new method in investigation of obesity-related eating behaviors ‘three-factor eating questionnaire’’ by Kıraç et al., 2015 was used. The universe of the research was composed of individuals with Down syndrome, the results indicate that 80% of the individuals included in the research have above normal body mass index, 65% are in the category of slightly fat and 15% are in the category of fat. When the findings related to the nutritional habits of individuals were examined, it was seen that 85% of the individuals had 3 meals, 10% of the individuals had 5 meals and 5% of the individuals had 4 meals. This shows that none of the individuals skipped meals. When the participants were asked, "Are you trying not to eat some foods because they cause you to gain weight?” All of the responses from the participants were "No, I cannot give up, because I love to eat". This situation supports the fact that individuals included in the

research could not control their weight. This result shows that the individuals included in the research do not have the knowledge that obesity may threaten their health.

4. The study of Eman S. Zein eldeen et al, (2019 AD) (6), Evaluating the nutritional status of female students of the Faculty of Physical Education in university cities at Beni Suef University in accordance with international standards, and this study aimed to evaluate the nutritional status of the students of the College of Physical Education in the university cities by studying the nutritional status of the students in the same type and type of food. The researcher used the descriptive method in the survey method, The sample of the research Students of the Faculty of Physical Education, Beni Suef University in the 25 university cities was chosen in a deliberate manner, ranging in age from 19-22 years of female students residing in the university cities for the academic year 2017/2018. The number of female students is 10, (5) The results indicate that the differences between the percentage of calories and nutritional values of the daily duties of the students of the sample of the search for daily needs in accordance with the recommendations of global food and effort, and the most important recommendations are necessary attention to nutrition students of the Faculty of Physical Education given Of the physical effort undertaken in accordance with the recommendations of the world.

5. The study of Asmaa M. AbdAllah. (2013 AD) (2), Nutritional Status of some Children and Adolescents with Down syndrome in Jeddah, and this study aimed to assess nutritional status of some children and adolescents with Down syndrome in Jeddah based on nutrient intake and anthropometrical characteristics. And to establish baseline data of their nutritional status in order to make their needs addressed by the society to enhance their quality of life, increase their life expectancy, realize their life aspirations and make them valued and productive members of a welcoming community. This Case/control study included 30 Down syndrome cases 6-18 years. The sample was divided into two age groups, 6-<12 years and 12–18 years old. And 30 cross matched healthy control individuals; the data was collected by Anthropometric measures of body weight, height and calculated BMI for each Participant. And 24 hours recall method was conducted to evaluate daily dietary intake, The results indicate that Short stature was reported significantly for the majority (87%) of Down syndrome individuals compared to normal controls. While 53% of them were

either overweight or obese compared to 43% of controls with no significant difference. There was significant higher consumption of macronutrients especially from carbohydrates and fats by Down syndrome cases compared to normal controls.

Research plan and procedures

1- Research methodology

The researcher used the descriptive approach due to its suitability to the nature of the research objectives and questions.

2- Research community

Athletics players with Down syndrome at Al-Nasr Sports Club, Al-Shams Sports Club, Hadayek Al-Ahram Club, Saqr Quraish, Algazeera youth centers and Bahtim Sports Club.

Human Society: The human field of research included (29) athletics players with Down syndrome Male gendered between the ages of (15 - 20 years), Players registered in the records of the Egyptian Sports Federation for Intellectual Disabilities.

Temporal society: It was applied in the period from 19/8/2021 till 6/11/2021 AD.

3- The research sample

The research sample was selected intentionally, consisting of (29) athletics players with Down syndrome Male gendered between the ages of (15 - 20 years), players registered in the records of the Egyptian Sports Federation for Intellectual Disabilities, for the purpose of applying the questionnaire and drawing results.

Table (1):

Number and percentage of chosen Down syndrome athletics players in sports centers

Num	Sports Center	Count	Percent %	From 15:18 Years Old	From 19:20 Years old
				Running Players	Throwing Players
1	Al-Nasr Club	5	17%	4	1
2	Saqr Quraish Y.Center	4	14%	1	3
3	Al-Shams Club	1	3.5%	0	1
4	Hadayek al -	1	3.5%	0	1

	Ahram Club				
5	El Gazeera Y.Center	12	41%	2	10
6	BahteemClub	6	21%	5	1
Total	29	29	100%	12	17
Percent	100	100	-	41%	59%

4- Data collection methods and tools

Based data collection for this research on the following tools:-

-Food intake using 24 hours recall for one week. Sheet (1) (Abdelkader, et all (2001): 35)

-The anthropometric measurements include: sheet (2) (Abdelkader, et all (2001): 72)

Body weight, Height, Body Mass Index (BMI), Triceps Skinfold thickness (TSF), Mid Arm Circumference (MAC) and Mid Arm Muscle Circumference (MAMC)

Questionnaire application:

The researcher applied the questionnaire to the members of the research sample represented by the athletics players with Down syndrome, players registered in the records of the Egyptian Sports Federation for Intellectual Disabilities, who numbered (29) athletes in the time period from 19/8/2021 till 6/11/2021 AD.

Estimated Energy Requirement:

The Dietary Reference Intakes (DRIs) define the daily requirement for energy as the Estimated Energy Requirement (EER). The EER is based on calculations that account for an individual's energy intake, energy expenditure, age, sex, weight, height, and physical activity level. Including physical activity level in the calculations makes determining energy expenditure possible and achieving energy balance a more realistic goal.

The Equations to Estimate Energy Requirement:

- Boys from 9 – 18 Years

EER=88.5-
(61.9*AGE{Y})+PA*{(26.7*WEIGHT{KG})+(903*HEIGHT{M})+25

Average Actual Height HEIGHT 1.43 M

Average Standard Height	HEIGHT	1.74	M
Average Actual weight	WEIGHT	47.50	KG
Average Standard weight	WEIGHT	61	KG
Average Age	AGE	15.75	Y
Physical Activity level	PA	1.42	Very Active

- Men Adults from 19 Years and older

EER=662-(9.53*AGE{Y})+PA*{(15.91*WEIGHT{KG})+(539.6*HEIGHT{M})

Average Actual Height	HEIGHT	1.52	M
Average Standard Height	HEIGHT	1.77	M
Average Actual weight	WEIGHT	64.88	KG
Average Standard weight	WEIGHT	70	KG
Average Age	AGE	19.82	Y
Physical Activity level	PA	1.48	Very Active

(Institute of Medicine of the National Academies (2023 AD))

Statistical processes used:

The researcher used the SPSS program to measure the following tests:

- Mean $(\bar{X})$
- Standard Deviation (S)
- Skewness $(\propto_3)$
- Normal Distribution Test (Z)
- Randomization (Z)
- Significance of Differences (t) Test
- Spearman Test (r)
- T Test (t)

Presentation and discussion of results:

- **Table: 2**

Statistical Description of nutritional status Down syndrome running players aged between 15:18 years old

Variable	Unit	$\bar{X}$	S	$\propto_3$	Normality		Randomization	
					Z	P (value)	Z	P (value)
Energy	K/cal	2193.25	313.39	1.07	**0.62***	0.83	**-0.91***	0.36
Protein	Gram	87.58	17.70	1.04	**0.53***	0.94	**-1.51***	0.13
Fats	Gram	86.51	23.78	1.63	**0.61***	0.84	**-0.30***	0.76
Carbs	Gram	266.09	40.68	-0.66	**0.46***	0.98	**-0.91***	0.36
Potassium	Gram	2244.56	393.35	0.49	**0.54***	0.93	**-0.30***	0.76
Calcium	Gram	679.87	246.72	0.99	**0.64***	0.81	**0.00***	1.00
Phosphorus	Gram	1185.46	187.29	0.84	**0.58***	0.89	**0.91***	0.36
Iron	Gram	16.31	3.19	2.10	**0.84***	0.49	**0.00***	1.00
Zinc	Gram	12.97	3.97	1.24	**0.90***	0.39	**0.91***	0.36
Vitamin A	Gram	1823.55	2350.35	1.95	**1.09***	0.18	**0.91***	0.36
Thiamin	Gram	0.89	0.15	-1.29	**0.60***	0.86	**-0.91***	0.36
Riboflavin	Gram	1.37	0.63	1.39	**0.55***	0.92	**0.91***	0.36
Vitamin C	Gram	124.56	53.57	0.21	**0.65***	0.79	**0.30***	0.76

Significance at (p) ≥ (0.05)

This table shows that skewness value for the sample is between (±3) which means that there is no positive or negative skewness for the sample data; However the normality and randomization tests are distributed normally and randomly which means that all members of the sample are even in all variables.

Table: 3

Statistical Description of nutritional status Down syndrome throwing players aged between 19:20 years old

Variable	Unit	$\bar{X}$	S	$\propto_3$	Normality		Randomization	
					Z	P (value)	Z	P (value)
Energy	K/cal	2046.71	584.99	0.86	***0.77**	0.59	***0.00**	1.00
Protein	Gram	92.03	31.87	0.98	***1.03**	0.24	***0.52**	0.60
Fats	Gram	71.73	21.25	0.25	***0.52**	0.95	***1.02**	0.31
Carbs	Gram	258.25	125.42	1.75	***1.05**	0.22	***0.00**	1.00
Potassium	Gram	1974.87	580.21	1.13	***0.71**	0.69	***-2.00**	0.05
Calcium	Gram	709.90	371.14	1.72	***0.91**	0.38	***0.52**	0.60
Phosphorus	Gram	1077.65	330.95	1.07	***0.77**	0.60	***0.52**	0.60
Iron	Gram	88.44	64.63	0.70	***0.57**	0.90	***-0.99**	0.32
Zinc	Gram	11.79	3.52	0.86	***0.93**	0.36	***0.52**	0.60
Vitamin A	Gram	962.15	988.11	2.00	***1.34**	0.06	***0.00**	1.00
Thiamin	Gram	0.81	0.37	1.86	***0.99**	0.28	***0.00**	1.00
Riboflavin	Gram	1.11	0.43	0.78	***0.65**	0.79	***0.00**	1.00
Vitamin C	Gram	104.50	85.07	2.40	***0.93**	0.35	***0.52**	0.60

Significance at (p) ≥ (0.05)

This table shows that skewness value for the sample is between (±3) which means that there is no positive or negative skewness for the sample data; However the normality and randomization tests are distributed normally and randomly which means that all members of the sample are even in all variables.

Table: 4

Significance of differences between the actual nutrient intake for Down syndrome running players aged between 15:18 years old and daily standard requirements

Variable	Unit	Actual intake			Standard required	Difference	t	P-(value)
		$\bar{X}$	S	%				
Energy	K/cal	2193.25	313.39	**52%**	4182.461	1989.21	**-21.99***	0.00
Protein	Gram	87.58	17.70	**42%**	209.12	121.54	**-23.79***	0.00
Fats	Gram	86.51	23.78	**62%**	139.42	52.90	**-7.71***	0.00
Carbs	Gram	266.09	40.68	**51%**	522.81	256.72	**-21.86***	0.00
Potassium	Gram	2244.56	393.35	**48%**	4700	2455.44	**-21.62***	0.00
Calcium	Gram	679.87	246.72	**52%**	1300	620.13	**-8.71***	0.00
Phosphorus	Gram	1185.46	187.29	**95%**	1250	64.54	**-1.19**	0.26
Iron	Gram	16.31	3.19	**148%**	11	5.31	**5.78***	0.00
Zinc	Gram	12.97	3.97	**118%**	11	1.97	**1.72**	0.11
Vitamin A	Gram	1823.55	2350.35	**203%**	900	923.55	**1.36**	0.20
Thiamin	Gram	0.89	0.15	**74%**	1.2	0.31	**-7.15***	0.00
Riboflavin	Gram	1.37	0.63	**105%**	1.3	0.07	**0.40**	0.70
Vitamin C	Gram	124.56	53.57	**166%**	75	49.56	**3.21***	0.01

Significance at (p) ≤ (0.05)

This table shows that there are statistical significant differences between most of actual results taken from the actual nutrient intake and daily standard requirements RDA, for running players aged between 15:18 years old with Down Syndrome and there are no statistically significant differences in (**Phosphorus, Zinc, Vitamin A and Riboflavin)**

Table: 5

Significance of differences between the actual nutrient intake for Down syndrome throwing players aged between 19:20 years old and daily standard requirements

Variable	Unit	Actual intake			Standard required	Difference	t	P-(value)
		$\bar{X}$	S	%				
Energy	K/cal	2046.71	584.99	**58%**	3534.93	1488.22	**-10.49***	0.00
Protein	Gram	92.03	31.87	**44%**	209.12	117.10	**-15.15***	0.00
Fats	Gram	71.73	21.25	**51%**	139.42	67.68	**-13.13***	0.00
Carbs	Gram	258.25	125.42	**49%**	522.81	264.55	**-8.70***	0.00
Potassium	Gram	1974.87	580.21	**42%**	4700	2725.13	**-19.37***	0.00
Calcium	Gram	709.90	371.14	**55%**	1300	590.10	**-6.56***	0.00
Phosphorus	Gram	1077.65	330.95	**86%**	1250	172.35	**-2.15***	0.05
Iron	Gram	88.44	64.63	**804%**	11	77.44	**4.94***	0.00
Zinc	Gram	11.79	3.52	**107%**	11	0.79	**0.92**	0.37
Vitamin A	Gram	962.15	988.11	**107%**	900	62.15	**0.26**	0.80
Thiamin	Gram	0.81	0.37	**68%**	1.2	0.39	**-4.29***	0.00
Riboflavin	Gram	1.11	0.43	**85%**	1.3	0.19	**-1.85**	0.08
Vitamin C	Gram	104.50	85.07	**139%**	75	29.50	**1.43**	0.17

Significance at (p) ≤ (0.05)

This table shows that there are statistical significant differences between most of actual results taken from the actual nutrient intake and daily standard requirements RDA, for throwing players aged between 19:20 years old with Down Syndrome, and there are no statistically significant differences in **(Zinc, Vitamin A, Riboflavin and Vitamin C).**

Interpretation of the results:

To answer the first question "Is there statistical relationship between actual energy intake and recommended dietary allowance of athletics players with Down syndrome?"

The researcher applied a memorable questionnaire for the last 24 hours intake over 1 week on the research sample (n:29) using mean, standard deviation, and skewness, to find the significant differences between actual intake and recommended dietary allowance.

The tables (2) (3) showing that the skewness for the sample is ($\pm$3) which means there is no positive or negative skewness, and the values of the randomization and normality tests are distributed normally and randomly signaling to sample equality in all variables.
As the p- value is$\leq$0.05

Table (4) revealing that there is statistical significant differences between actual nutrient intake and the recommended dietary allowance for the running players aged between 15:18 as the percentage of the daily acquired calories was 52%, and it was 62%, 51%, 48%, 52%, 148%, 74%, &166% of the basic nutrient elements; the electrolytes, &vitamins (protein, fats, carbohydrates, potassium, calcium, iron, thiamin, &vitamin C) simultaneously. It also shows that there are no significant differences in phosphorus, zinc, vitamin A, &riboflavin, as the calculated t was higher than the scheduled t.

The percentages showed that there is a noticeable rising in the consumption of the electrolytes and the vitamins specially the phosphorus, iron, zinc, Vitamin A, Riboflavin, &vitamin C.

Table (5) is showing that there is statistical significant differences between actual nutrient intake and recommended daily allowance for the throwing players aged between 19:20 as the percentage of the daily acquired calories was 58%, and it was 44%, 51%, 49%, 42%, 55%, 86%, &804%, 68% of the basic nutrient elements; the electrolytes, &vitamins (protein, fats, carbohydrates, potassium, calcium, phosphorus, iron, &thiamin) simultaneously . It also shows that there are no significant differences in zinc, vitamin A, riboflavin, &vitamin C, as the calculated t was higher than the scheduled t.

The percentages showed that there is a noticeable rising in the consumption of the electrolytes and the vitamins specially the phosphorus, iron, zinc, Vitamin A, &vitamin C. As the p- value is$\leq$0.05

Calories:

The caloric percentage values are low for the two groups 52%, 58% as the consumption in the running players male gendered group aged 15:18 years old (52%), the group of throwing players male gendered group aged 19:20 years old (58%).

The researcher notices that there is a great reduction in the consumption of the caloric intake; and these values doesn't fulfill their recommended daily nutritional needs , and this means that there is no

comparison between the caloric intake for the Down syndrome people and the normal people, due to the differences in the physical shape compared with the others, So, the researcher Suggests to build standard Anthropometric measurement reference specified for this community so it makes it easier to extract their nutritional needs according to their physical nature.

And the study of (Hassan, et la…2022),& (Zein eldeen,2019) as the targeted sample has got 80% of their caloric needs,& there was statistically significant differences between the calories and the daily meals nutritional value to the daily needs according to normal standards.

The basic nutrient elements

Protein:-

The protein percentage values are low for the two groups 42%, 44%; the consumption in the running players male gendered group aged 15:18 years old is (42%), and the group of throwing players male gendered group aged 19:20 years old is (44%).

Fats:-

The fats percentage values are low for the two groups 62%, 51% ; the consumption in the running players male gendered group aged 15:18 years old is (62%), and the group of throwing players male gendered group aged 19:20 years old is (51%).

Carbohydrates:-

The carbohydrates percentage values are low for the two groups 51%, 49%; the consumption in the running players male gendered group aged 15:18 years old is (51%), the group of throwing players male gendered group aged 19:20 years old is (49%).

The researcher notices that there is a great reduction in the consumption of the basic nutrient elements intake; it is compatible with the study of (Hassan, et la…2022) DS groups met less than 70%, 90% of carbohydrate and fat requirements, respectively. The deficiency was prevalent in DS children, & disagrees with the study of (Abdullah, ET la … 2013) as there was significant higher consumption of macronutrients especially from carbohydrates and fats by Down syndrome cases compared to normal controls.

The electrolytes:

Potassium:

The potassium percentage values are low for the two groups 48%, 42%; the consumption in the running players male gendered group aged 15:18 years old is (48%), and the group of throwing players male gendered group aged 19:20 years old is (42%).

Calcium:

The calcium percentage values are low for the two groups 52%, 55%; the consumption in the running players male gendered group aged 15:18 years old is (52%), and the group of throwing players male gendered group aged 19:20 years old is (55%).

Phosphorus:

The phosphorus percentage values are high for the two groups 95%, 86%; the consumption in the running players male gendered group aged 15:18 years old (95%), meanwhile the other group of throwing players male gendered group aged 19:20 years old (86%).

Iron:

The iron percentage values are very high for the two groups 148%, 804% ; the consumption in the running players male gendered group aged 15:18 years old (148%), and the group of throwing players male gendered group aged 19:20 years old (804%).

Zinc:

The zinc percentage values are high for the two groups 118%, 107%; the consumption in the running players male gendered group aged 15:18 years old is (118%),and the group of throwing players male gendered group aged 19:20 years old is (107%).

Vitamins:

Vitamin A:

The vitamin A percentage values are high for the two groups 203%, 107%; the consumption in the running players male gendered group aged 15:18 years old is (203%),and the group of throwing players male gendered group aged 19:20 years old is (107%).

Thiamin B1:

Thiamin B1 percentage values are low for the two groups 74%, 68% ; the consumption in the running players male gendered group aged 15:18 years old is (74%), and the group of throwing players male gendered group aged 19:20 years old is (68%).

Riboflavin B2:

The riboflavin B2 percentage values are high for the two groups 105%, 85% ;the consumption in the running players male gendered group aged 15:18 years old is (105%), meanwhile the other group of throwing players male gendered group aged 19:20 years old is (85%).

Vitamin C:

The vitamin A percentage values are high for the two groups 166%, 139%; the consumption in the running players male gendered group aged 15:18 years old is (166%), the group of throwing players male gendered group aged 19:20 years old is (139%).

The researcher notices that there is a great rising in the consumption of the electrolytes and the vitamins specially phosphorus, iron, zinc, Vitamin A, Riboflavin, &vitamin C; meanwhile there is a great reduction in the consumption of the Potassium and Calcium, and there is moderate consumption of the thiamin and this disagrees with (Shaheen, 2008, p63)as They have disturbances in the level of basic nutrient elements in the body, such as vitamins and The electrolytes, as they appear to have a deficiency in vitamin (B), especially (B1, B2), and a deficiency in both vitamin (A) and vitamin (C), as well as a deficiency in The electrolytes such as (iron and zinc), And an increase in (calcium), but it agrees with a deficiency in (potassium) and agrees with an increase in (phosphorus), and it agrees with (Khamis, Shaheen, 2005 , p335) the Chromosomal defects leading to a change in the genetic subject, or in the metabolic pathways for nutrients, and all of this affects the body's needs for these elements. and this agrees with the study of (Hassan, et la…2022) DS group met less than 20% and 60% of fiber and calcium requirements.

Table: 6

Statistical Description of Anthropometric measures for Down syndrome running players aged between 15:18 years old

Variable	Unit	$\bar{X}$	S	$\propto_3$	Normality		Randomization	
					Z	P (value)	Z	P (value)
Age	Year	15.75	1.14	1.47	**1.14***	0.15	**0.00***	1.00
Length	M	1.43	0.12	0.08	**0.39***	1.00	**0.00***	1.00
Weight	KG	47.50	10.57	-0.57	**0.35***	1.00	**0.91***	0.36
BMI	KG/M^2	22.89	3.64	-0.07	**0.69***	0.73	**-1.51***	0.13
TSF	Mm	10.33	3.87	0.43	**0.41***	1.00	**0.42***	0.68
AC	CM	25.92	3.55	-0.69	**0.64***	0.81	**0.00***	1.00
MAC	CM	22.67	3.26	-0.51	**0.49***	0.97	**-0.30***	0.76

Significance at (p) ≥ (0.05)

This table shows that skewness value for the sample is between (±3) which means that there is no positive or negative skewness for the sample data; However the normality and randomization tests are distributed normally and randomly which means that all members of the sample are even in all variables.

Table: 7

Statistical Description of Anthropometric measures Down syndrome throwing players aged between 19:20 years old

Variable	Unit	$\bar{X}$	S	$\propto_3$	Normality		Randomization	
					Z	P (value)	Z	P (value)
Age	Year	19.82	0.39	-1.87	**1.14***	0.15	**0.00***	1.00
Length	M	1.52	0.06	-0.47	**0.48***	0.97	**0.00***	1.00
Weight	KG	64.88	9.33	0.10	**0.63***	0.82	**0.52***	0.60
BMI	KG/M^2	28.04	4.61	0.22	**0.77***	0.60	**-0.49***	0.63
TSF	Mm	14.76	4.47	-0.35	**0.73***	0.66	**1.02***	0.31
AC	CM	30.18	2.86	-0.93	**0.62***	0.84	**1.52***	0.13
MAC	CM	25.54	1.86	-0.46	**0.46***	0.98	**0.00***	1.00

Significance at (p) ≥ (0.05)

This table shows that skewness value for the sample is between (±3) which means that there is no positive or negative skewness for the sample data; However the normality and randomization tests are distributed normally and randomly which means that all members of the sample are even in all variables.

Table: 8

Relationship between actual nutrient intake and Anthropometric measures of athletics players with Down syndrome running players aged between 15:18 years old

(N = 12)

Variable	Unit	Actual intake		Age		Height		Weight		BMI		TSF		Ac		MAC	
		$\overline{X}$	S	r	P- (value)	r	P- (value)	r	P- (value)	r	P- (value)	r	P- (value)	r	P- (value)	r	P- (value)
Energy	K/cal	**2193.25**	**313.39**	**-0.15**	0.65	**0.47**	0.13	**0.04**	0.91	**-0.43**	0.17	**-0.31**	0.32	**0.09**	0.79	**0.21**	0.52
Protein	Gram	87.58	17.70	**-0.06**	**0.90**	**0.55**	**0.07**	**0.19**	**0.56**	**-0.27**	**0.39**	**-0.35**	**0.26**	**0.24**	**0.45**	**0.40**	**0.20**
Fats	Gram	86.51	23.78	**-0.42**	**0.35**	**0.18**	**0.57**	**-0.08**	**0.80**	**-0.34**	**0.27**	**-0.08**	**0.81**	**-0.03**	**0.93**	**-0.00**	**0.99**
Carbs	Gram	266.09	40.68	**-0.07**	**0.88**	**0.42**	**0.17**	**0.10**	**0.76**	**-0.25**	**0.43**	**-0.35**	**0.27**	**0.10**	**0.77**	**0.23**	**0.46**
Potassium	Gram	2244. 6	393.35	**-0.58**	**0.18**	**0.67***	**0.02**	**0.62***	**0.03**	**0.21**	**0.51**	**-0.17**	**0.60**	**0.45**	**0.13**	**0.56**	**0.06**
Calcium	Gram	679.87	246.72	**-0.36**	**0.43**	**0.45**	**0.14**	**0.37**	**0.23**	**0.07**	**0.84**	**-0.04**	**0.91**	**0.43**	**0.16**	**0.48**	**0.11**
Phosphorus	Gram	1185.5	187.29	**-0.11**	**0.81**	**0.18**	**0.58**	**0.02**	**0.95**	**-0.14**	**0.67**	**-0.32**	**0.31**	**-0.07**	**0.84**	**0.05**	**0.88**
Iron	Gram	16.31	3.19	**0.17**	**0.71**	**0.15**	**0.65**	**0.11**	**0.75**	**0.04**	**0.90**	**-0.40**	**0.19**	**-0.04**	**0.90**	**0.11**	**0.74**
Zinc	Gram	12.97	3.97	**0.08**	**0.87**	**0.22**	**0.49**	**0.11**	**0.74**	**-0.06**	**0.86**	**-0.28**	**0.38**	**0.11**	**0.73**	**0.22**	**0.48**
Vitamin A	Gram	1823.6	2350.4	**-0.42**	**0.35**	**0.14**	**0.66**	**0.02**	**0.95**	**-0.09**	**0.79**	**-0.48**	**0.12**	**-0.17**	**0.60**	**-0.00**	**0.99**
Thiamin	Gram	0.89	0.15	**0.08**	**0.87**	**-0.13**	**0.69**	**-0.03**	**0.92**	**0.11**	**0.74**	**-0.16**	**0.62**	**-0.06**	**0.86**	**-0.00**	**0.99**
Riboflavin	Gram	1.37	0.63	**-0.47**	**0.28**	**0.19**	**0.55**	**0.11**	**0.74**	**-0.02**	**0.95**	**-0.41**	**0.19**	**-0.04**	**0.91**	**0.11**	**0.73**
Vitamin C	Gram	124.56	53.57	**-0.24**	**0.61**	**0.27**	**0.39**	**0.07**	**0.67**	**-0.21**	**0.50**	**-0.21**	**0.51**	**-0.08**	**0.81**	**-0.01**	**0.98**

***Significance at (p) ≤ (0.05)**

This table shows that there are no statistically significant relationships between the actual nutrient intake and the Anthropometric measures for running players aged between 15:18 years old with Down syndrome, and there are statistical significant differences in **(Potassium with Height and Weight)**

Table: 9
Relationship between actual nutrient intake and Anthropometric measures of athletics players with Down syndrome throwing players aged between 19:20 years old

(N = 17)

Variable	Unit	Actual intake		Age		Height		Weight		BMI		TSF		Ac		MAC	
		$\overline{X}$	S	r	P- (value)	r	P- (value)	r	P- (value)	r	P- (value)	r	P- (value)	r	P- (value)	r	P- (value)
Energy	K/cal	**2046.71**	**584.99**	**-0.08**	0.77	**0.44**	0.08	**0.10**	0.70	**-0.12**	0.96	**-0.02**	0.96	**0.12**	0.64	**0.20**	0.44
Protein	Gram	92.03	31.87	**-0.17**	**0.52**	**-0.05**	**0.86**	**0.29**	**0.25**	**0.29**	**0.26**	**0.13**	**0.61**	**0.30**	**0.24**	**0.37**	**0.15**
Fats	Gram	71.73	21.25	**-0.26**	**0.32**	**0.08**	**0.76**	**-0.01**	**0.98**	**-0.03**	**0.90**	**-0.08**	**0.81**	**-0.08**	**0.75**	**-0.07**	**0.78**
Carbs	Gram	258.25	125.42	**0.05**	**0.85**	**0.49***	**0.05**	**0.05**	**0.85**	**-0.20**	**0.45**	**-0.02**	**0.93**	**0.10**	**0.71**	**0.17**	**0.51**
Potassium	Gram	1974.87	580.21	**-0.27**	**0.30**	**0.27**	**0.30**	**0.01**	**0.97**	**-0.12**	**0.64**	**-0.01**	**0.96**	**-0.02**	**0.95**	**-0.02**	**0.95**
Calcium	Gram	709.90	371.14	**-0.07**	**0.79**	**0.04**	**0.88**	**0.05**	**0.86**	**0.02**	**0.94**	**-0.02**	**0.93**	**0.01**	**0.98**	**0.04**	**0.89**
Phosphorus	Gram	1077.65	330.95	**-0.20**	**0.44**	**0.25**	**0.33**	**0.11**	**0.65**	**-0.03**	**0.91**	**-0.03**	**0.90**	**0.05**	**0.85**	**0.09**	**0.72**
Iron	Gram	88.44	64.63	**-0.05**	**0.86**	**0.26**	**0.32**	**0.16**	**0.53**	**-0.00**	**0.99**	**0.17**	**0.51**	**0.05**	**0.85**	**-0.06**	**0.82**
Zinc	Gram	11.79	3.52	**-0.10**	**0.70**	**0.39**	**0.13**	**0.22**	**0.48**	**-0.12**	**0.64**	**0.08**	**0.75**	**0.13**	**0.61**	**0.14**	**0.58**
Vitamin A	Gram	962.15	988.11	**0.18**	**0.45**	**0.04**	**0.88**	**0.36**	**0.15**	**0.28**	**0.27**	**0.24**	**0.35**	**0.35**	**0.16**	**0.36**	**0.17**
Thiamin	Gram	0.81	0.37	**-0.22**	**0.48**	**0.40**	**0.11**	**-0.03**	**-0.09**	**-0.28**	**0.27**	**-0.10**	**0.68**	**-0.03**	**0.90**	**0.03**	**0.90**
Riboflavin	Gram	1.11	0.43	**0.12**	**0.64**	**0.05**	**0.85**	**0.20**	**0.45**	**0.14**	**0.61**	**0.12**	**0.65**	**0.16**	**0.53**	**0.16**	**0.55**
Vitamin C	Gram	104.50	85.07	**0.09**	**0.74**	**0.11**	**0.69**	**-0.21**	**0.91**	**-0.09**	**0.74**	**0.04**	**0.89**	**-0.13**	**0.61**	**-0.23**	**0.38**

***Significance at (p) ≤ (0.05)**

This table shows that there are no statistically significant relationships between the actual nutrient intake and the Anthropometric measures for throwing players aged between 19:20 years old with Down syndrome, and there are statistical significant differences in **(Carbohydrates with Height)**

Table: 10

Significance of differences between the Anthropometric measures for Down syndrome running players aged between 15:18 years old and the standard

(N = 12)

Variable	Unit	$\bar{X}$	S	%	Standard	Lower rang			Upper range		
						Difference	t	P- (value)	Difference	t	P- (value)
Height	M	1.43	0.12	%82	1.74	0.31	-8.56*	0.00	-	-	-
Weight	Kg	47.50	10.57	%78	61	13.5	-4.42*	0.00	-	-	-
BMI	Kg/M^2	22.89	3.64	%92	25 ≥20	2.89	2.76*	0.02	2.11	-2.01	0.07
TSF	MM	10.33	3.87	%60 - %90	12.5–7.5	2.83	2.54*	0.03	2.17	-1.94	0.08
AC	CM	25.92	3.55	%60 - %90	29.3–17.6	8.32	8.11*	0.00	3.38	-3.30*	0.01
AMC	CM	22.67	3.26	%90	25.3–15.2	7.47	7.95*	0.00	2.63	2.80*	0.02

***Significance at (p) ≤ (0.05)**

This table shows that there are statistical significant differences between most of the Anthropometric measures results and the standard in Lower rang , for running players aged between 15:18 years old with Down Syndrome, and there are no statistically significant differences in **(BMI and TSF)** in Upper range**.**

Table: 11

Significance of differences between the Anthropometric measures for Down syndrome throwing players aged between 19:20 years old and the standard

(N = 17)

Variable	Unit	$\bar{X}$	S	%	Standard	Lower rang			Upper range		
						Difference	t	P- (value)	Difference	t	P- (value)
Height	M	1.52	0.06	%86	1.77	0.25	-15.9*	0.00	-	-	-
Weight	Kg	64.88	9.33	%93	70	5.12	-2.26*	0.04	-	-	-
BMI	Kg/M^2	28.04	4.61	%112	25 ≥20	8.04	7.19*	0.00	3.04	2.72*	0.02
TSF	MM	14.76	4.47	%118	12.5–7.5	7.26	6.71*	0.00	2.26	2.09*	0.05
AC	CM	30.18	2.86	%103	29.3–17.6	12.58	18.16*	0.00	0.88	1.27	0.22
AMC	CM	25.54	1.86	%101	25.3–15.2	10.34	22.92*	0.00	0.24	0.53	0.60

***Significance at (p) ≤ (0.05)**

This table shows that there are statistical significant differences between most of the Anthropometric measures results and the standard in Lower rang , for throwing players aged between 19:20 years old with Down Syndrome, and there are no statistically significant differences in **(AC and AMC)** in Upper range**.**

To answer the 2nd question "Is there statistical relationship between dietary intake and anthropometric measures of athletics players with Down syndrome?"

The researcher applied a Anthropometric measures questionnaire on the research sample (n:29) using mean, standard deviation, skewness, and finding the significant differences between actual intake Anthropometric measures.

The tables (6) (7) showing that the skewness for the sample is ($\pm$3) which means there is no positive or negative skewness, and the values of the randomization and normality tests are distributed normally and randomly signaling to sample equality in all variables.
As the p- value is$\leq$0.05

Table (8) revealing that there is no statistical significant relation between actual nutrient intake and Anthropometric measures for the running players aged between 15:18 as the calculated r was higher than the scheduled r. It also shows that there is significant relation in potassium with Height and Weight.

The researcher believes that this indicates that sample receives the daily recommended percentage of potassium in their natural dietary pattern for both weight and height only, while they do not receive the daily recommendation from the rest of the nutritional components of their daily dietary pattern, which leads to the necessity of developing a nutrition program for achieving daily nutritional recommendations.

Table (9) revealing that there is no statistical significant relation between actual nutrient intake and Anthropometric measures for the throwing players aged between 19:20 as the calculated r was higher than the scheduled r. It also shows that there is significant relation in Carbohydrates with Height.

The researcher believes that this indicates that sample receives the daily recommended percentage of Carbohydrates in their natural dietary pattern for height only, while they do not receive the daily recommendation from the rest of the nutritional components of their daily dietary pattern, which leads to the necessity of developing a nutrition program for achieving daily nutritional recommendations.

As the p- value is$\leq$0.05

The researcher believes that there are clear differences between the actual Anthropometric measurements under study and the standard Anthropometric measurements as showing from tables (10) (11),

The average actual heights and weights of the research sample are less than the average ideal heights and weights for the same age group and the same gender for normal people.

The calculated body mass index (BMI) in the group of boys from 15: 18 years old were in the normal range, while group of boys from 19: 20 years old were suffered from first degree obesity,

The average of (TSF) for the group of boys from 15 to 18 years old Comes in the medium range, while group of boys From 19:20 years old fall in the highest range compared to the ideal,

The average of the arm circumference (AC) for the group of boys from 15: 18 years old Comes in the medium range, while group of boys from 19: 20 years old fall in the highest range compared to the ideal,

The average of the arm muscle circumference (AMC) for the group of boys from 15: 18 years old fall in the medium range, while group of boys from 19: 20 years old fall in the highest range compared to the ideal,

The researcher sees that these differences between actual and standard body measurements are due to a genetic defect that causes a disturbance in the shape and composition of the body and general appearance from their siblings on the same age. This is consistent with (Khamis and Shaheen, 2005, p. 334) As the proportions of body components growth and development of people with Down Syndrome differ from their siblings, growth and development are less than the growth of a normal child, as (Shaheen 2008, p. 58) mentioned, weight and height are affected in children with Down Syndrome as their birth weights are lower than the normal rate, then it becomes more than normal as 87% of them develop an increase in the level of subcutaneous fat. As for height, they are below the normal rate, their final height reaches about (155) cm for males and about (145) cm for females, (Abdullah, 2016, p. 247) mentioned growth rates are abnormal as they suffer from a lack of growth (height/weight), or (weight/age). This agreed with the study of (Hassan, et al. 2022), where obesity was found among 85.7% of Down Syndrome, and agreed with the study of (Wernio, et al. 2022), where Obesity was recognized in 15% of the sample and 23% were overweight, and also agreed with the study (Dogan, et al., 2020), where 80% of the individuals included in the research have above normal body mass index, 65% are in the category of slightly fat and 15% are in the category of fat, and it agrees

with the study of (Abdullah, et al. 2013) that Short stature was reported significantly for the majority (87%) of Down syndrome individuals compared to normal controls. While 53% of them were either overweight or obese compared to 43% of controls with no significant difference.

The researcher believes that the presence of statistically significant differences in the Anthropometric measurements between the research sample and the standard, as shown in tables (10), (11), indicates that it is not possible to compare the Anthropometric measures for Down syndrome with the standard for normal people due to the presence of fundamental differences in the body composition for them depends on the difference in their genetic form, and therefore it is not possible to extract ideal nutritional recommendations for this sample because there are no standard Anthropometric measurements which are specified only for Down syndrome, Therefore, the researcher Suggests to build standard Anthropometric measurement reference for this community so it makes it easier to extract their nutritional needs according to their physical nature.

Conclusions and recommendations:-

First: conclusions

1. There is a great reduction in the consumption of the caloric intake compared with the RDA.
2. There is a great reduction in the consumption of the basic nutrient elements intake compared with the RDA.
3. There is a great rising in the consumption of the electrolytes and the vitamins specially the phosphorus, iron, zinc, Vitamin A, Riboflavin, &vitamin C compared with the RDA.
4. There is a great reduction in the consumption of the Potassium and Calcium compared with the RDA.
5. The sample receives the daily recommended percentage of potassium in their natural dietary pattern for both weight and height only.
6. The sample receives the daily recommended percentage of Carbohydrates in their natural dietary pattern for height only.
7. There are statistical significant differences in the Anthropometric measurements between the research sample and the standard.

Second: Recommendations:

1. Build standard Anthropometric measurement reference specified for this community according to their physical nature.
2. Build standard recommended dietary intake specified for this community according to their needs.
3. There is necessity of developing a nutrition program for achieving daily nutritional recommendations.
4. Conduct similar research to applied nutrition programs for Down syndrome.
5. Conduct similar research on applied nutrition programs for Down syndrome.
6. Holding training courses on nutrition for athletes with Down Syndrome for those who care and guide them.
7. Paying attention to nutrition for sports teams because nutrition is of utmost importance in improving physical performance.
8. The need to raise awareness of the importance of having a sports nutritionist, especially for athletes with Down syndrome.

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